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Bill Travis

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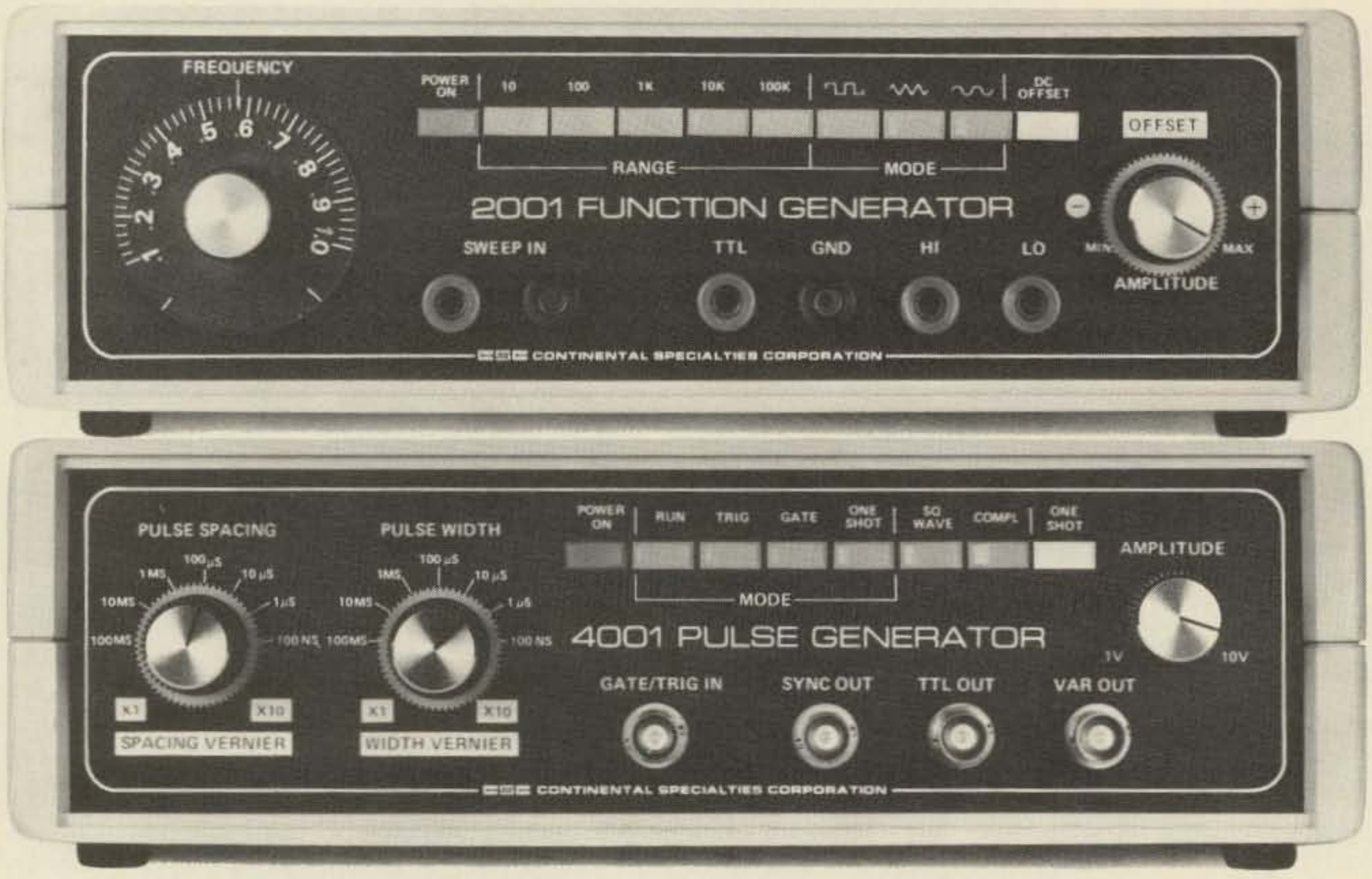

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3 KW VERSA TUNER IV's

[1] MFJ-984 3 KW VERSA TUNER IV

$299.95 ***EXCLUSIVE RF AMMETER insures maximum power to antenna at minimum SWR. Built-in dummy load.***

This is MFJ's best 3 KW Versa Tuner IV. The MFJ-984 Deluxe 3 KW Versa Tuner IV gives you a combination of quality, performance, and features that others can't touch at this price.

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A 200 watt 50 ohm dummy load lets you tune your exciter off air for peak performance. Efficient, encapsulated 4:1 ferrite balun.

[2] MFJ-981 3 KW VERSA TUNER IV

$199.95 ***Accurate meter gives SWR, forward and reflected power in 2 ranges: 2000 and 200 watts. 4:1 ferrite balun.***

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[3] MFJ-982 3 KW VERSA TUNER IV

$199.95 ***Antenna switch lets you select 1 coax thru tuner and 2 coax thru tuner or direct, or random wire and balanced line.***

The MFJ-982 3 KW Versa Tuner IV gives you a versatile 7 position antenna switch that lets you select 1 coax thru tuner and 2 coax thru tuner or direct, or random wire and balanced line. Encapsulated 4:1 balun.

If you already have a SWR/wattmeter, the MFJ-982 is for you.

[4] MFJ-980 3 KW VERSA TUNER IV

$169.95 ***Heavy duty encapsulated 4:1 ferrite balun for balanced lines.***

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1.5 KW VERSA TUNER III's

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$169.95 ***SWR, dual range forward and reflected power meter, 6 position antenna switch, encapsulated 4:1 ferrite balun.***

The MFJ-962 1.5 KW Versa Tuner III is an exceptional value.

An accurate meter gives SWR, forward and reflected power in 2 ranges (2000 and 200 watts).

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Black front panel has reverse lettering.

[6] MFJ-961 1.5 KW Versa Tuner III

$149.95 ***6 position antenna switch lets you select 2 coax lines thru tuner or direct, or random wire and balanced line.***

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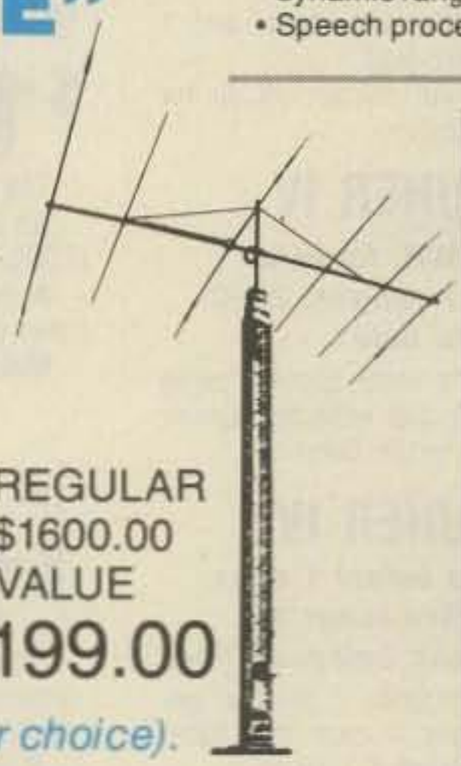

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Postmaster: Please send form 3579 to CQ Magazine, 14 Vanderventer Ave., Port Washington, L.I., N.Y. 11050.

AUGUST, 1979 VOL. 35, NO. 8

CQ

The Radio Amateur's Journal

FEATURES

DEPARTMENTS

Novice, QRP, 200 w, deluxe — good, better, best — $299, $369, $399, $699, $869, $899, $1069. TEN-TEC has them all. A choice of seven HF transceiver models — a choice of power levels — a choice of operating features (and accessories) for beginner or old timer. Best of all, there's a wide choice of prices to fit every amateur budget.

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TEN-TEC "ARGONAUT" TRANSCEIVER—QRP CHOICE. The challenge and excitement of working the world on 5 watts. And every feature you need: all solid-state; 5 bands (80-10 m); full amateur band coverage SSB/CW; sensitivity less than 0.5 μV; offset tuning; 4-pole IF crystal filter, 2.5 kHz bandwidth; analog dial; vernier tuning; automatic sideband selection; built-in speaker; 5-watt input to broadband push-pull final amplifier; PTT; full CW break-in; adjustable sidetone volume and pitch; built-in SWR bridge; TVI filter; plug-in boards; small and light weight enough to go anywhere (4½"h x 13"w x7"d and 6 lbs.). World beating price, too: Model 509 only $389: Model 210 AC Power Supply just $34.

TEN-TEC 540/544 TRANSCEIVERS—POWER CHOICE. 200 watts from the bottom of 80 m to the top of 10 m — SSB or CW. No compromise from the leader in solid-state HF technology. Instant band change without tune-up; sensitivity 0.3 μV; offset tuning; 8-pole crystal-lattice filter; WWV at 10 & 15 MHz; push-pull solid-state final amp.; 100% duty cycle; adjustable ALC with LED indicator; built-in SWR bridge; PTT; full CW break-in; adjustable sidetone pitch and vol.; zero-beat switch in Model 544. Choose the value leading Model 540 with analog dial and built-in 25 kHz pulsed calibrator for just $699 or the Model 544 with six 0.43" LED digital readouts for $869. Model 240 160M converter, $110; Model 262M AC Power Supply with VOX, $145; Model 252M AC supply only, $139.

TEN-TEC CW TRANSCEIVERS—BUDGET CHOICE. The "Century 21" series. Unique. Modern technology with old-fashioned value. Fine performance, reliability, and simplicity of operation, all at low cost. Win raves from novices and confirmed brass pounders alike. All solid-state; 5 bands (80-10 m) full amateur band coverage; receive CW and SSB, transmit CW; sensitivity 1 μV or less; offset tuning; 3-position selectivity (2.5 kHz, 1 kHz, 500 Hz); 70 w input to push-pull Class C final amp.; broadbanded for no tune-up or resonating; full break-in; adjustable side-tone level; built-in AC power supply. Choose Model 570 with analog dial for only $349. Model 574 has a 5 LED digital readouts for only $449.

The choice is all yours when you choose TEN-TEC HF transceivers; see your nearest dealer or write for full details.

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WIDEST CHOICE IN HF TRANSCEIVERS: TEN-TEC

Zero Bias

an editorial

This month we feature an article by Johann William Rush on amateur radio and The People's Temple. Although Mr. Rush is not an amateur he does chronicle the amateur radio activity between U.S. amateurs and Jonestown, Guyana. The Jonestown incident is still under investigation at this writing and articles still appear in newspapers bringing forth more information. Amateur radio did not foment the tragedy nor could amateurs have prevented it in the last analysis. We did *enable* the people involved with The People's Temple, the hierarchy, to plan and put into effect the taking of almost one thousand lives. Though no one could foresee the terrible climax to Jonestown and, in retrospect we can all point to certain aberrations which seem perfectly obvious now, we as amateurs enabled, the governments of the U.S. and Guyana enabled, and several noted politicians and well meaning citizens enabled the whole series of events to occur.

Being naive is not an exclusive characteristic of amateurs. People saw what they wanted to see and were motivated by external circumstances ready to be capitalized on. Religious zeal, political image, pandered guilt, Messianic fervor all have their advocates and followers. Altruists too have theirs. Even Guyana saw in The People's Temple commune a cheap source of labor in clearing the jungles to improve the food supply. All of us collectively chose to ignore the tell-tale signs and egregious nature of The People's Temple Project in Jonestown for a variety of reasons. So for a few of us, a quick cryptic phone patch is certainly worth a rare QSL card.

Larry Brockman's article on list operation last May continues to draw considerable mail. Most of the mail seems to favor Larry's article, but the exchanges have been hot and heavy. In fact, at the Dayton Hamvention I received first hand comments from readers on their views. Those who didn't like the article in no uncertain terms and those who could spell out specific gripes were offered the chance to do a rebuttal or counter-article. None of the "anti" people could be talked into doing an article in favor of lists or list operation. I'm sure there is another side to the coin and other views worth expressing but, and it's a *very big but*, from the letters I've seen so far most of the DXers commenting have been more emotional than factual. Pride and ego have been injured.

In the near future we will publish a synopsis of the comments we have received, both pro and con. We're waiting for the magazine to circulate through the rest of the world to include overseas comments.

We had hoped to publish the *CQ* WW DX Contest Phone Results this month, but it looks like September will be more likely. Each year the contest gets bigger and bigger and harder to score, let alone type-set. So bear with us for another month . . . it's worth waiting for. I know that this pushes it too close to this year's contest and that the All-Time Records will also be late but at this point we can't push it any faster.

Several years ago John Schultz, W4FA, wrote a series of articles in *CQ* entitled "The Shoebox Linear." This series of amplifiers proved to be extremely popular with our readers and many hundreds were built over the years. Well, John has done it again. He's updated everything and presents (in two parts) amateur linear amplifiers that are Easy, Economical and Enjoyable to build plus Entertaining to use. It's a four "E" project that'll fit most wallets.

Shop Talk

One of the interesting problems each month is the positioning of advertising within the pages of *CQ*. We try to give each advertiser a good position, assuredness that they will not face or be on the same page as a competitor. It is also important that the ad not be on an editorial page describing a device that negates the advertised product or service by building your own or theoretically stating the lack of need. Sound perplexing? Well, it is. To further complicate the matter, the editorial content of all amateur radio magazines is geared towards or aimed at doing it yourself. The content itself by its very nature is the antithesis of the advertising. I guess this is true of most "hobby" type magazines where the content explains how to do something yourself that the advertiser is trying to sell you. Doesn't make sense until you realize that most people like to read about projects, get their appetite whetted in a particular direction, then go out and buy the product or products that satisfy that appetite. By learning how things work, what it takes to build something or the theory involved makes us better consumers in the marketplace. Manufacturers in today's era of sophisticated and complex electronic hardware benefit from "how to" articles in that his customer is aware of the work, engineering, equipment and logistics involved to bring that product to the market. It's a soft sell for technology. After all, the average amateur knows more about the rig he buys than the car he drives, and both can cost thousands of dollars. He can buy his rig with more confidence than his car, since the manufacturer of amateur equipment as a result of this situation must produce a good product. When was the last time you heard of a mass recall of transceivers or antennas?

73, Alan, K2EEK

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3600A	$199.95	50Hz - 600MHz	Oven .5 PPM 17° - 37°C	10MV	10MV	50MV	8	.5 Inch	115 VAC or 8.2 - 14.5VDC	2⅛"H x 8"W x 5"D
3550W	$149.95	50Hz - 550MHz	TCXO 1 PPM 65° - 85°F	25MV	25MV	75MV	8	.5 Inch	115 VAC or 8.2 - 14.5VDC	2⅛"H x 8"W x 5"D
3550K	$ 99.95									

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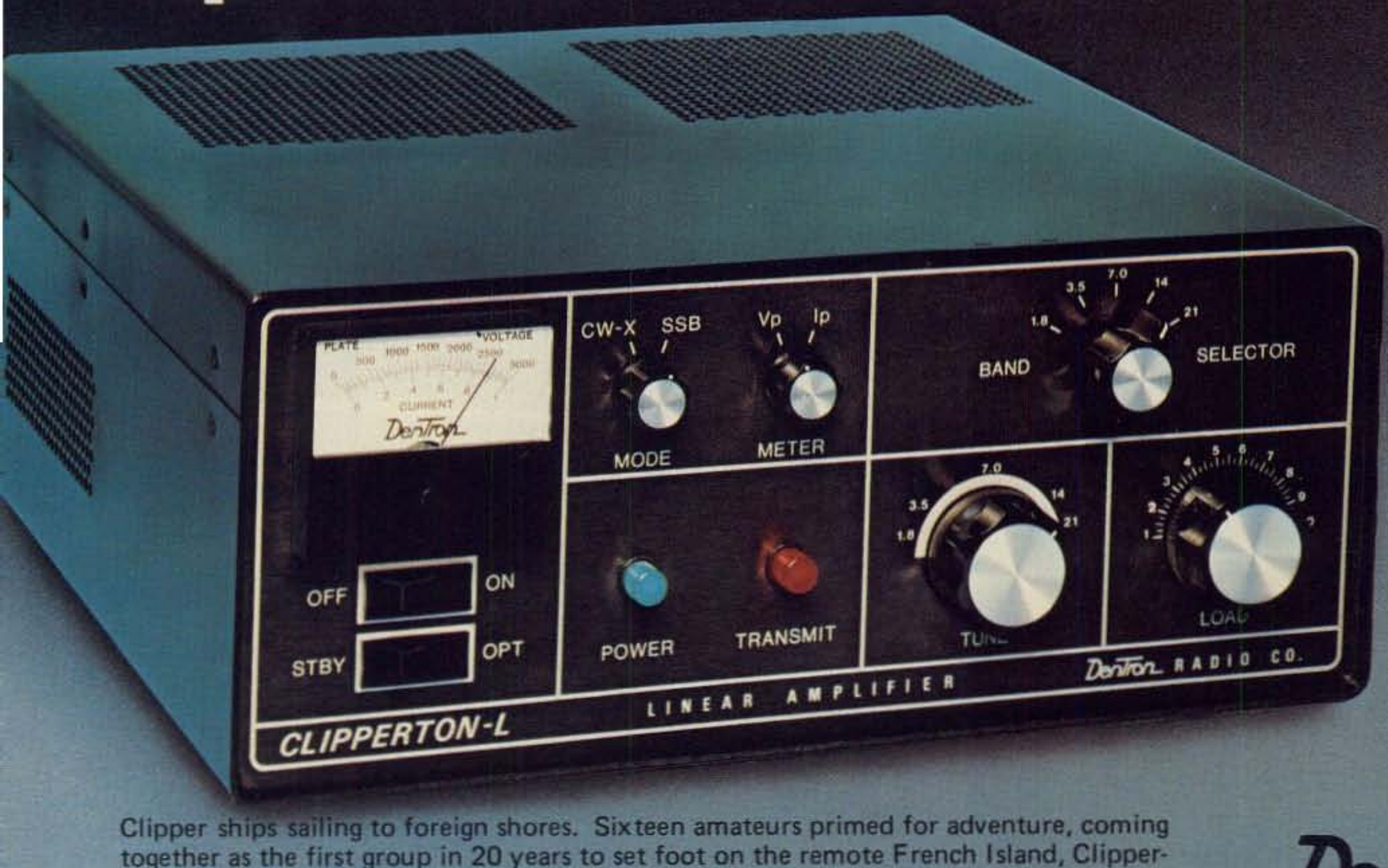

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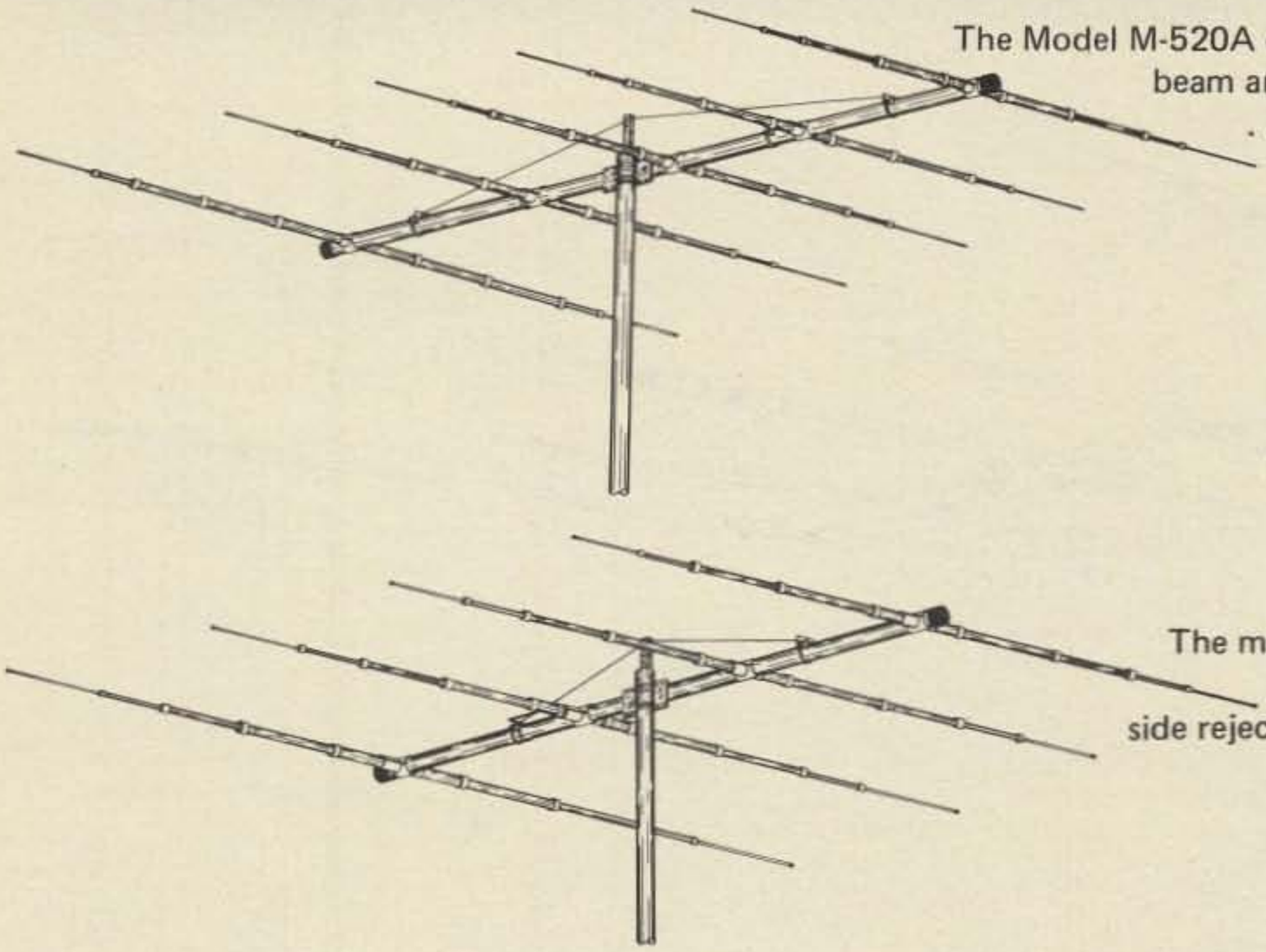
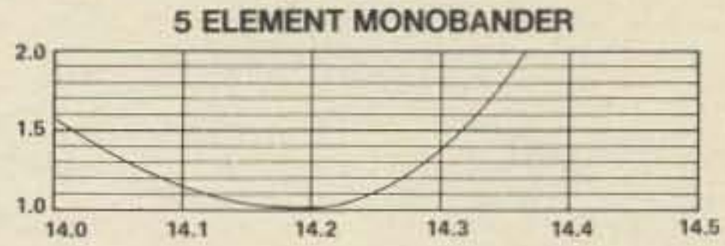


The Model M-520A offers the discriminating DXer an unexcelled beam antenna that really punches through the QRM . . . ask anyone who owns one! Features 5 full sized elements on a 2" O.D. x 34 ft. boom. Low SWR across the entire 20 meter band. The M-520A is shipped UPS in two cartons.

M-520A

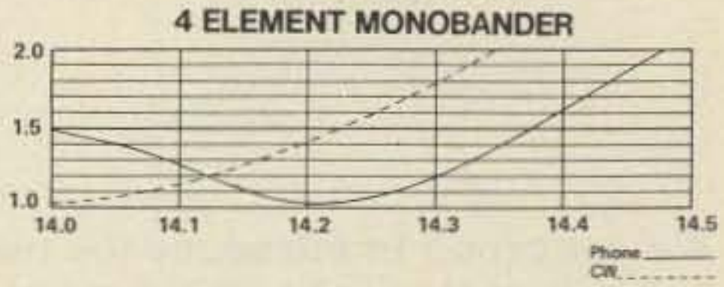
5 ELEMENT MONOBANDER



The magic 20 meter beam: M-420A . . . 4 elements on a 26 ft. boom. Super front-to-back and side rejection. The M-420A ships UPS in two cartons.

M-420A

4 ELEMENT MONOBANDER



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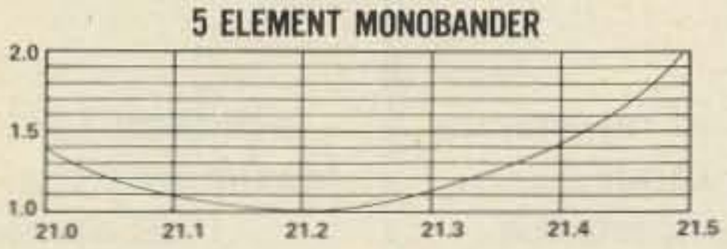
CW _ _ _ _ _ _ _

The M-155A is the top of the line 15 meter monobander. This is the one for the serious DXer. Top performance that will make you heard on 15! 5 elements wide spaced on a 25' 7" boom.

M-155A

5 ELEMENT MONOBANDER

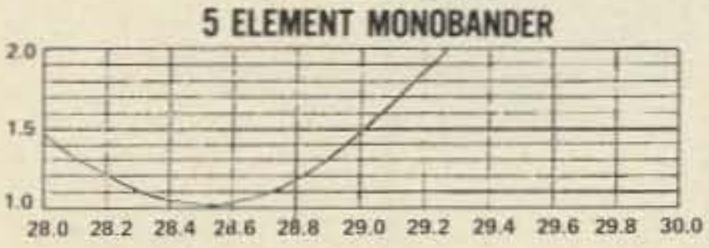


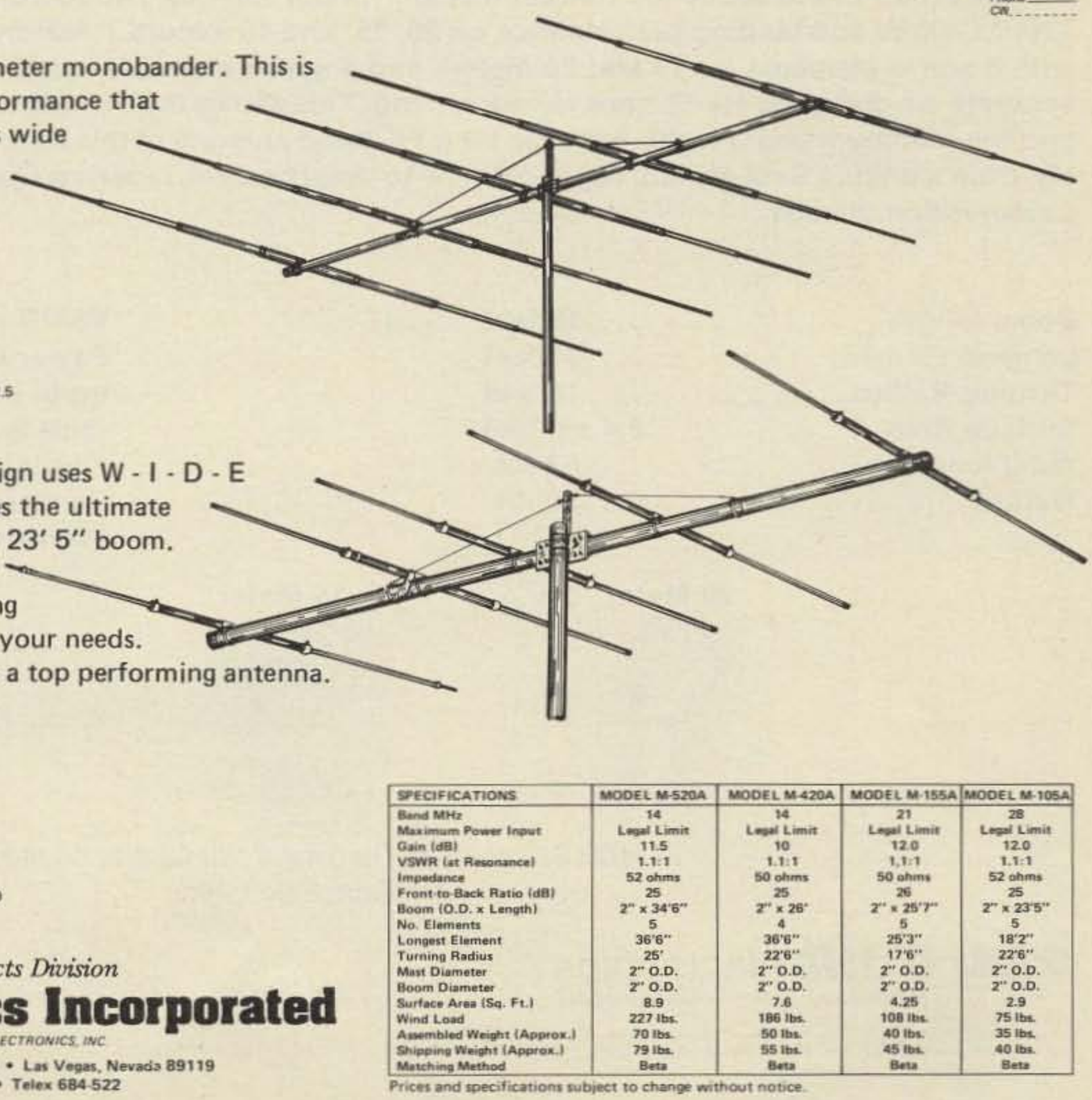
The M-105A — our latest 10 meter design uses W - I - D - E spacing. Well researched design provides the ultimate in a 10 meter antenna. 5 elements on a 23' 5" boom.

With the 10 meter band making a strong comeback, choose our model to fulfill your needs. Five wide spaced elements will provide a top performing antenna.

M-105A

5 ELEMENT MONOBANDER





SPECIFICATIONS	MODEL M-520A	MODEL M-420A	MODEL M-155A	MODEL M-105A
Band MHz	14	14	21	28
Maximum Power Input	Legal Limit	Legal Limit	Legal Limit	Legal Limit
Gain (dB)	11.5	10	12.0	12.0
VSWR (at Resonance)	1.1:1	1.1:1	1.1:1	1.1:1
Impedance	52 ohms	50 ohms	50 ohms	52 ohms
Front-to-Back Ratio (dB)	25	25	26	25
Boom (O.D. x Length)	2" x 34'6"	2" x 26'	2" x 25'7"	2" x 23'5"
No. Elements	5	4	5	5
Longest Element	36'6"	36'6"	25'3"	18'2"
Turning Radius	25'	22'6"	17'6"	22'6"
Mast Diameter	2" O.D.	2" O.D.	2" O.D.	2" O.D.
Boom Diameter	2" O.D.	2" O.D.	2" O.D.	2" O.D.
Surface Area (Sq. Ft.)	8.9	7.6	4.25	2.9
Wind Load	227 lbs.	186 lbs.	108 lbs.	75 lbs.
Assembled Weight (Approx.)	70 lbs.	50 lbs.	40 lbs.	35 lbs.
Shipping Weight (Approx.)	79 lbs.	55 lbs.	45 lbs.	40 lbs.
Matching Method	Beta	Beta	Beta	Beta

Prices and specifications subject to change without notice.

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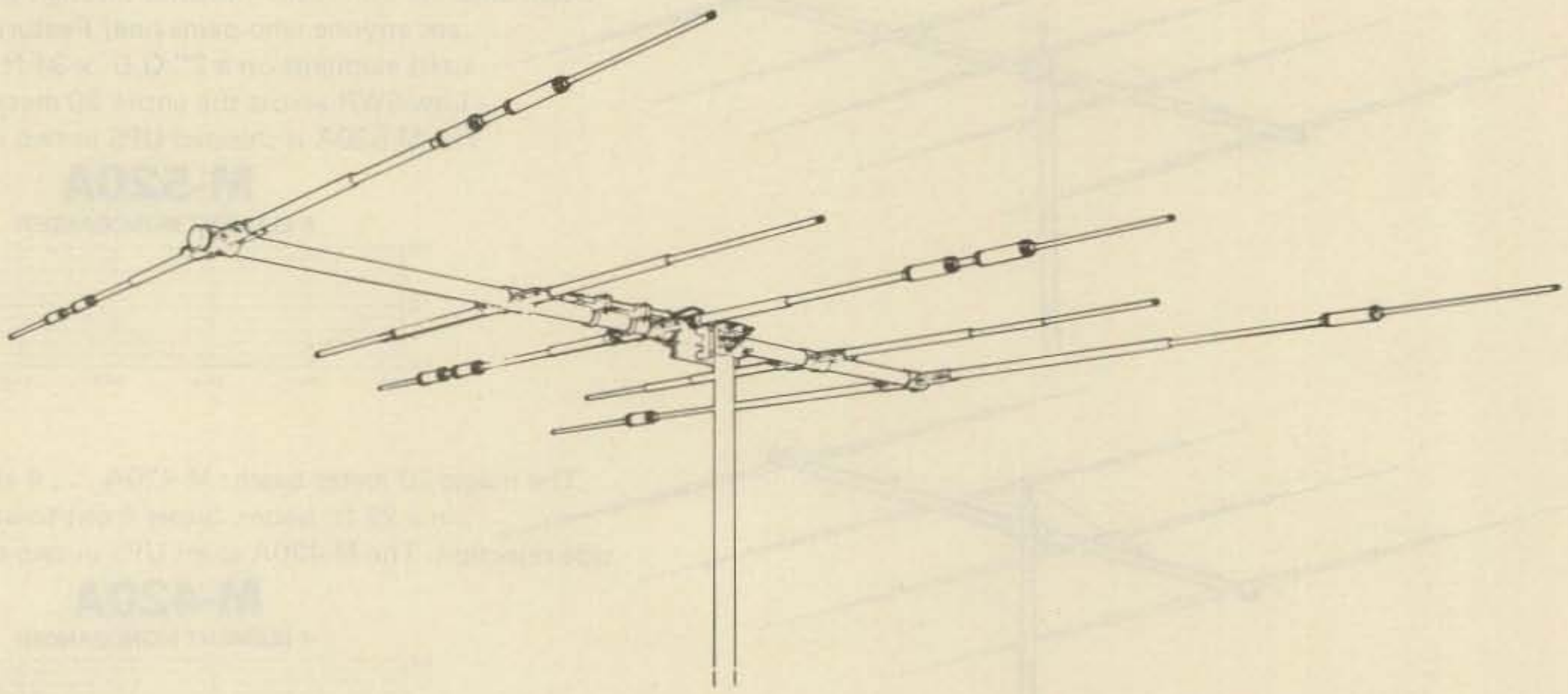
CIRCLE 56 ON READER SERVICE CARD

hy-gain®

TH5DX
10-15-20 METERS

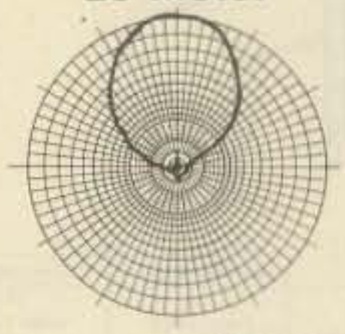


We are proud to introduce the newest member of our famous Thunderbird line of Tri-Band antennas. The TH5DX offers outstanding performance on 20, 15, and 10 meters. It features 5 elements on an 18 foot boom, with 3 active elements on 15 and 20 meters and 4 active elements on 10 meters. The TH5DX also features separate air-dielectric Hy-Q traps for each band. This allows the TH5DX to be set for the maximum F/B ratio and the minimum beam width possible for a Tri-Band antenna of this size. Also standard on this antenna are Hy-Gain's unique Beta-match, rugged Boom-to-mast bracket, taper-swaged elements and improved element compression clamps.

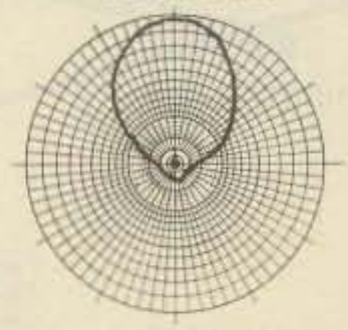
Boom length	18 feet
Longest Element	31 feet
Turning Radius	18 feet
Surface Area	6.4 sq. feet
Wind load	164 lbs.
Weight	50 lbs.

VSWR at resonance	less than 1.5:1
Power Input	Maximum Legal
Input Impedance	50 ohms
-3dB Beamwidth	66° average
Lightning Protection	DC ground
Forward Gain	8.5 dB
Front-to-Back Ratio	25 dB

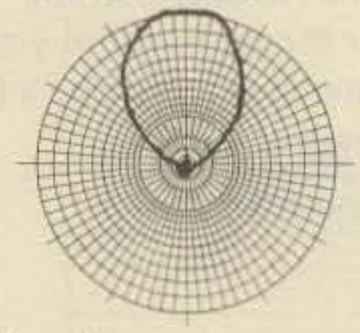
20 Meter



15 Meter



10 Meter



NOTE: These are original Polar Charts on file at Hy-Gain Electronics

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NRI's bite-size lessons and carefully matched practical experiments combine theory and bench work to give you the most effective training for your money. No need to quit your job or take night classes.

NRI guarantees FCC license.

The law requires that technicians hold an FCC Radiotelephone License to work on broadcast equipment. NRI training in Complete Communications Electronics or our CB Radio Specialist course is carefully designed to give you the special coaching so helpful in passing FCC license exams. If you fail to pass the FCC examination for radiotelephone license after graduating, *NRI will refund your tuition in full.* The money-back agreement is valid for six months after completion of your course.

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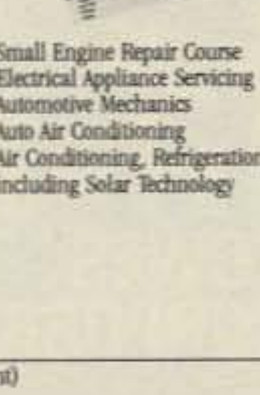

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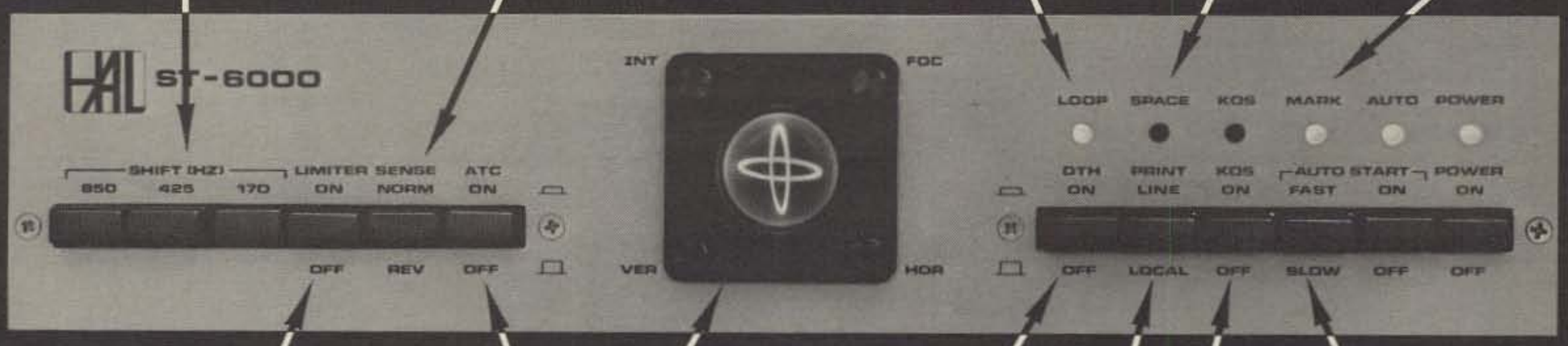
Loop 1 Post-Autostart Pre-Autostart



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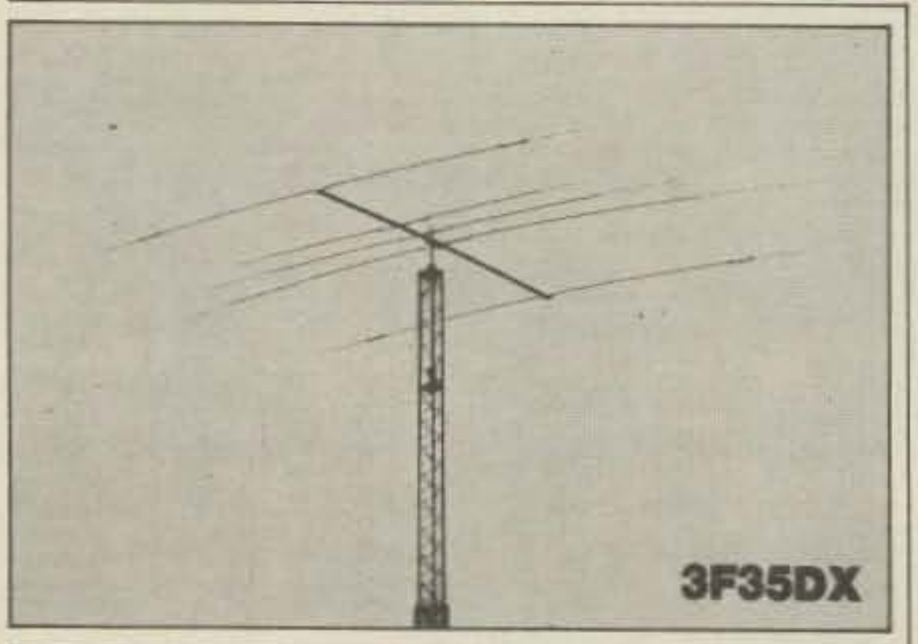
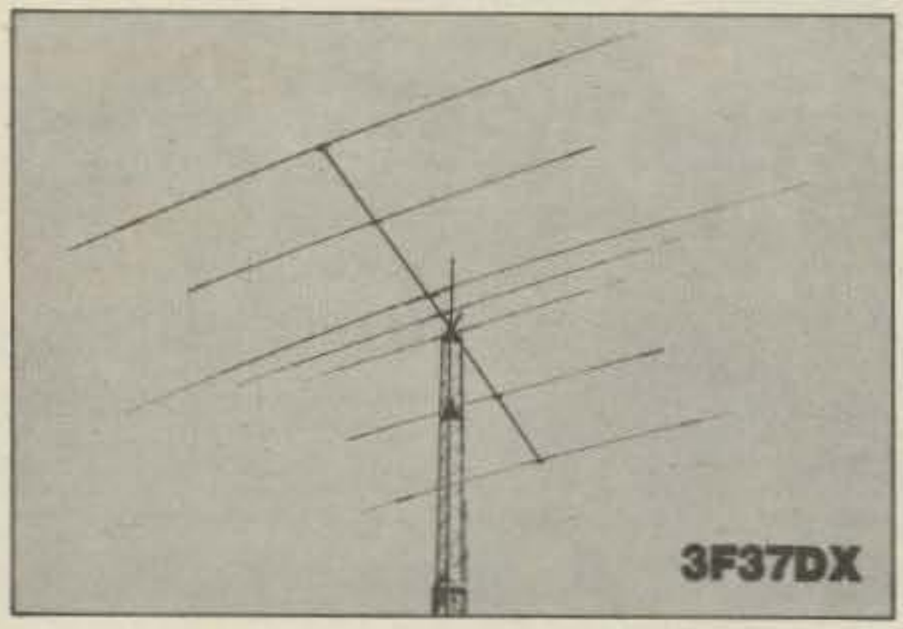
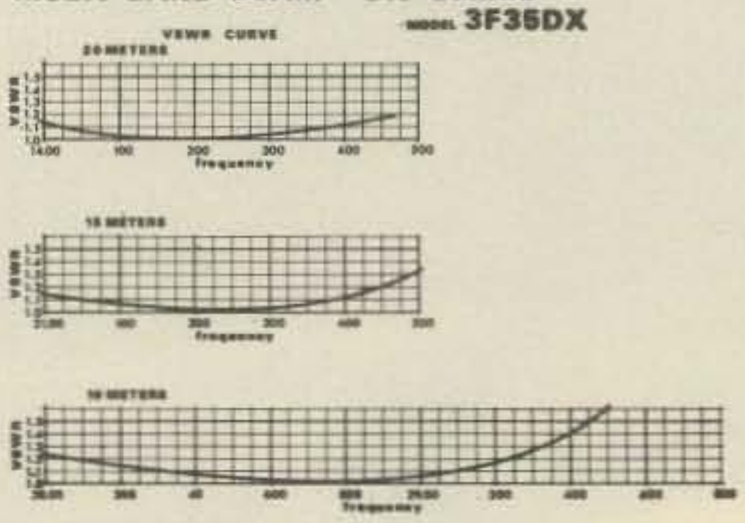
These beams employ hybrid system which is a combination of separated full-size driven element for each band individually and Hi-Q trap parastic elements. These feature result high radiation efficiency, high power rating and excellent VSWR in entire band width.


3F35DX

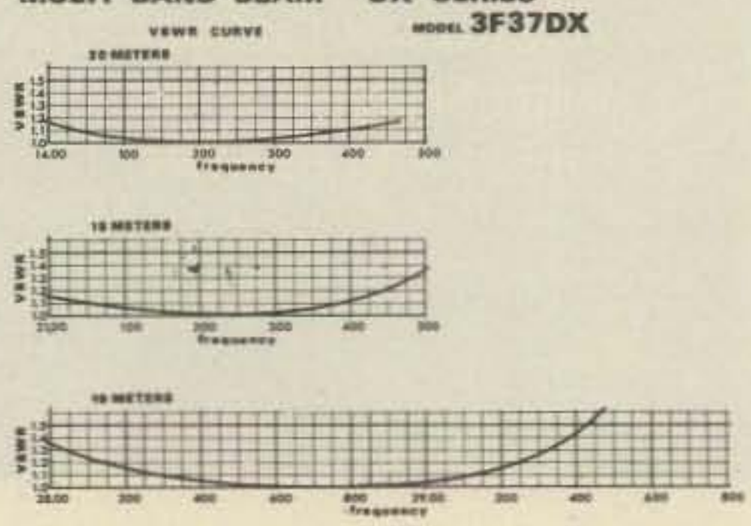

3F37DX

MODEL		3F37DX	3F35DX
BAND		14 21 28	14 21 28
ELEMENTS		7	5
ELEMENTS PER BAND	20m	3	3
	15m	5	3
	10m	5	3
ANTENNA GAIN	20m	8.5dB	8.0dB
	15m	10dB	8.5dB
	10m	10dB	8.0dB
FRONT BACK RATIO		25dB	20-25dB
MAX. POWER INPUT		3kw	3kw
VSWR		1.5 OR BETTER	1.5 OR BETTER
IMPEDANCE		50Ω	50Ω
MAX. ELEMENT L.		10.5m	10.5m
BOOM LENGTH		7.5m	5.0m
BOOM DIAMETER		50mm	50mm
TURNING RADIUS		5.3m	5.25m
WIND RATING		40m/sec.	40m/sec.
SUITABLE MAST		50mm	50mm
WEIGHT		23kg	17kg

MULTI BAND BEAM DX SERIES MODEL 3F35DX



MULTI BAND BEAM DX SERIES MODEL 3F37DX



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The VBC Model 3000 provides full audio level compression and expansion... complete intelligibility in only 1300 Hz bandwidth. It permits you to take full advantage of other stations' RF speech clippers and processors... similar to the amplitude compression and expansion used for many years in telephone and satellite communications.

The Model 3000 is for mobile and fixed station use and requires no modifications to your existing equipment. It is completely self contained, including its own audio amplifier. The unit automatically switches into transmit mode when microphone is keyed or voice operation is used. It connects just after the microphone on transmit and just prior to the speaker on receive. In addition to its basic function of operating in a narrow bandwidth, the Model 3000 also increases the performance of your station in the following ways:

- Reduces adjacent channel interference
- Increases signal to noise ratio
- Increases communications range

Some of its outstanding features include:

- High quality narrow band speech
- Self contained transmit/receive adapter
- Built in audio amplifier
- 5 active filters with a total of 52 poles
- Rugged dependable hybrid IC technology
- Low power consumption

Receive only features, such as sharp voice and CW filtering and amplitude expansion, provide improved reception without requiring a unit at the transmitting station.

For the more advanced experimenter the Model 3000 is available in a circuit board configuration for building into your present transceiver.

Henry Radio is ready to offer technical assistance and advice on the use and servicing of the Model 3000 and will help introduce new owners to others operating NBVM units. Get in on the ground floor... order yours now.

Price: VBC Model 3000 $349.00
Circuit board configuration $275.00

For more detailed information please call or write. The Model 3000 will be available from most Tempo dealers throughout the U.S. and abroad.

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Butler, Missouri 64730 816/679-3127

Henry Radio

Prices subject to change without notice.

CIRCLE 29 ON READER SERVICE CARD

Announcing

● **Jacksonville, FL** — The Jacksonville Hamfest Assn., sponsored by the Six Amateur Radio Clubs of the Greater Jacksonville Area, is pleased to announce the 1979 Jacksonville Hamfest and ARRL North Florida Section Convention to be held on August 4th and 5th, 1979, at the Jacksonville Beach Municipal Auditorium. Advanced registrations are available at $3 per person from R.J. Cutting, W2KGI/4, 303 10th St., Atlantic Beach, FL 32233. Price at the door will be $3.50. A large indoor swap area will be featured. Some of the other features are: meetings, such as traffic nets and MARS, a DX "pile-up" contest, antenna and technical seminars, and a hidden transmitter hunt. More general information may be obtained from JHA, 911 Rio St. Johns Dr., Jacksonville, FL 32211.

● **Mt. Sinai, NY** — The Radio Central Amateur Radio Club would like to present "Ham-Central" on Sunday, August 5, 1979, with a rain date of Sunday, August 12, at the Mt. Sinai Elementary School. Many great events are scheduled. Ham-Central opens at 7 a.m. for sellers, and 9 a.m. for others. Closes at 4 p.m. Sellers: $3.00 per tailgate space. Buyers: $1.50. Talk-in on K2VL/Rpt. 144.71/145.31, and 146.52 MHz, WA2UEC. For further info on Ham-Central, write or call for their flyer, containing full information to: Radio Central ARC, "Ham-Central", P.O. Box 680, Miller Place, L.I., N.Y. 11764, or call: Joan Longtin, (516) 924-8438, or Robin Goodman, (516) 744-6260.

● **Lexington, KY** — The Bluegrass Amateur Radio Club is sponsoring its Annual Central Kentucky Hamfest on August 12, 1979, at the Fasig-Tipton Sales Paddock, Newton Pike. The Hamfest program will include grand prizes, hourly, door prizes, manufacturer's exhibits, indoor/outdoor flea markets, guest speakers, and forums. For more info, contact: The Bluegrass Amateur Radio Club, Inc., Club Station K4KJQ, P.O. Box 4411, Lexington, KY 40504.

● **Perkiomenville, PA** — The Perkiomen Valley Amateur Radio Club would like to present its 3rd Annual Hamfest on August 26, 1979, at the Perkiomen Sales Grounds, from 9 a.m. to 3 p.m. Grounds open at 7 a.m. Admission will be $2.00, tables are an additional $2.00 each. Talk-in on 146.28/88 and .52 simplex. Plenty of free parking, refreshments, and lots of prizes will be featured. For more info, contact: Tom, WB3JEJ, RD no. 1, E. Greenville, PA 18041.

● **Muncie, IN** — The Delaware Amateur Radio Assoc., Inc., would like to announce its Second Annual Hamfest to be held on Saturday, August 11, 1979, at Springwater Park. There will be hourly drawings from 9 a.m. to 3 p.m., with the grand prize drawing at 3 p.m. Tickets are $1.50 in advance, $2.00 at the gate. Talk-in on 146.25-.85 and 146.52-.52. For more info, contact: DARA, P.O. Box 3021, Muncie, IN 47302.

● **Amarillo, TX** — The Panhandle ARC would like to announce its Sixth Annual Golden Spread Hamfest and Convention on August 12, 1979, at the Inn of Amarillo. Two full days of exhibits and trading, an ARRL forum, and numerous valuable door prizes are some of the scheduled activities. For more info, contact: Hamfest, P.O. Box 10221, Amarillo, TX 79106 or call Jay Ledbetter, WB5UBM, at (806) 376-6042 (nights and weekends) or Chuck Passmore, WB5BRC, at (806) 372-1631.

● **Oakland, NJ** — The 550 Amateur Radio Club and Oakland Repeater Inc., will hold its Annual Flea Market on August 18, 1979, at the American Legion Hall. Indoor tables are $5.00 and tailgating is $3.00. No admission fee for buyers. Talk-in on 147.49/146.49 WR2AHD or 146.52 simplex. Call: Bud Hauser, WA2JUO at (201) 797-8471 or 791-0589 for further information and advance reservations.

● **Allegan, MI** — The Black River Amateur Radio Club will sponsor the 26th Annual VHF Picnic and Swap-N-Shop on Sunday, August 5, 1979, at the Allegan County Park. Talk-in on 147.90/30 and 146.52 MHz. Great family event: Lake Michigan sandy beach, playground, and many door prizes. For more info, contact: Ed Alderman, WB8BNN, R.R. no. 2, Box 98 AA, Bangor, MI 49013, or call (616) 427-8830.

● **Little Rock, AR** — The Caren Club will hold its Second Annual Ham-A-Rama at the Arkansas State Fairgrounds on Saturday and Sunday, August 4th and 5th, 1979. For further info, contact: Morris H. Middleton, AD5M, 19 Elmherst Drive, Little Rock, AR 72209 or call (501) 568-0938.

● **Mansfield, PA** — The Tioga County (PA) ARC will hold its Third Annual Hamfest on August 25, 1979, from 9 a.m. to 5 p.m. Location: The Tioga County Fairgrounds, the same site as last year's Hamfest. Technical forums, ARRL News, FCC info, and a flea market will be some of the featured activities. Talk-in on WA3DPV/RPT 146.19/79, .52/52 and CB channel 5. For more info, contact: Wells Farr, WB3CUF, 101 Sherwood St., Mansfield, PA 16933 or Don Kimble, AE3Z, Box 109, 210 Maple St., Knoxville, PA 16928.

● **St. Charles, MO** — The St. Charles Amateur Radio Club, Inc., will be holding Hamfest '79 on August 26, 1979, at the Wentzville Community Club. Admission will be $1.00 per car. Flea market, prizes, and games for all are scheduled. Talk-in on 34/94 and 07/67. For more info, write: SCARC, P.O. Box 1429, St. Charles, MO 63301.

● **Concordia, KS** — The Kansas-Nebraska Radio Club will host its 28th Annual Hamfest with Flea Market and Distributor Displays at the Cloud County Community College on Saturday, August 11th and 12th, 1979. Registration starts at 11 p.m. on Saturday. There will be technical talks on Oscar, MARS, DX, antennas, computers and SSTV. There will also be a banquet on Saturday evening starting at 7 p.m. and on Sunday at noon a Hawaiian style Luau will be served. At 3 p.m. there will a big prize drawing will take place. For further information, write: W0UQD, Box 404, Beloit, KS 67420.

● **Willow Springs, IL** — The Hamfesters' Radio Club would like to announce its 45th Annual Picnic and Hamfest on Sunday, August 12, 1979, at Santa Fe Park. Famous swappers' row. Tickets at the gate will be $2.00, tickets in advance are $1.50. For Hamfest info and/or advance tickets, (send check or money order, SASE appreciated), to: Box 42792, Chicago, IL 60642.

● **Flagstaff, AZ** — The Amateur Radio Council of Arizona would like to present its Annual Ft. Tuthill Hamfest to be held on August 3rd, 4th, and 5th, 1979. Prizes include: (2) TS 520 transceiver, a microwave oven, a Wilson Mark II H.T., a Wilson System III, Triband antenna, and much more. A country style bar-b-q, tech sessions, exhibits, and prize drawings will be featured. For further details or information, write: Ft. Tuthill Hamfest, c/o 8520 E. Edward Avenue, Scottsdale, AZ 85253.

● **Petoskey, MI** — The Straits Area Radio Club of Petoskey would like to announce its Annual Swap'N Shop/Hamfest on August 18th and 19th, 1979. Bigger and better this year at a new location with a Saturday night banquet. Banquet tickets are limited to 200 sold in advance. Talk-in on 146.52 and CB channel 11. For full info and logging, send SASE to: Bill Moss, WA8AXF, 715 Harvey St., Petoskey, MI 49770 or call (616) 347-4734.

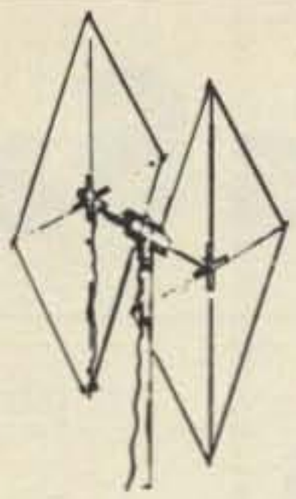
● **Marysville, OH** — The Union County ARC would like to present its Third Annual Hamfest on Sunday, August 26, 1979, at the Marysville Fairgrounds. Admission is $1.50 in advance, $2.00 at the door. Door prizes galore! For more info or dealer space, contact: Chuck Simpson, 19726 Del Co Line Rd., Marysville, OH 43040, or phone (614) 666-2721. Talk-in on 146.52 or 147.99/39.

● High school graduates who plan to enter college this fall and who are licensed amateurs may be eligible for one the the $250 scholarships offered by the Atlanta Radio Club. If you qualify, write to: ARC Scholarship Fund, P.O. Box 77171, Atlanta, GA 30357.

● All airline employees, who are amateurs, are invited to join the International Association of Airline Hams, IAAH. For full information on the organization, contact: Carl H. Crumley, N4VD, 512 N. Harrison Ave., Cary, NC 27511.

● For those of you who QSO'ed with the recent Belize expedition (see April, 1979 CQ, p. 74) and want QSL information, it has been supplied to us by W4SME.

If you worked	Send your QSL card to:
VP1PG	WB9TOU
G5BZW	WB9TOU
WB9TOU/TF3	WB9TOU
WB9UXR/TF3	WB9UXR
WB9ZBK/TF3	AF9K



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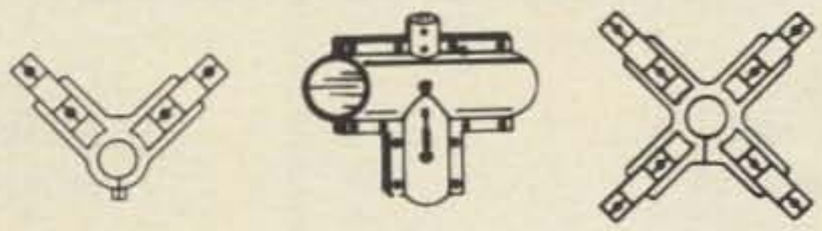

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	(1)	2" Boom to 1½" Mast T-Mount	$24.69
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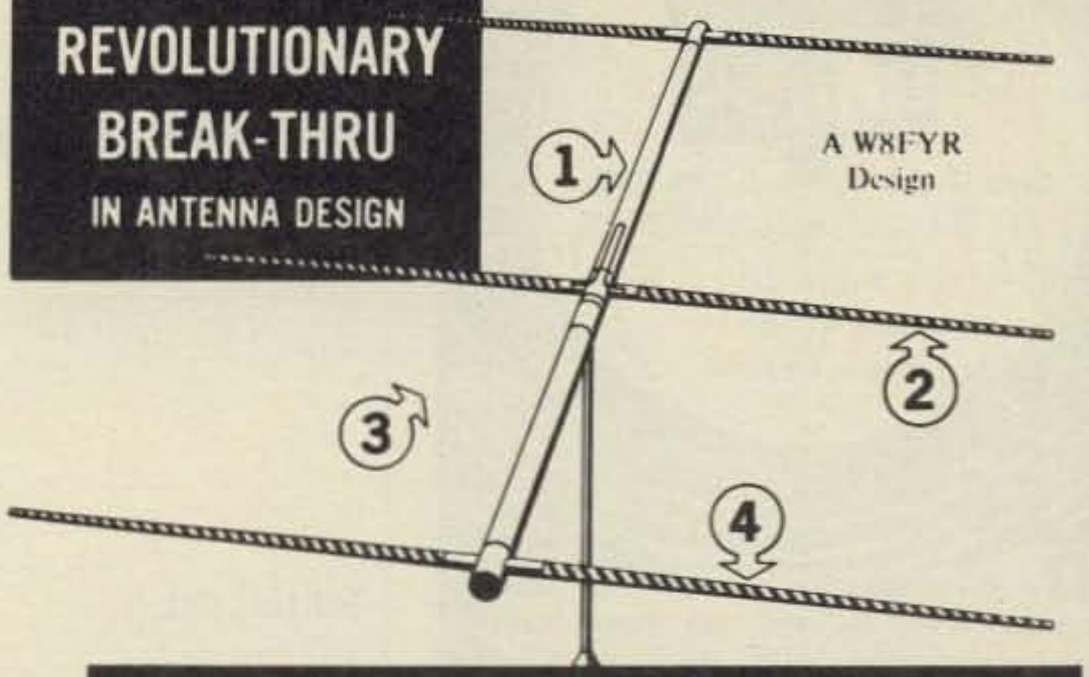

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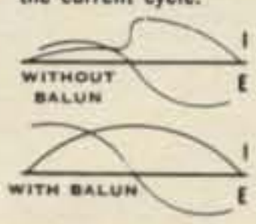

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CIRCLE 34 ON READER SERVICE CARD

Our Readers Say

Corrections

Editor, CQ:

In my article, "Mobile Autopatch Operation", in the April 1979 issue, I inadvertently neglected to include a mail order source indentification for the Mostek ICs. Circuit Specialists, 1344 N. Scottsdale Rd., Tempe, AZ 85281, will deliver the MK5085N for $10.00, the MK5086N for $7.85, the 3.589 MHz crystal for $2.00, if ordered with either of the Mostek chips, and the LM741 minidip for 36 cents. All prices are postage paid within the USA.

R.S. Isenson, N6UE
Santa Maria, CA

Editor, CQ:

There are some corrections to my article "A Solid-State 3.5/7 MHz V.F.O. For the Viking-5 Transmitter", which appeared in the April, 1979 issue.

Fig. 1, pg. 34, shows two parts values that are incorrect. R1 should be 47K ohms, not 4.7K. R3 should be 470 ohms, not 1K. The components list for the Viking-5 QRPp transmitter, fig. 1, list L4 as using a "T-40-2" toroid. It should read T-50-2" toroid core.

Adrian Weiss,
K8EEG/W0RSP
Vermillion, SD

A Second Look

Editor, CQ:

I would like to suggest that you reprint the article by Bill Orr, W6SAI, entitled "How To Pass A Multiple Choice Test When You Don't Know The Answers", which appeared in the April 1975 issue of CQ. It helped with a least 5 questions on my General Exam.

Bob Mershon, WD9BFK
Menlo Park, CA

Reprints of this article may be obtained by sending $1.50 plus a s.a.s.e. to: CQ Magazine, *14 Vanderventer Ave., Port Washington, NY 11050.* —*Ed.*

Nostalgia

Editor, CQ:

Now that we have alerted the younger element about the Arc Transmitters, let's have some more information pertaining to the Old Spark, and *especially the reserve impact transmitters that were used for emergency operations.*

As Mr. Rennaker noted, my first exam was also on the Arc transmitters. That was in 1928.

Some of the receivers in that era would also be interesting to hear about, especially when they were crystal and were outboarded with a 201, used by the more *advanced* operators of that time.

I think the younger generation would get a real kick out of our technical attempts, which I'm sure they would really wonder about!

As a small item, shine the copper, keep it clean and when you are hauling sulphur, especially when one had an inspector like one Krotiful! I imagine some of those older inspectors could have some very interesting tales to relate. Or one Grinnell.

Paul T. Kiefer,
Louisville, KY

—Nostaligic articles in CQ *are always popular and well received by our readers. Though not as old as ARC or SPARC, we have another vintage piece this month by Bill Orr on one of the old Hallicrafter gems of 1936. We are trying to chronicle our history bit-by-bit, and perhaps someday compile all of this material into a book.* —*Ed.*

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CIRCLE 57 ON READER SERVICE CARD

So, you think John J. Schultz limits his construction to small accessories, eh? To find out otherwise, build his multi-band linear amplifier. It's not that hard to do.

An Updated "Shoebox" Linear Amplifier

Part I

BY JOHN J. SCHULTZ*, W4FA

Two of the most popular articles, judging by reader inquiries, that the author wrote for *CQ* several years ago concerned "Shoebox" h.f. linear amplifier construction. These amplifiers emphasized simple construction in a plain, commercial metal utility enclosure that literally looked like a shoebox. The construction used was such that it could be accomplished using simple handtools and yet one would end up with a neat, functional unit.

This method of construction has recently been applied to two linear amplifiers using improved circuitry over that used in the original shoebox linears. One linear still uses sweep tubes and is particularly inexpensive for a linear in the 1-2 kW p.e.p. range. The other linear uses a modern Eimac 8875 tube which makes it a bit more expensive but brings with it all of the advantages of a linear using a single tube specifically designed for s.s.e. service. This article describes in detail (in two parts) the construction of these linears. Many other tube types can also be used since it is really the method of construction used rather than any specific linear amplifier circuit which makes the shoebox linear so appealing to tackle as a home-brew project.

One may debate the value of home-brewing a relatively large item such as a linear amplifier. Before one commits oneself to such a project, it is worthwhile to think over several factors. The cost of parts for a home-brew linear can be from ⅓ to ½ the price of an equivalent purchased linear. So, there is a definate initial cost savings. On the other hand, a purchased linear will have an established used price if one later decides to buy something else. There is no

*c/o CQ

NOTES:
1. L1 = 6 turns No. 18, ¾" dia., 1¼" long.
2. L2 = Ohmite 2-14 choke.
3. L3 = 120 turns No. 20, ¾" dia., 4½" long (teflon rod) or see text.
4. L4 = See Fig. 2.
5. Each 4½ turns No. 20 on 100Ω, 1w. resistor.

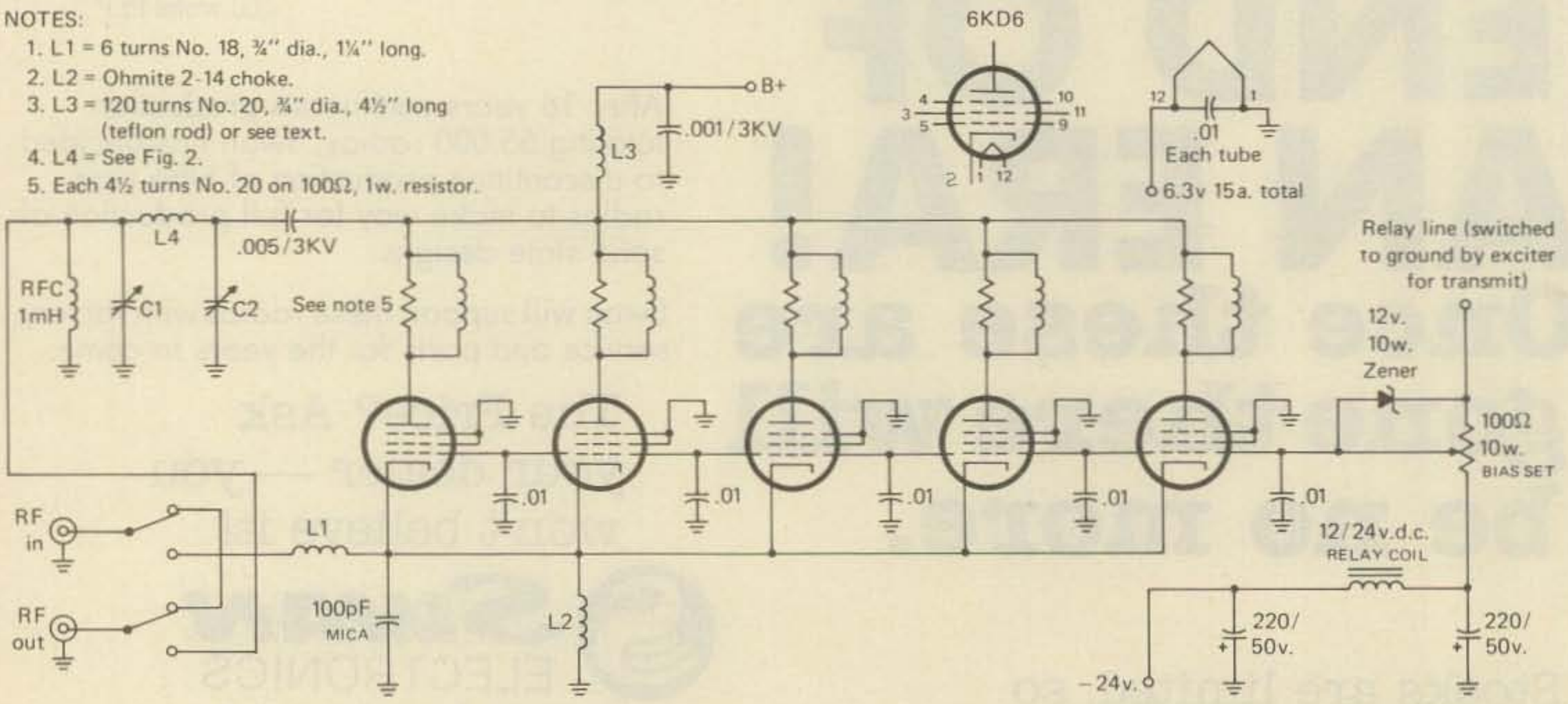


Fig. 1 - A kilowatt linear amplifier built around five 6KD6 sweep tubes

established price for a home-brewed linear but rarely has any amateur failed to sell a well built, home-brewed linear for much less than the parts cost.

Building a home-brew linear is not a one-weekend project. But, then again, one is not acting like an assembly robot in just putting a kit type linear together. If one regards every little assembly problem or material requirement that develops as a challenge rather than a frustration as one puts together a linear, it can be fun and a very satisfying experience. The latter is really the key, of course, to really enjoying the construction of any home-brew piece of equipment.

The sweep-tube linear first to be described in Part I uses five 6KD6 tubes. As built, the linear is a single-band affair but sufficient data is given to easily make it into a regular band-switched 80-10 or even 160-10 meter linear. It can also be readily adapted to any possibly new bands that might come out of WARC 1979. The 6KD6 tubes are used in the usual grounded-grid arrangement. About 100 watts p.e.p. drive is required and, if the tubes are cooled adequately, it can handle up to 2,000 watts p.e.p. input.

This is a pretty hefty input for a sweep-tube linear but, nonetheless, it can be done and the third-order distortion products will still be tolerable at about -25 dB or so. However, for longer tube life and cooler operation, a more conservative input of 1,000 to 1,200 watts p.e.p. is really recommended. The 6KD6 is one fo the heftier tubes designed for horizontal sweep amplifier operation in color TV's and uses the 12 pin compactron socket. The retail price of the tube tends to turn one off ($12), but with a little bit of shopping one can find the tubes for about $4 each (Edlie Electronics, 2700 Hempstead Turnpike, Levittown, N.Y., 11756 or Fordam Radio, 855 Conklin St., Farmingdale, N.Y. 11735). When purchasing the tubes, however, it must be emphasized that one wants tubes of all the same brand. If different brands of tubes are mixed, it is quite possible that the current drawn by the tubes will differ and some tubes will tend to overheat. Also, the distortion products produced will very likely rise.

The schematic of the 6KD6 linear is shown in fig. 1. The circuitry is straight-forward and conventional for a grounded-grid linear. L1 and the 100 pF capacitor in the input circuit form a single section filter to attenuate any harmonics from the exciter. If one knows that the exciter used already has good harmonic suppression, these components may be omitted. An operating bias of -12 volts is placed on the grids of the tubes and regulated by zener diode D1. During receive periods, the bias voltage rises to approximately -30 volts in order to cut-off the tubes so they do not generate any noise which could affect reception. Note that what appears to be a choke in the bias supply filter circuit is really the coil of the antenna change-over relay. Because the pull-in voltage of various relays can vary quite a bit, one should test the relay contemplated for use in the circuit before finally wiring it in.

Due to the relatively low plate impedance of the five tubes in parallel, the pi-network circuit used in the output requires relatively large values of capacitance. Fig. 2 is a detailed listing of the capacitors and coil inductances required on each band. The inductor can be easily made by using B&W Miniductor coil stock and fig. 2 gives some specific dimensions for such stock. Note that an 18μH roller inductor could be usded to cover 80-10 meters while the use of a 28μH roller inductor would allow 160-10 meter coverage. The capacitors are formed by using a variable capacitor with mica capacitors in parallel. The mica capacitors should be of the transmitting type with a voltage rating of at least 1500 volts. Alternatively, the Centralab 850 seies of ceramic capacitors can be used if one can find them at surplus prices since they run about $5/1000 pF at regular prices. A good source fo supply for suitable inductors or capacitors is G.R. Whitehouse Co., Newbury Drive, Amherst, N.H. 03031.

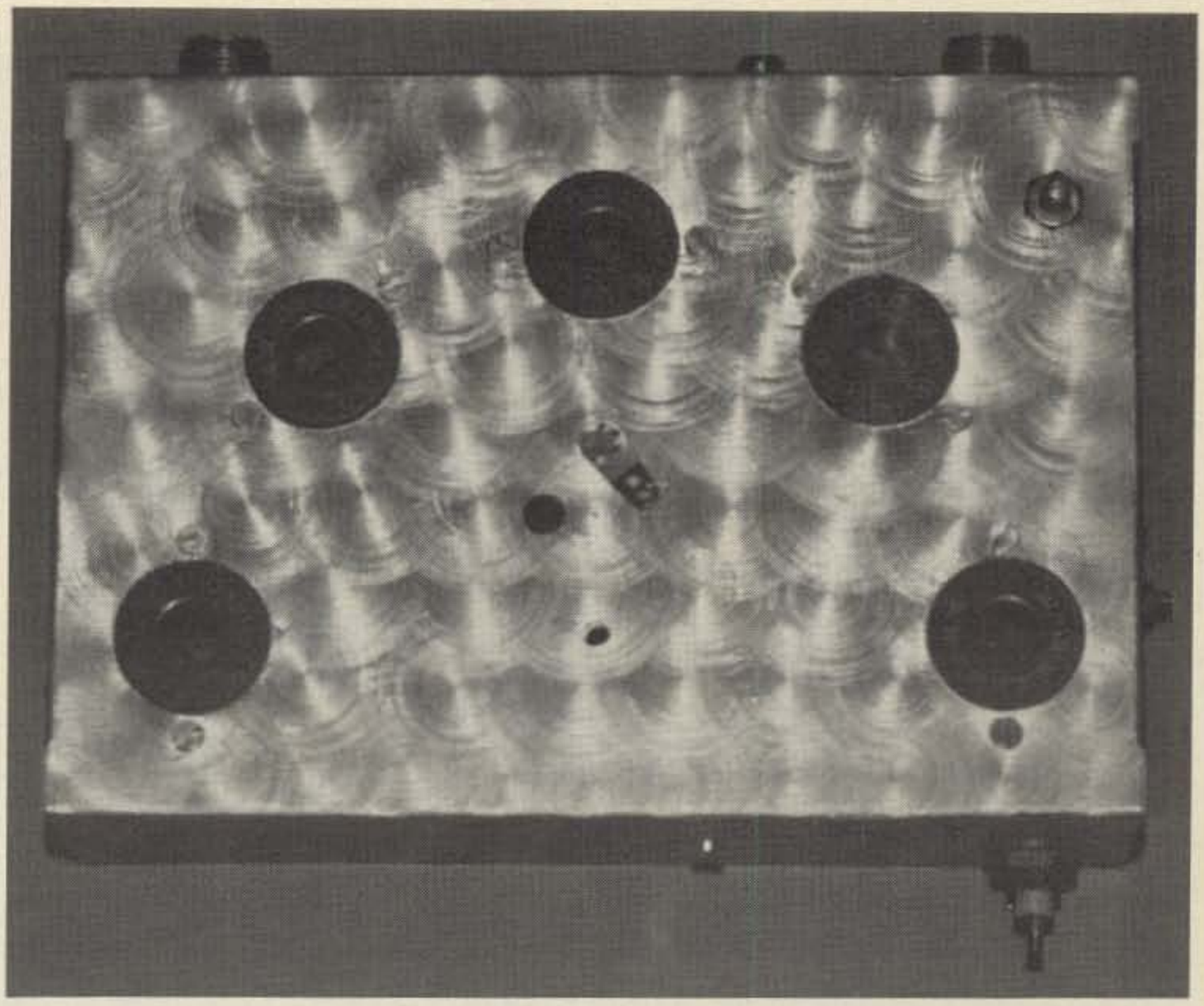


Photo 1 - This top view of the inner chassis shows the semicircular arrangement of the tube sockets. One can also see the feed-through for the pi-network output at the lower right and the coaxial connectors on the rear panel. The plate r.f. choke which is counted in the middle of the tube sockets has been removed.

Photo 1 shows the 5 x 7 x 2 inch chassis on which most of the components for the linear are mounted. This chasis should be fully completed first, of course. The chasis is then mounted in a 10x8x7 inch metal utility box (Bud CU-879) which houses the pi-network components. It is this procedure of first assembling most of the components on a small chassis and then placing the chassis in an utility enclosure that makes "Shoebox" construction so simple. The small chassis is easily worked on and wired up.

Only a few main components are mounted on the walls of the utility enclosure so it is also easily worked. Then the small chassis is mounted in the utility enclosure; a few last connections made and that's it!

The tube sockets are arranged in a semi-circular fashion on the small chassis. They should not be cramped together but rather arranged to utilize the full width and depth of the chassis so there is plenty of room for air circulation around the tubes. The plate r.f. choke is mounted in the

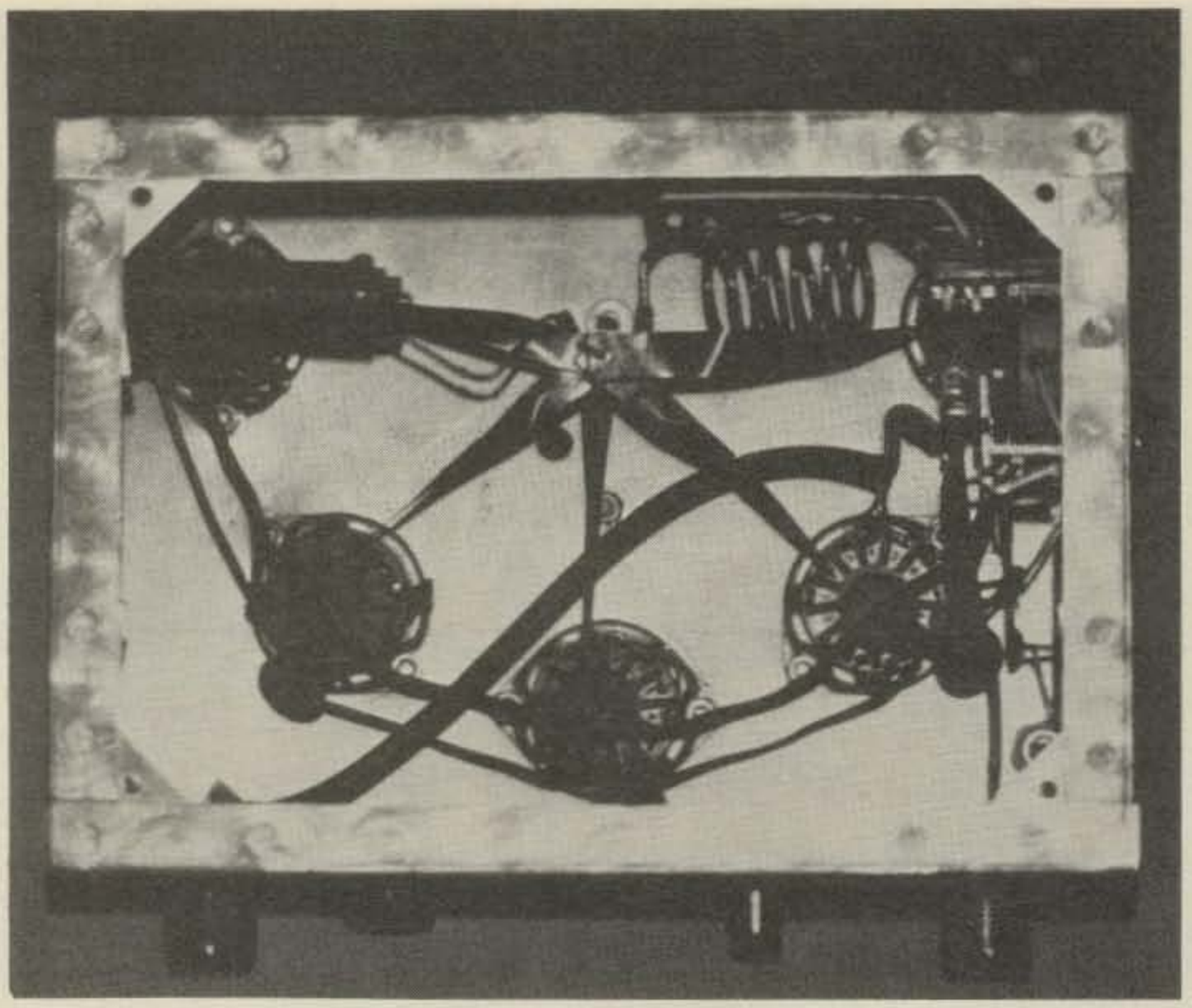


Photo 2 - Underside view of the chassis showing the cathode r.f. choke on the left and the coil for the input low-pass circuit on the right. The antenna relay is on the right wall of the chassis. The rear panel includes the r.f. in/out coaxial connectors, a feed-through for the power supply cable and a phono type connector for control of the relay.

center of the tube socket semi-circle. If one doesn't want to wind the choke as detailed in fig. 1, it can be replaced by standard Ohmite Z-14 and Z-50 chokes wired in series. The Z-14 choke is mounted above the chassis and the Z-50 choke below the chassis. Both should have .001 mF/3 kV disc ceramic bypass capacitors on their power supply side. Although the Z-14 choke is only rated at 600 mA, there does not appear to be any difficulty in using it although the total plate current can be slightly over 1 ampere.

Photo 2 shows an underside view of the chassis. L2 is mounted on the left chassis wall and the antenna change-over relay is on the right side. L1 is mounted directly between the contacts on the relay and an insulated center post in the middle of the tube semi-circle. Form this center post ¼" wide copper sheeting conductors are run to pin 2 (cathode) on each socket. Note that where bypass capacitors are indicated in fig. 1 (pins 1, 5 and 12), they are mounted directly on the tube sockets. Ground leads (pins 1, 3, 4, 10 and 11) are run directly to the nearest ground lug on each tube socket. Pins 6 and 8 may be grounded, if desired, since they are not used. Pin 7, however, must be left unwired since it is an internal connection in the 6KD6 tube. The two semi-circular leads on the top of the tube sockets interconnect the grids (pin 9) and the filaments (pin 12). The connectors on the back panel of the chassis are single hole SO-239 types for "R.F. In" and "R.F. Out" and a single hole phono socket for control of the antenna changeover relay. The use of these single hole mounting sockets is particularly recommended since they can be used to secure the chassis to the back panel of the main enclosure. A feed-through insulator near the upper right hand corner of the chassis is used to connect to the antenna of L4. A grommet on the rear of the chassis provides for the feed-through of a cable to a power supply. There is nothing critical about the placement of parts on the chassis and one can vary them to suit the components available. However, one should retain the semi-circular arrangement of the tube sockets and wire the tube sockets carefully as previously indicated. A good way to ensure a perfect fit of the small chassis in the final enclosure is to lay out and drill the holes for the connectors and cable access on the back of the utility enclosure first. Then insert the small chassis in the utility enclosure and use the holes drilled as a guide for drilling the small chassis. Better than drilling out the holes, however, one should use a 5/8" chassis punch for the r.f. connectors and the cable hole. The investment in this punch and a 1" punch for the tube sockets will greatly ease construction.

Photo 3 shows the small chassis installed in the 10x8x7 inch utility box which has its bottom and top covers removed. The pi-network components mount on the front panel of the utility cabinet. As shown, the amplifier is not band-switched. But, as can be seen, there is plenty of room within the enclosure to add a bandswitch arrangement. The tubes should be air cooled because of the amount of heat they dissipate. Although a rather awkward exhaust fan arrangement on the top cover was initially tried, it is recommended instead that two approximately 3 to 4 inch square boxer or muffin type fans be mounted on the rear panel of the utility box so they blow intake air across the tubes. These fans are usually very quiet and mounting them in this manner is inconspicuous and adds only about 1½ inches to the overall depth of the amplifier. Suitable fans can be found for about $10 each from mail order sources (e.g. Burstein Applebee, 3199 Mercier St., Kansas City, Mo. 64111). A series of holes should be drilled in the top cover of the enclosure above the tubes and covered with a fine metal screen for shielding purposes to allow for air exhaust. Also, the top and bottom covers of the utility enclosure should have their paint removed where they fasten to the main part of the enclosure. This is to ensure good metal-to-metal contact around the edges of the covers with the main part of the enclosure to prevent r.f. leaks which would negate the effect of a low-pass filter used after the amplifier.

Because of the room available in the enclosure, one might be inclined

Band	C1(pF)	C2(pF)	L4(μh)	B&W Coil Stock
160	2250	9250	26	5" No. 3030
80	1125	4600	13	4" No. 3026
40	560	2300	6.8	3 ½" No. 3058
20	280	1150	3.5	3 ¾" No. 3021
15	190	780	2.25	2 ¾" No. 3021
10	140	580	1.75	2 ½" No. 3021

Fig. 2 - Component data for the pi-network output circuit used in fig. 1.

to include the bias supply, filament transformer or plate meter in the enclosure. But, it is suggested that this not be done. The enclosure as it stands provides a "tight" r.f. enclosure, especially when the top and bottom covers make good metallic contact and possibly a few additional self-tapping sheet metal screws are used to secure them. A power supply can be assembled in a similar size enclosure. This approach simplifies construction and it really does not add that much to the final size of the amplifier. In fact, even using two separate enclosures, the amplifier is smaller, on a cubic inch basis, than several commercial amplifiers in the same power class. An inter-connecting cable is used between the enclosures without the need of connectors. As long as the end of the cable in the power supply enclosure is connected to a screw terminal barrier strip, the amplifier and power supply enclosures can be separated when desired. The interconnecting cable can be easily and neatly constructed. A length of shielding is removed from a piece of RG-8 and the filament leads, high voltage lead, etc. placed inside the shield. The shield is stretched out to snugly cover the wires and then heat shrink tubing used over the shield. The shield has to be grounded, of course, where it enters both enclosures.

Any number of power supply circuits can be used, depending on what transformers can be found. Fig. 3 shows just one example of what can be done with components found at the moment. In this case, four power transformers having a 200 volt/500 mA secondary and costing $4 each (Fair Radio, Box 1105, Lima, Ohio, 45802) are wired in series. A conventional bridge rectifier is used with an effective value of 42 μF filter capacitance. With a bit of bargain hunting one can find all the parts necessary, including the Bud CU-879 enclosure to match the linear amplifier enclosure, for between $40 and $50.

In operation, the tubes should be allowed to heat up for 30 seconds or so before the amplifier is put into service. The bias voltage is initially set for its maximum value. Then, with no drive applied but the relay line grounded, the bias is adjusted for a plate current of 100 mA. When initially tuning the amplifier it is very desirable that the plate voltage be reduced. This can be done easily with the arrangement of fig. 3 by temporarily using only two or three of the 200 volt secondaries. Drive is then

(Continued on page 83)

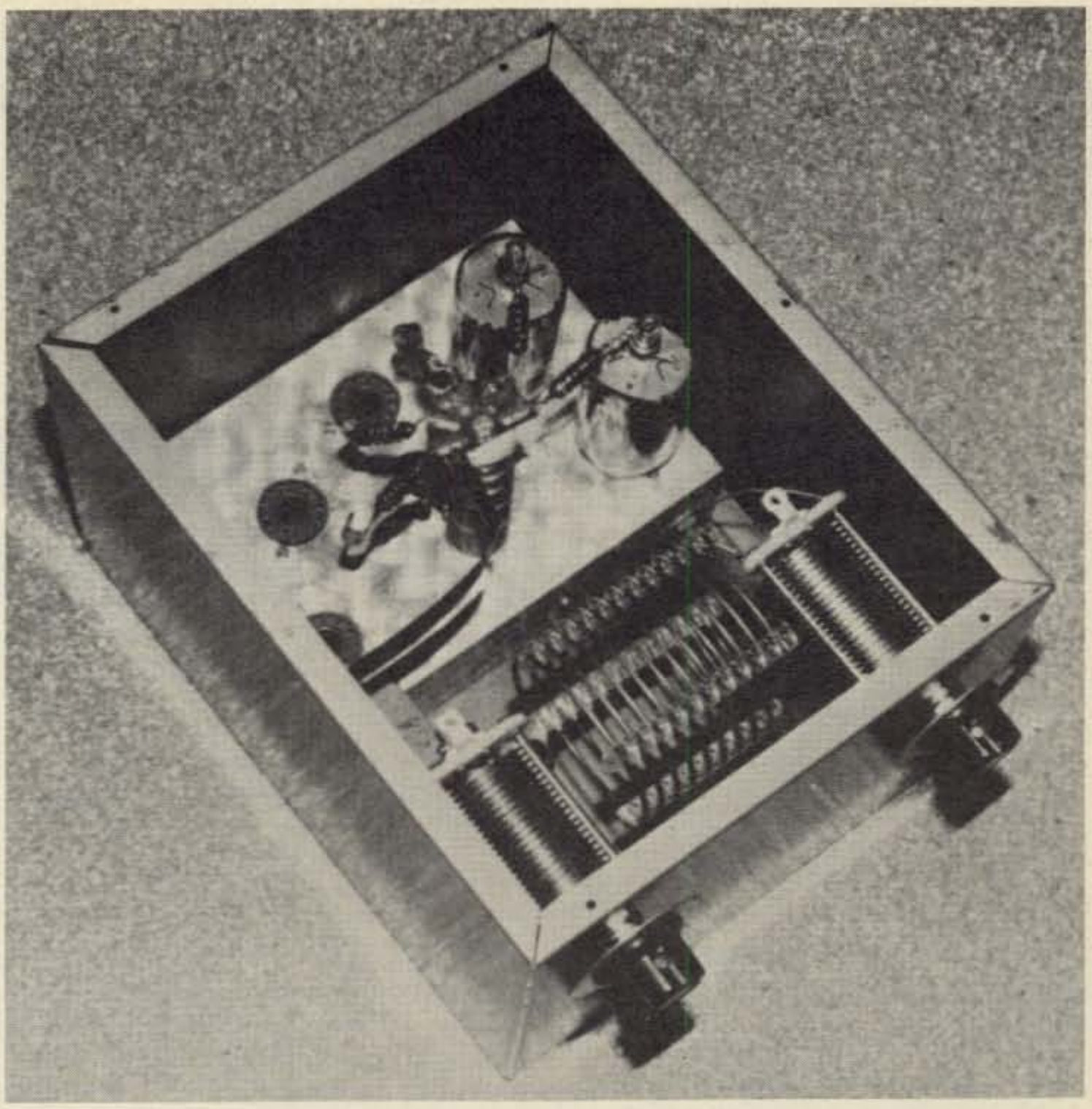


Photo 3 - The chassis is shown mounted inside the utility enclosure in this single band version of the amplifier. Parasitic suppressors go from the top of the r.f. choke to the plate cap of each tube. On the lower left one can see the plate coupling capacitor fastened to the plate tuning capacitor and to the r.f. choke via a strip of copper.

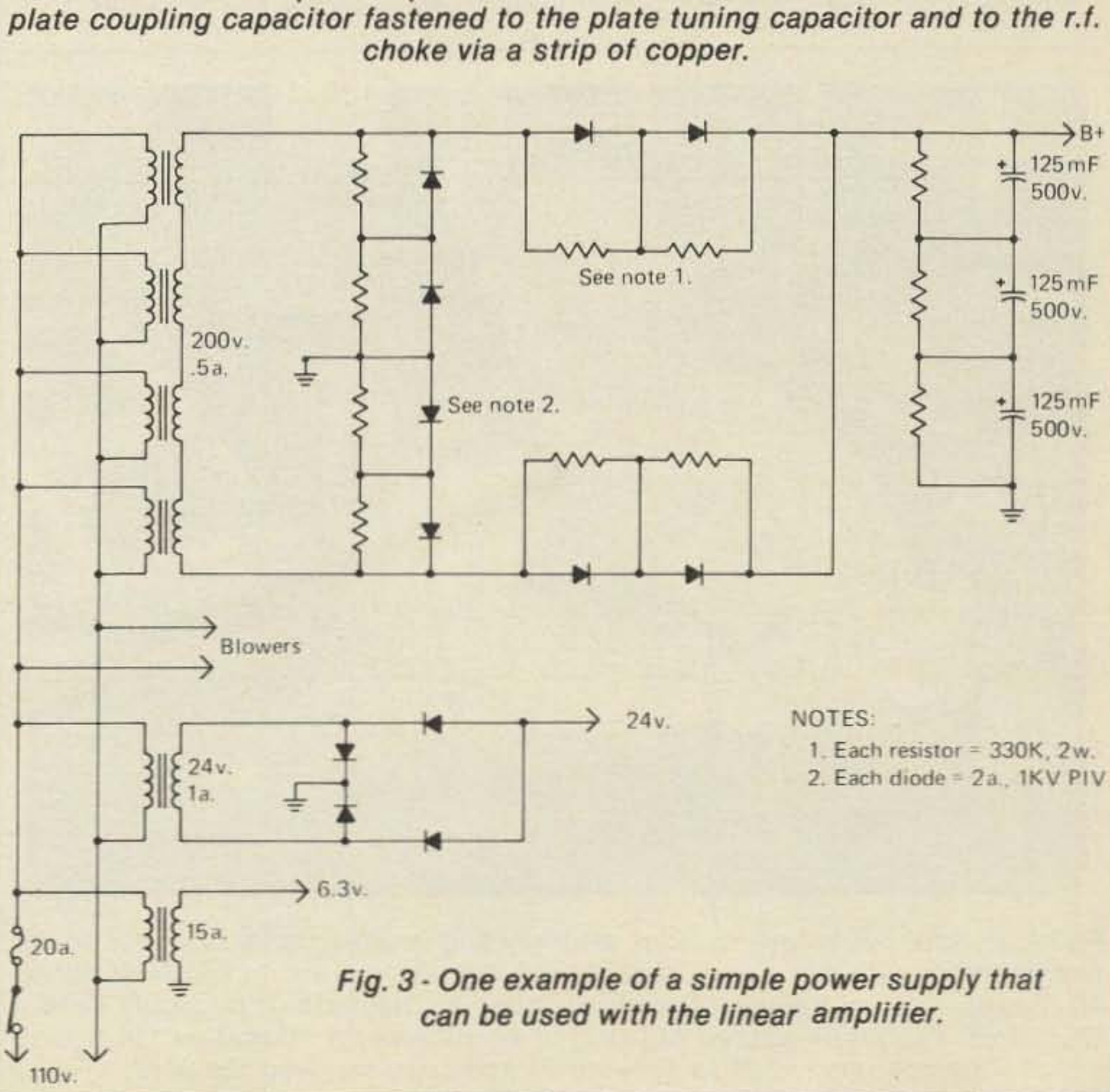


Fig. 3 - One example of a simple power supply that can be used with the linear amplifier.

The Jonestown hecatomb was an exercise in human tragedy. American radio amateurs had no idea that they were privy to a prelude to death.

Amateur Radio and The People's Temple Net

BY JOHANN WILLIAM RUSH*

Amateur radio operators traditionally have been noted for zeal and enthusiasm when it comes to helping a worthy cause. We can point with pride to our work with special interest nets, emergency communications during disasters and the countless phone patches uniting servicemen with their families. On rare occasions, however, it backfires. The Jonestown debacle is a prime example. Whether it was the humanitarian altruism coming forward (which I prefer to think) or merely the desire for scratching another country off the list, amateurs did provide a significant form of aid to the People's Temple. They survived in the jungle with our help and prospered exacting who knows what ultimate price in misery. Mr. Rush can and does supply the details of this tragic episode. Time may supply the weave that completes the fabric of the story. Why, we'd like to know, were so many people enthralled to aid and protect something they obviously knew so very little about? Hopefully, we may learn from this event to question the things which we support and to examine who's best interests are being served. There is quite a difference between being fallible and being dangerously foolish. -K2EEK

Phillip P. Spencer, a New Orleans attorney and amateur radio operator, made two contacts with Al Touchette at Jonestown last year on 14.250 MHz. When Mr. Spencer asked Peoples Temple member Al Touchette if he would send a QSL card, Touchette agreed but only if he received a "donation" in return. Spencer mailed $1 to Jonestown and soon received the card.

Less than a week after the murder of Congressman Leo Ryan and the disastrous mass suicide of 900 People's Temple cultists in Jonestown, Guyana, last November, newspapers around the country began running articles about local amateur radio operators who had made contact with the Jonestown outpost. It seems that several dozen stateside amateurs had had brief QSOs with Al Touchette, WB6MID/8R3, Jim Jones' chief radio operator at the remote jungle commune, and a few of those U.S. hams called their local hometown newspapers to let them know about it.

Although some of the stories ran over Associated Press and United Press International, they seemed to be of little importance, merely an interesting "sidebar" to the main

*P.O. Box 563, Hattiesburg MS 39401

murder/suicide story itself. As the Christmas season rolled around, most news agencies began to relegate Peoples Temple follow-up reports to back pages, and by mid-January, media interest in the amateur radio aspect seemed to fade out completely. After all, why bother to report yet another amateur who had spoken to WB6MID/8R3 once or twice?

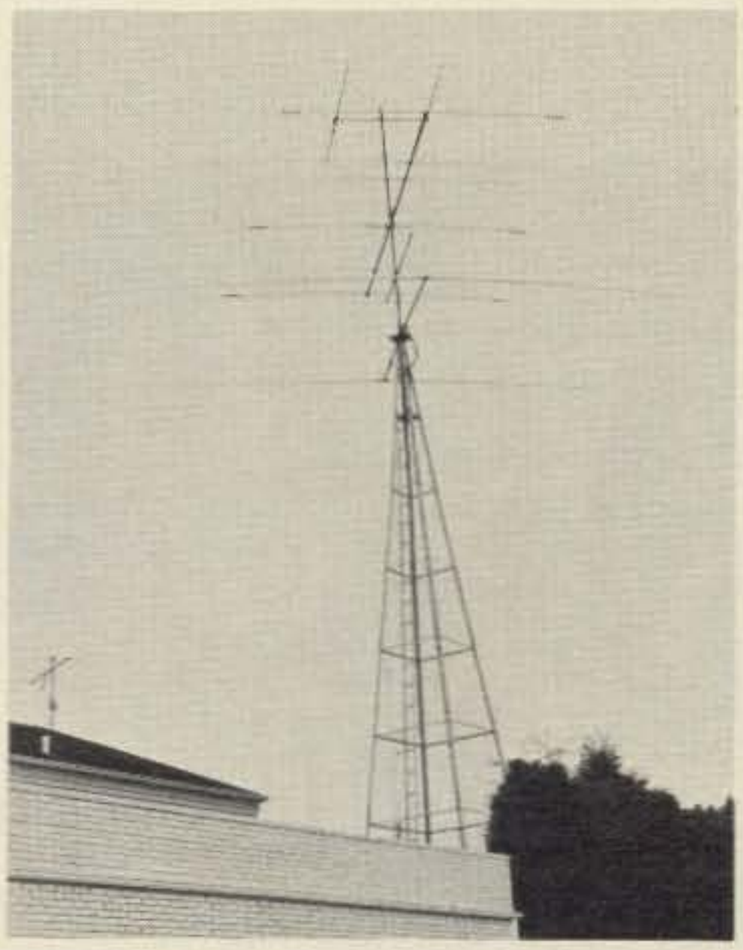
But, as it turns out, there's more to this story than what was first reported. From a Baton Rouge (Louisiana) paper I learned that an amateur, Phillip Spencer, an attorney in New Orleans, had not only spoken to Jonestown, but had received a QSL card from the Peoples Temple in Guyana. I thought a close look at the card might turn up something interesting so I went to New Orleans to interview Mr. Spencer. Indeed, it seems that the national press missed the whole point about amateur radio contact with the cult of Jim Jones, and in fact, much of the cult's activities in Guyana during the past two years may not have been possible without the cooperation of *hundreds* of unsuspecting stateside amateurs who helped Al Touchette relay *thousands* of messages from Guyana to San Francisco!

I began to conduct an intense investigation regarding this case. From a Mississippi amateur who talked with Jonestown, I learned that TV reporter Roy Neal (NBC's science editor) also an amateur, K6DUE, is on the air in Burbank, California, nearly every night. I contacted Mr. Neal and learned that his office was right next to that of Don Harris, the NBC newsman slain at the Port Kaituma airport in Guyana, but that Neal had *never* had any contact with either the Jonestown of San Francisco Peoples Temple radio operators. Why? "It was nearly impossible for any California station to receive signals *from* Guyana," he said, "and San Francisco's signal *to* Guyana skipped right over us here in the Los Angeles area."

Mr. Neal suggested I contact the San Francisco DA's office whose investigators are trying to interview all amateurs who had talked with Jonestown. This led me to Doug Keener, of the DA's staff, who was a wealth of information.

"What we've come up with is that the Peoples Temple had a transceiver in San Francisco, one in Jonestown, and one in Georgetown, Guyana (which is about 150 miles out of Jonestown)," said Mr. Keener. "It's true that Guyana signals would barely reach San Francisco, so what they would do was use a *phone patch* setup and relay the message via different amateur operators from various stations along the U.S. East Coast."

Here's how their system worked: Al Touchette in Jonestown would try to reach Ben Bowers, WA6DTJ, or Elton Adams, WD6DVI, in San Francisco. About 20% of the time, the two stations could talk direct, but about 80% of the time, phone patches were required. Touchette would put out a call in the 20-meter band (usually at 14.250 MHz) to any stateside amateur who had phone patch capabilities. Sometimes the same person was used



Phillip Spencer used this Mosley Tri-band Classic 36 antenna and a Collins S-Line KWM2 radio (with 2,000 watts PEP) for his communication between New Orleans and Jonestown.

over and over again, sometimes new amateurs were found and used only once. The stateside contact would then be asked to place a collect telephone call to the San Francisco Peoples Temple headquarters and the conversation—carried part by radio transmissions and part by telephone lines—would take place.

This Peoples Temple communication network was used *for more than two years,* perhaps for as many as *five years*. Jim Jones first visited Guyana in 1973, and established his smaller pioneer outpost of Jonestown (then called "Mission Village") in 1974. No one is sure when the transceiver was first installed there, but the FCC began receiving complaints from American amateurs about unauthorized 20-meter traffic out of Jonestown as early as 1976.

Rumors have been floating around for months ranging from, "*the FCC failed to act on those letters of complaint*" to "*the FCC recorded all the transmissions and were about to pull the licenses of Bowers, Adams, and Touchette.*" Neither rumor is based on fact, and the truth lies somewhere in between. The FCC's part in monitoring the Peoples Temple communication network is most intriguing.

I talked with FCC attorneys Gerald Zuckerman and Molly Fitzgerald in Washington, and with Stephen Tsuya, an engineer who recorded nearly 50 hours of Peoples Temple transmissions at the Douglas, Arizona monitoring station.

"First let me say that we did not actually monitor the *Peoples Temple*," said Mr. Zuckerman. "We monitored WA6DTJ (Bowers) and WD6DVI (Adams). As you know, amateur station licenses are held by individuals. We can never monitor an organization, only a licensee or his station. We monitored only the San Francisco station as operated by Bowers and Adams. Since by law, we have no jurisdiction over any foreign license holder or foreign station, we had little interest in Al Touchette or the Jonestown or Georgetown stations." A very interesting situation!

The FCC monitored Bowers and Adams from May, 1977 to late September, 1978, but it seems that they never monitored Al Touchette's phone patch calls out of Jonestown. It was possible of course, and well within their legal rights, since the part of the phone patch message going *out* of the United States had to have been transmitted by a cooperating stateside amateur. But the FCC still could not have done anything to Touchette—or even to Bowers or Adams—when the phone patches took place. However, the FCC *could* have acted against the amateurs who were relaying the patches via their East Coast stations, had any business been conducted during these transmissions.

Why weren't the cooperative amateurs monitored? The FCC says that no complaints were received against them and random monitoring—to try to catch phone patch messages from Bowers and Adams—would have been useless since hundreds of different amateur intermediaries played a part in this unusual network.

What put the FCC onto the Peoples Temple case in the first place? Before Jim Jones moved to the Jonestown commune himself, with more than 1,000 of his followers in late 1977, the San Francisco and Guyana stations were in contact on a daily (or nightly)

No -25-26

basis. Dozens of the *direct* radio exchanges that did get through were monitored by amateurs across the country. It was obvious that Jones and his followers were using the 20-meter band to conduct business, and this of course is in violation of FCC rules and regulations. Dozens of complaint letters began to arrive at FCC headquarters in Washington.

"These transmissions had a lot to do with the daily goings-on with what was necessary for them to survive down at the mission in Jonestown," said Doug Keener of the San Francisco DA's office. "The conversations involved information on the shipments of raw materials,

Many ham operators overlooked some of the irregular Peoples Temple radio traffic when they learned they could add this rare Guyana card to their collection.

generators, food, medical supplies, diesel fuel, tools. This business activity infuriated many law-abiding amateurs who listened in, but when they would go on the air to complain, Touchette, Bowers, or Adams just cut them short or changed frequencies," he said.

By the end of 1977, Jim Jones' unusual and sometimes lawless activities were beginning to be noticed by a number of investigative newspaper reporters in San Francisci, and his radio traffic was now being monitored by the FCC at the Douglas station. Official "cease and desist" letters were mailed to Bowers and Adams by the FCC, and this led Jones to devise a cipher of rather simple code words used to represent different parts of their business transmissions. The FCC saw right through the ciphers and sent out more letters warning that licenses might be revoked if the illegal transmissions continued.

A general Peoples Temple expose story ran in California's *New West* magazine in 1977, and Jones appeared to become paranoid. He felt there were plots developing against him and his followers. One of his attorneys, Mark Lane, reports that Jones felt the government was in one a plot and that the FCC letters were evidence of such a plot. Lane told me that he, too, believed there might be some truth to the "government plot" theory since the FCC apparently had enough evidence to pull the licenses, yet did not do so despite the numerous complaints from amateurs.

Before he left the country, Jim Jones had his followers write more than 2,000 letters to the FCC to complain to that agency about "government harassment" of their "religious" organization. This took the FCC by surprise—it was unprecedented—and it just may have had some influence in the FCC's decision *not* to recall Bowers' and Adams' licenses. The FCC denies the letters had any influence and feels—officially—that they did enough to discourage the illegal use of amateur radio by Peoples Temple members. They issued one forfeiture fine of $50 to Bowers, then dropped their investigation in late September of 1978.

By then, Jones and most of his cultists had been living in Jonestown, Guyana, for more than nine months and had refined their communication net to try to avoid the wrath of the FCC.

Cipher was used constantly, but it was so simple—basic word transpositions and special slang—that the FCC must have considered it innocuous. More and more phone patches were used by Jones so that better signals could be received from and transmitted San Francisco. Frequencies were changed in mid-transmission—signaled by certain code words—when *direct* radio contact was made with San Francisco.

When cooperative and unsuspecting amateurs weren't available for phone patches, Al Touchette would often rely on members of the MARCO net (the Medical Amateur Radio Council) to either place phone patches or relay phony medical emergency messages. One MARCO member, Dr. Walter Thain, WB4KKB, of Florida, became suspicious when he detected many routine non-emergency business transmissions coming out of Jonestown.

Dr. Thain recorded several hours of Peoples Temple transmissions and wrote a letter to the FCC asking if his cooperation with Jonestown was against the rules and regulations. Their reply? No, not if the messages were legitimate, and not if he, personally, observed all of the rules and regulations when *he* transmitted relay messages for Jonestown.

Dr. Thain continued his relationship with the Peoples Temple members and actually visited Jonestown shortly after the amateur radio community helped relay emergency medical messages to the commune in May of 1978, when a commune member was having difficulty in giving birth to twins at the jungle outpost. Dr. Thain had already made plans to attend a meeting with members of the Pan American Cancer Cytology Society in Georgetown, Guyana, in May, and while there, flew by charter plane to Jonestown as the guest of Jim Jones.

Dr. Thain said recently that although the commune appeared somewhat unorthodox, there was nothing there to suggest the bizarre disaster that was to take place six months later. When the murder and suicide news broke on November 18, 1978, Dr. Thain immediately con-

tacted the FBI office nearest his home and turned over all his tapes and as much documentary evidence as possible.

While dozens of amateurs were complaining to the FCC about Peoples Temple activity, it seems that *hundreds* were actually *cooperating* with Temple members, although many of the amateurs knew that all of the transmissions weren't 100% legitimate. Why? Any amateur contact with Guyana had been rare before Touchette set up his station there. Some reports say that there were only half a dozen amateur stations in all of Guyana. There always seemed to be a missing stick pin on the American amateur's wall maps. A QSL card from Guyana? "Wow, I need one of those." seemed to be the attitude.

Touchette had QSL cards printed by the thousands. Each one read, "WB6MID/8R3—PEOPLES TEMPLE AGRICULTURAL/MEDICAL PROJECT." The call sign WB6MID had been Touchette's stateside call and registered in Redwood Valley, California. The "/8R3" was added when he moved to Guyana.

Sources close to the investigations (the FBI, the FCC, the San Francisco DA's office) all say that thousands of transmissions were made by use of the phone patch setup. But who are the amateurs who communicated with Jonestown? Investigative reporter and amateur operator Mike Wendland reported in the *Detroit News* that his paper is in possession of a tape recording made by an unnamed Florida amateur in which Jim Jones can be heard preaching over WB6MID/8R3 for nearly two hours.

Wendland also reported that Herb Schoenbohm, KV4FZ, a resident of the Virgin Islands, overheard the Jonestown station talking with the Georgetown station the week Congressman Ryan was in Guyana. Schoenbohm is supposed to have heard Temple members saying that, "Nothing will come of Ryan's visit but a lot of trouble."

San Francisco District Attorney investigator, Doug Keener, reported that a cult survivor who has been interviewed by the DA's office said that he had been in the Georgetown Temple headquarters just a short time after the Jonestown massacre and that another survivor, Linda Amos, told him that, "Everything is over, everyone's gone." Amos was supposed to have said that she had just been "in touch with San Francisco" and had told the Peoples Temple members there to "begin the revenge." Linda Amos apparently said little more because she and her three children were found murdered that November 18, 1978.

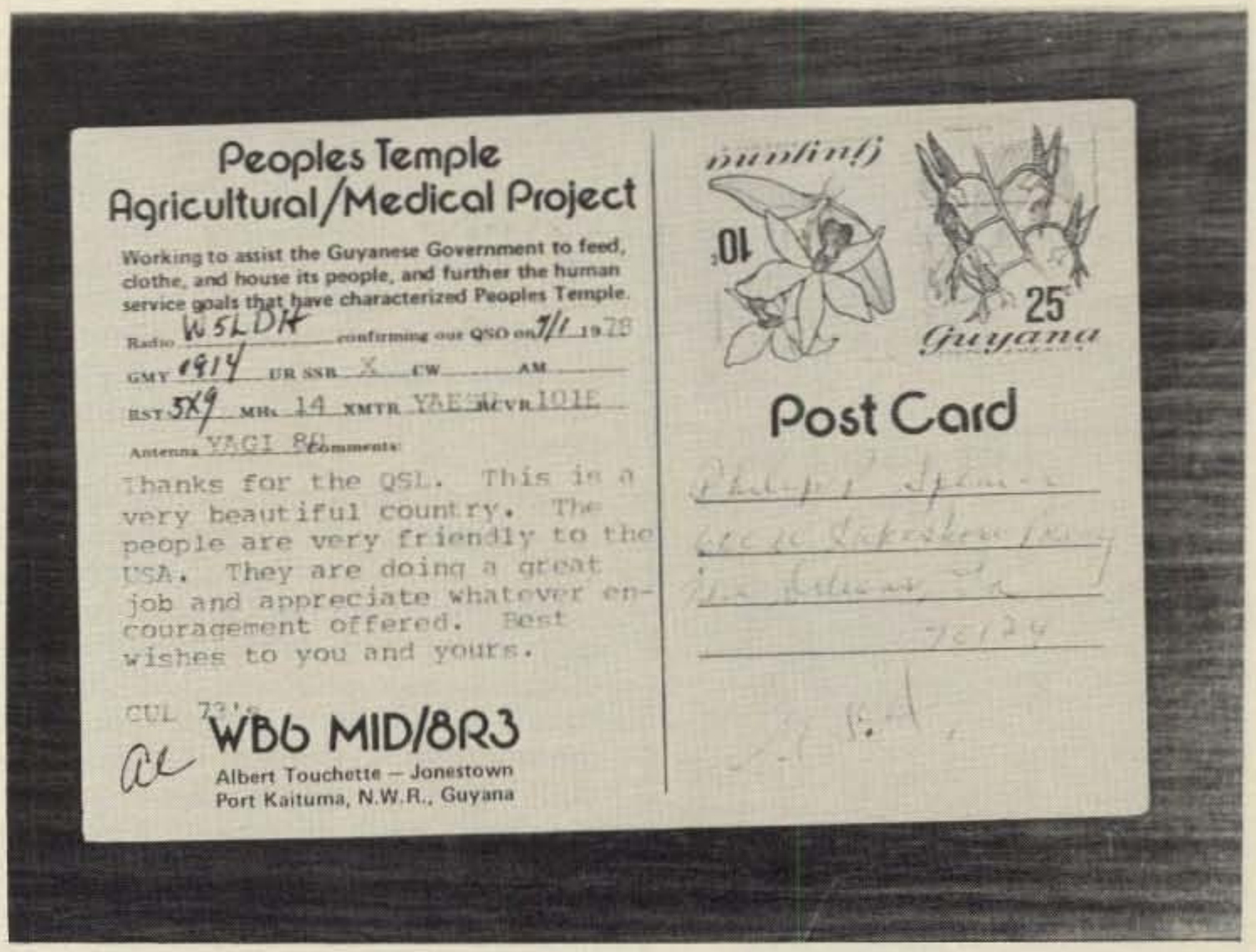
Were there transmissions made on November 18th? So far, no investigator or reporter had been able to find out for sure. I talked with attorney Charles Garry's legal secretary, Pat Richards. Garry, along with Mark Lane, had been held prisoner behind the Jonestown compound as the mass murders and suicides took place. Ms. Richards said that Mr. Garry was in constant contact with the San Francisco Peoples Temple offices and that someone from the Temple called her the afternoon of the 18th to report, "that a message had just come through from Jonestown to Georgetown to San Francisco saying that Congressman Ryan had met with Jones and had found things at the commune to be wonderful."

"How was the conversation transmitted?" I asked. "I'm not sure there was a conversation," Ms. Richards replied. "I think it was in Morse code or something like that," she said. "The message was supposed to have been relayed here via the East Coast," she added.

Was it "Morse code" or just *cipher code*? Ms. Richards, not being familiar with amateur radio, was not sure. Later that evening she heard bulletins about the death of Ryan and the newsmen. She called the San Francisco to find out any news of her boss, Charles Garry. "Temple members told me that they had not had any radio communication with Jonestown for the past 24 hours," she said.

Another intriguing message was given to Pat Richards a week before the tragedy. "At the beginning of November, Mr. Garry had decided to withdraw from representing the Peoples Temple, and we told San Francisco members to inform Jones," she said. "That was on the 11th. On the 12th or 13th someone came into our office to tell us that Marceline Jones had just relayed a message by radio that her husband was in a semi-comatose condition and packed in ice somewhere in the jungle. No one could reach him to tell him about Mr. Garry's withdrawal."

How did the message reach San Francisco? "They said it was relayed by telephone and radio via the East Coast," she replied. What happened next? "On Wednesday, the 15th, we received another hand-delivered message saying that Jones wanted to see Mr. Garry immediately. He packed and left that night, and arrived in Guyana on Friday morning," said Ms. Richards.



Al Touchette, whose signiture is on the back of the Peoples Temple QSL card, is reported to have committed suicide at Jonestown on November 18, 1978. Attorney Mark Lane, who visited Jonestown, reports that Jim Jones often used the code name "Al" when transmitting messages since Jones did not have a ham license.

Other amateurs who had contact with Al Touchette in Jonestown included Bruce Johnson, the international officer for the American Radio Relay League. Johnson monitored several hours of Peoples Temple transmissions and was in frequent communication with the FCC regarding the matter during the summer of 1977. Johnson even wrote to Touchette explaining some of the rules and regulations, but Touchette wrote back saying that the work of the Peoples Temple was so important and humanitarian in nature that a slight bending of the rules would do more good than harm.

Another monitor, and recorder, of Jonestown transmissions was Marshall Kilduff of the *San Francisco Chronicle.* His book *The Suicide Cult* was released just a month after the massacre. But Mr. Kilduff, a farsighted reporter, had begun his investigation nearly two years ago. "Many nights in 1977," Mr. Kilduff told me, "I would go over to a friend's house and monitor Jonestown on his amateur radio. In all, I probably listened to more than 50 hours of conversations."

Attorney Mark Lane actually used the Jonestown radio last September 17th, two months before the massacre. "I was in Guyana to meet with Jones," he said. "I was at the outpost and mentioned that I needed to talk with a friend in California. Cult member Terri Buford told me she could arrange a phone patch so I could get my call through," said Mr. Lane. According to Lane, Ms. Buford (who doesn't have an amateur license) made a transmission "to a ham in Massachusetts" who, in turn, made a collect call to Mr. Lane's friend in California.

The conversation started but was quickly interrupted by an angry amateur in Florida, said Lane, who later got the man's name and called him when he got back to this country. "He was quite frank about harassing the Temple," said Lane. "Well, he didn't really harass them. He just kept interrupting their transmissions and reading them the rules and regulations."

Doug Keener said that he has talked with amateurs from "most of the states in the East" who had communicated with Jonestown in some way. "There were doctors in Florida, Michigan, Minnesota, North Carolina, Tennessee, and other amateurs in many other states who helped with phone patches," said Mr. Keener. "More hams than we first expected had apparently helped them out. Of course from the reports we are receiving, they just didn't know what they were getting into," he concluded.

To some, it all sounded so innocent: A racially-mixed agricultural and medical religious commune set up in the jungle of some mysterious and remote South American country. Babies were being born. Operations performed. Doctors and nurses were dedicating their lives to help others. The FCC had no objections to radio tranmissions coming *out* of Guyana. The MARCO net was cooperating. And that beautiful, four color QSL card...with the inscription, "Working to assist the Guyanese Government to feed, clothe, and house its people, and furthre the human service goals that have characterized the Peoples Temple."

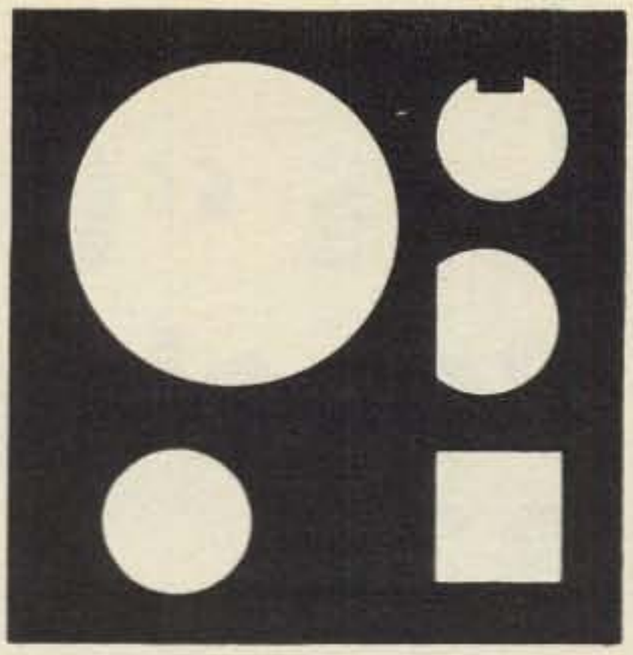
Who is to blame? Amateurs? Those who were aware of the full implications of the messages complained to the FCC. Then is the FCC to blame? They say no, because, after all, they *did* conduct an investigation and they *did* issue a forfeiture.

And what of the newsmen who knew over a year ago that something was amiss with Jones and his cult? Many of them now report that their article ideas were turned down again and again as California politicians got wind of the stories that were about to break and telephoned editors around the state to have the stories—exposes of their personal and long-time friend, Jim Jones—suppressed.

And what about the State Department, whose representatives visited Jonestown and gave it a clean bill of health; and the Customs Department, whose agents apparently ignored warnings that guns were being shipped from San Francisco to Jonestown? Are these agencies blameless?

Even Congressman Leo Ryan and NBC newsman Don Harris had heard of the suicide threats and possible murder plots proposed by Jim Jones. Yet these educated and informed men flew unarmed into the jungle to scrutinize, to threaten, to harass, and to lay the last straw on Jones' back.

Epilogue: According to the San Francisco DA's office, Al Touchette (WB6MID/8R3) was in Jonestown at the time of the suicides and is now dead. Elton Adams, WD6DVI, was in Guyana at the same time and is presumed to be dead. Ben Bowers, WA6DTJ, was last seen alive in San Francisco. According to Mike Wendland of the Detroit News, the FCC received payment of the $50 Bowers forfeiture fine on November 28, 1978—ten days after the Jonestown massacre.



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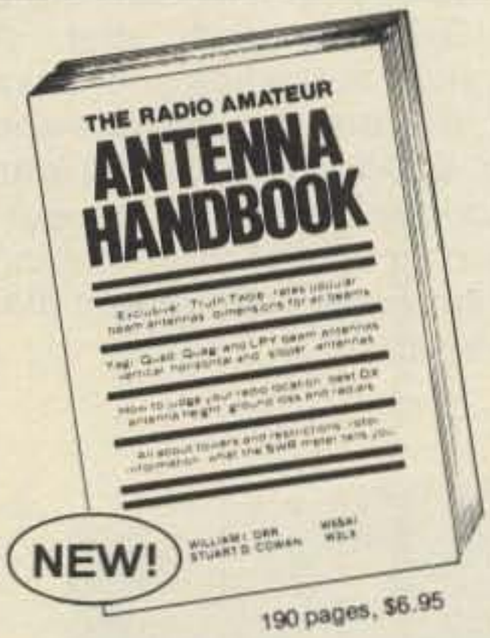

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The Hallicrafters "Ultra-Skyrider" Receiver The 1936 "Receiver of the Year"

BY WILLIAM I. ORR, W6SAI

Yes, 1936 was a year of advancement and change for amateur radio. It was during this year that amateur radio matured and became the picture of what amateur radio is today. Before that date, the image of amateur radio was uncertain and fuzzy, but a reader of *QST* magazines of the 1936 period can sense the great change taking place in high frequency communication. And it was just in time, too, as World War II storm clouds were on the horizon.

For example, the October, 1936 issue of *QST* featured an article discussing the use of multiple tubes in an "Ultra-high Frequency Oscillator". By the use of an unusual ring circuit, a large number of tubes could be connected together to provide very high output at frequencies up to 300 MHz. This was the forerunner of the famous SCR-268 radar transmitter (and others) that were the backbone of aircraft detection in the early days of the war.

The rising sunspot cycle in 1936 spurred interest in 10 meter DX and "ultra-high frequency" activity. W6FQY was the first station to work WAC (Worked All Continents) on 10 meter phone and designs for home-built 10 and 5 meter equipment appeared in all of the amateur radio magazines of that time.

The "Ultra High Frequency" Receiver

Up to 1936 any amateur interested in reception above the 10 meter band had to build his own receiver. Most commercially produced receivers, moreover, provided only mediocre performance on the 10 meter ham band. Poor sensitivity, instability and bad images were the rule, rather than the exception.

Almost simultaneously, two companies decided to solve the ultra-high frequency reception problem. The National Company introduced the "One-Ten" receiver, a superregenerative "rush box" that covered the range from 1 to 10 meters (approximately 28 to 270 MHz). This simple set used miniature "acorn" tubes and plug-in coils to do the job.

The Hallicrafters Company, on the other hand, decided to tackle the job head-on and produce the world's first commercial ultra-high frequency superheterodyne. This is the story of that interesting, pace-setting receiver.

Announcing the "Ultra-Skyrider" Receiver

Design of the new receiver began in mid-1935, using the newly-announced metal tubes. The concept incorporated such innovative ideas as the use of powdered iron-core i-f transformers for high selectivity, an i-f noise limiter, newly developed in late 1935 by James J. Lamb of the ARRL and a complete bandswitching coil assembly that completely covered the range of 3.6 meters to 46 meters (approximately 82 MHz. to 6.5 MHz.) in four bands. (The range was altered to 79 MHz. to 5.5 MHz. for production receivers.)

The Ultra-Skyrider introduced the "new look" that soon became a famous Hallicrafters identification (fig. 1). The receiver was built around a 19" relay rack panel and featured a calibrated, German silver dial. A moveable pointer moved up and down the face of the dial to indicate the band in use. Bandspread tuning was accomplished by means of an auxiliary condenser (capacitor) tuning gang and a separate bandspread dial and control knob.

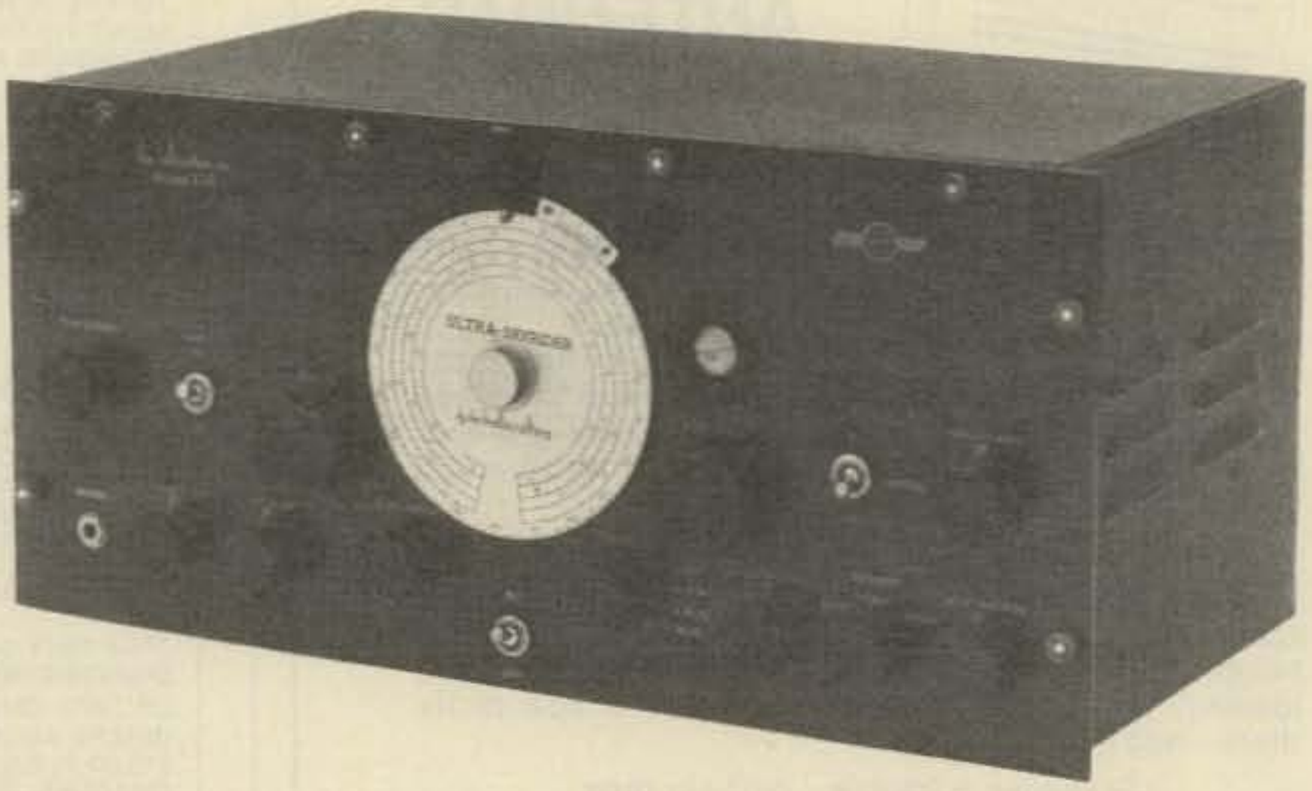

Fig. 1- The Hallicrafters "Ultra Skyrider" receiver of 1936. This design was the forerunner of the World War II S-36 receiver and featured a high frequency i-f strip, crystal filter and Lamb noise silencer. It tuned from 5.5 MHz. to 79 MHz. in four bands. Note the famous Hallicrafters German silver dial! They don't make 'em like this anymore!

c/o CQ Magazine

The newly-announced *Alladin* powdered iron core i-f transformers were used in the design. These transformers had a tertiary winding that could be cut in the circuit to expand the passband for "high fidelity" reception, or the reception of modulated osillators on the 5 meter ham band.

The great problem facing the Hallicrafters Company in producing this receiver was that the state-of-the-art components of that bygone year were not really applicable to "ultra high frequency" operation. The best metal tubes available began to deteriorate at frequencies much above 20 MHz. and the design technique using available bandswitch components made efficient, low-C tuning circuits difficult to achieve.

Nevertheless, a receiver was designed and built, using components and techniques at hand (fig. 2). The r-f coil catacomb of the Ultra-Skyrider is of particular interest to today's circuit conoisseurs. To begin with, the tubes used (6K7 r-f amplifier and 6L7 mixer tube) were notoriously noisy—the noise figure of the receiver probably ran about 20 dB. This meant that only the loudest 5 meter signals could be received. At 10 and 20 meters, however, the noise figure was somewhat improved and on 20 meters the receiver could actually get down to the average background noise level.

What the receiver lacked in sensitivity it made up in i-f gain so that to the casual observer, local 5 meter signals were easily read on the loudspeaker—a feat that few 5 meter receivers of that era could duplicate.

The Coil Catacomb

No one had ever built a bandswitching receiver that tuned as high as 80 MHz. so Hallicrafters was literally flying in the dark. Basic common sense pointed the way. The bandswitch, tuning condenser gang, tube sockets and coils were mounted in such fashion that short leads to all circuits were possible. Very small coil forms were used, and they were mounted directly upon the terminals of the bandswitch segments. Novel, air padding capacitors (believed to be imported from Europe) were used and these were mounted directly to the bandswitch.

To reduce circuit loss, ceramic tube sockets were used and the Raytheon Company provided 6K7 and 6L7 tubes having ceramic top insulators, instead of the common phenolic insulators. Two of these very rare ceramic-topped tubes are seen in the rear-view photograph (fig. 3).

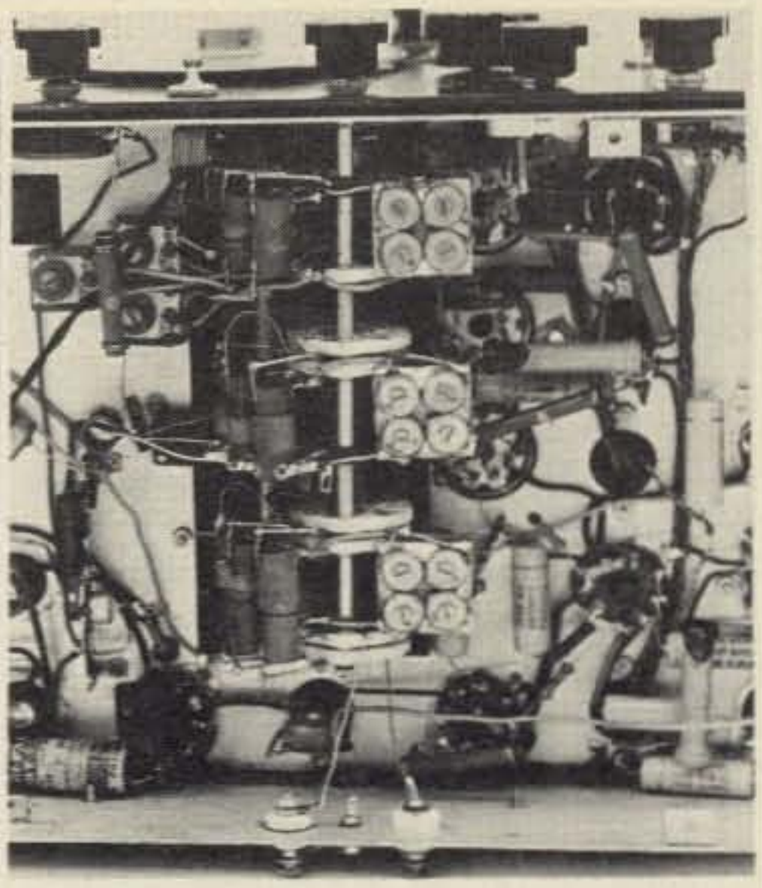

Fig. 2 – The coil catacomb of the Ultra Skyrider receiver. Exact alignment was accomplished by using connecting leads looped into a small inductor between coil and bandswitch. Air padding capacitors are seen attached to the side of the bandswitch. This arrangement was the very first switchable "ultra high frequency" receiver coil assembly.

Adjustment of the coil inductances for alignment purposes was accomplished by means of a loop of wire between the coil terminal and the bandswitch (fig. 2). This loop could be squeezed and manipulated until the circuit was in close alignment. Very small mica bypass capacitors were mounted close to the tube sockets and every attempt was made to make the front-end of the receiver as efficient as possible.

A casual observer would conclude that the "Ultra-skyrider" was merely a version of an "all-wave" broadcast receiver, reboxed in a metal cabinet for amateur use. While such an assumption may have been true for the less-expensive amateur receivers, Hallicrafters astutely concluded that when the ham paid the high price of $99.50 for his receiver, he deserved something better than the run-of-the-mill circuitry. Hence the use of high grade i-f transformers and a custom-designed front-end assembly.

The Life of the Ultra-skyrider

Born in 1936 and advertised as a "1936 model" receiver, the Ultra-skyrider disappeared from the Hallicrafters advertisements by the end of 1937. During this short life, it is estimated that only one production run of the receiver was attempted, with less than 200 receivers manufactured. This makes the Ultra-skyrider a very rare bird today.

Why the early demise? Well, Hallicrafters had learned the trick of making a mass-produced communications receiver play up to 60 MHz., or thereabouts, which covered the popular amateur 5 meter band. The new "Super Skyrider," in fact, covered the spectrum from 540 kHz. to 60 MHz. and provided a calibrated

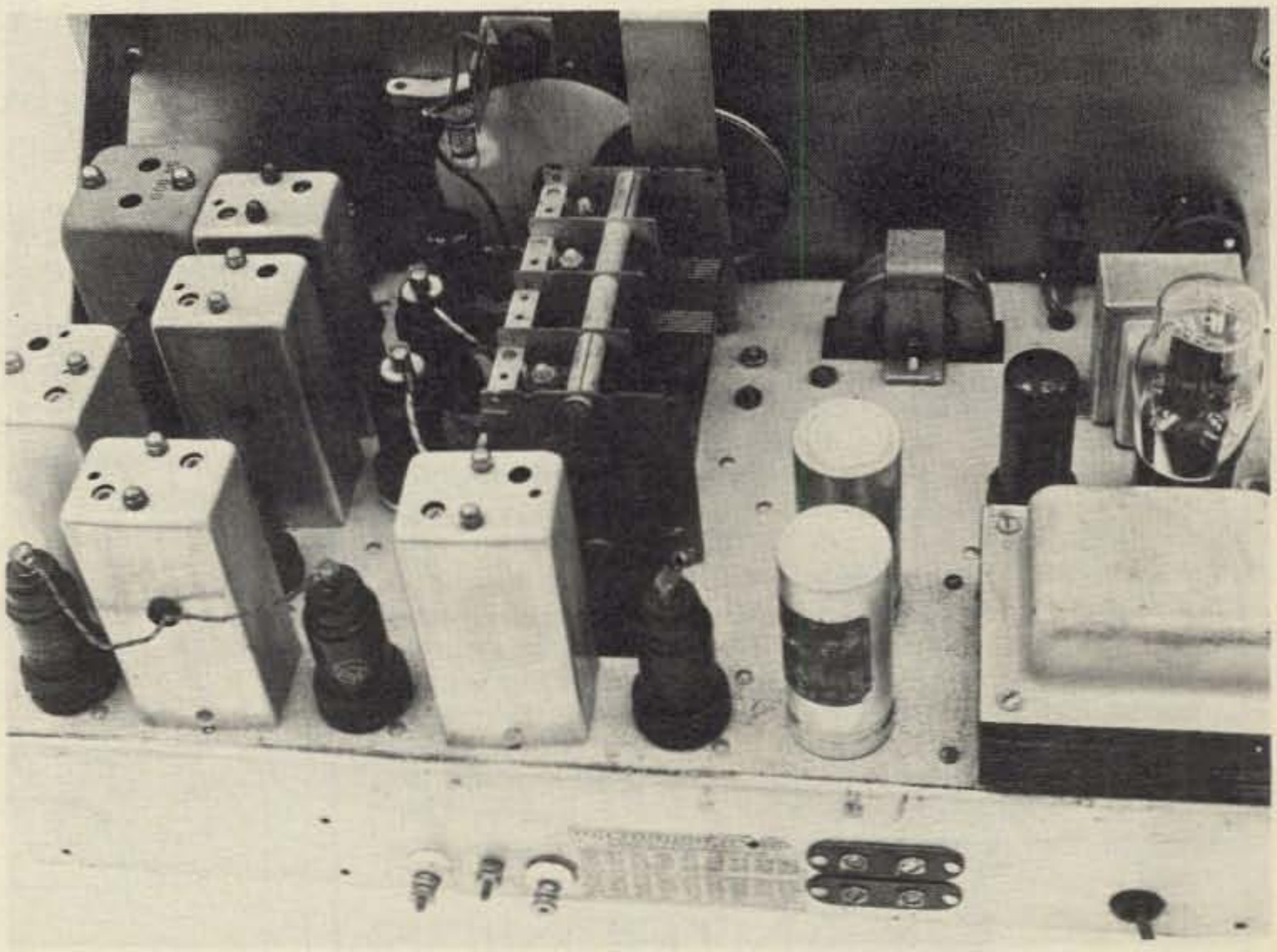

Fig. 3- Rear view of the Ultra Skyrider receiver showing iron-core i-f transformers and main tuning capacitor gang. Note the isolantite-topped 6K7 and 6L7 at center!

bandspread dial for the ham bands at a price comparable with that of the Ultra-skyrider. There was just no place in the family of Hallicrafters for this unusual receiver, so it was abruptly discontinued.

The Ultra-skyrider Circuit

The schematic of the Ultra-skyrider is quite conventional, but the circuit does not illustrate the production tricks taken to make sure the receiver provided reception at the top end of the tuning range. The relatively high intermediate frequency provided excellent image rejection for 20 and 10 meter operation. Image response, while not so good on the 5 meter band, was adequate as there were few image signals in those old days to cause interference at that very high frequency portion of the radio spectrum.

The basics of the Ultra-skyrider circuit were resurrected in late 1938 with the advent of the Hallicrafters "Five-Ten" receiver, which limited its range to two bands covering the 28-60 MHz. spectrum. The use of the newly developed 1851 television pentode (the godfather of the 6AK5) provided improved gain and noise figure for the 5 meter band. And at a still later date, the concept of the Ultra-skyrider was reborn as the S-36 "ultra-high frequency" receiver which tuned 25 MHz. to 150 MHz. with a brace of acorn tubes in the front end. The S-36 evolved to be one of the military's first v.h.f. surveillance receivers, the first of a long line of countermeasure equipment designed to foil enemy radars.

The Ultra-skyrider Today

It was the good luck of the author to obtain a mint condition Ultra-skyrider receiver. Replacement of various bypass capacitors and a complete realignment produced a working radio. Practically speaking, the receiver was useless above 54 MHz., unless one enjoyed listening to the sync pulses of the local channel 2 television station. But below 54 MHz., the receiver performed in fine fashion, in spite of the "noisy" front end. With a good antenna, plenty of stations were heard on the 6 meter amateur band, including sideband signals which could be copied with some effort. On 10 and 15 meters, the receiver played well and brought in many DX stations. And, of course, on 20 and 40 meters and the high frequency broadcast bands, the receiver was "as hot as a firecracker." Crystal filter, i-f expander and noise silencer all worked exceedingly well. Receiver stability was as good as could reasonably be expected and sideband reception on 40 meters was no problem.

Thus the basic Ultra-skyrider design proved that the Hallicrafters company could build an effective superheterodyne receiver that would perform in the lower reaches of the v.h.f. spectrum. When the war came along and such a receiver was needed, the company was able to produce one that would work, and in a minimum of time. The amateurs learned from this receiver that a superheterodyne receiver was, in the main, much superior to the super-regenerative "rush box" both in terms of selectivity and sensitivity. And when v.h.f. activity became immensely popular during the post-war period, the basic design encapsulated in the early Ultra-skyrider proved to be adaptable to newer tubes and circuit techniques.

So the very few Ultra-skyriders now floating around today in museums and collector's hands are a real chunk of history—a commercially produced receiver, using conventional components that really *worked* at the outer edge of the frequency spectrum, as it existed in the 1935-1937 period of time. To Hallicrafters, an enthusiastic *well done*! CQ

DIODES/ZENERS

QTY.			
1N914	100v	10mA	.05
1N4005	600v	1A	.08
1N4007	1000v	1A	.15
1N4148	75v	10mA	.05
1N4733	5.1v	1 W Zenner	.25
1N4749	24v	1W	.25
1N753A	6.2v	500 mW Zener	.25
1N758A	10v	"	.25
1N759A	12v	"	.25
1N5243	13v	"	.25
1N5244B	14v	"	.25
1N5245B	15v	"	.25
1N5349	12v	3W	.25

SOCKETS/BRIDGES

QTY.					
8-pin	pcb	.16	ww	.35
14-pin	pcb	.20	ww	.40
16-pin	pcb	.25	ww	.45
18-pin	pcb	.30	ww	.95
20-pin	pcb	.35	ww	1.05
22-pin	pcb	.40	ww	1.15
24-pin	pcb	.45	ww	1.25
28-pin	pcb	.50	ww	1.35
40-pin	pcb	.55	ww	1.45
Molex pins	.01	To-3 Sockets		.35
2 Amp Bridge		100-prv		.95
25 Amp Bridge		200-prv		1.50

TRANSISTORS, LEDS, etc.

QTY.		
2N2222M	(2N2222 Plastic .10)	.15
2N2222A		.19
2N2907A	PNP	.19
2N3906	PNP (Plastic)	.19
2N3904	NPN (Plastic)	.19
2N3054	NPN	.55
2N3055	NPN 15A 60v	.60
T1P125	PNP Darlington	1.95
LED Green,	Red, Clear, Yellow	.19
D.L.747	7 seg 5/8" High com-anode	1.95
MAN72	7 seg com-anode (Red)	1.25
MAN3610	7 seg com-anode (Orange)	1.25
MAN82A	7 seg com-anode (Yellow)	1.25
MAN74	7 seg com-cathode (Red)	1.50
FND359	7 seg com-cathode (Red)	1.25

9000 SERIES

QTY.		QTY.	
9301	.85	9322	.65
9309	.50	9601	.30
		9602	.45

MICRO's, RAMS, CPU's, E-PROMS

QTY.	
8T13	2.50
8T23	2.50
8T24	3.00
8T97	1.75
74S188	3.00
1488	1.25
1489	1.25
1702A	4.50
AM 9050	4.00
ICM 7207	6.95
ICM 7208	13.95
MPS 6520	10.00
MM 5314	4.00
MM 5316	4.50
MM 5387	3.50
MM 5369	2.95
TR 1602B	3.95
UPD 414	4.95
Z 80 A	22.50
Z 80	17.50
Z 80 P10	10.50
2102	1.45
2102L	1.75
2107B-4	4.95
2114	9.50
2513	6.25
2708	11.50
2716 D.S.	34.00
2716 (5v)	69.00
2758 (5v)	26.95
3242	10.50
4116	11.50
6800	13.95
6850	7.95
8080	7.50
8085	22.50
8212	2.75
8214	4.95
8216	3.50
8224	4.25
8228	6.00
8251	7.50
8253	18.50
8255	8.50
TMS 4044	9.95

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QTY.		QTY.		QTY.		QTY.	
7400	.20	7492	.45	74H20	.25	74LS76	.70
7401	.20	7493	.35	74H21	.25	74LS86	.95
7402	.20	7494	.75	74H22	.40	74LS90	.85
7403	.20	7495	.60	74H30	.30	74LS93	.85
7404	.20	7496	.80	74H40	.35	74LS96	2.00
7405	.35	74100	1.15	74H50	.30	74LS107	.90
7406	.25	74107	.35	74H51	.30	74LS109	1.50
7407	.55	74121	.35	74H52	.20	74LS123	1.95
7408	.20	74122	.55	74H53	.25	74LS138	2.00
7409	.25	74123	.55	74H55	.25	74LS151	.95
7410	.20	74125	.45	74H72	.35	74LS153	1.15
7411	.25	74126	.45	74H74	.35	74LS157	1.15
7412	.25	74132	.75	74H101	.95	74LS160	1.15
7413	.45	74141	.90	74H103	.55	74LS164	2.90
7414	.75	74150	.85	74H106	1.15	74LS193	2.00
7416	.25	74151	.95	74L00	.30	74LS195	1.15
7417	.40	74153	.95	74L02	.30	74LS244	2.90
7420	.25	74154	1.15	74L03	.35	74LS259	1.50
7426	.25	74156	.70	74L04	.40	74LS298	1.50
7427	.25	74157	.65	74L10	.30	74LS367	1.95
7430	.20	74161/9316	.75	74L20	.45	74LS368	1.25
7432	.30	74163	.85	74L30	.55	74LS373	2.50
7437	.20	74164	.75	74L47	1.95	74S00	.45
7438	.30	74165	1.10	74L51	.65	74S02	.45
7440	.20	74166	1.75	74L55	.85	74S03	.35
7441	1.15	74175	.90	74L72	.65	74S04	.35
7442	.55	74176	.95	74L73	.70	74S05	.45
7443	.45	74177	1.10	74L74	.75	74S08	.45
7444	.45	74180	.95	74L75	1.05	74S10	.45
7445	.75	74181	2.25	74L85	2.00	74S11	.45
7446	.70	74182	.75	74L93	.75	74S20	.35
7447	.70	74190	1.25	74L123	1.95	74S22	.55
7448	.50	74191	1.25	74LS00	.40	74S40	.30
7450	.25	74192	.75	74LS01	.40	74S50	.30
7451	.25	74193	.85	74LS02	.45	74S51	.35
7453	.20	74194	.95	74LS03	.45	74S64	.15
7454	.25	74195	.95	74LS04	.45	74S74	.70
7460	.40	74196	.95	74LS05	.45	74S112	.60
7470	.45	74197	.95	74LS08	.45	74S114	.85
7472	.40	74198	1.45	74LS09	.45	74S133	.85
7473	.25	74221	1.50	74LS10	.45	74S140	.75
7474	.30	74298	1.50	74LS11	.45	74S151	.95
7475	.35	74367	1.35	74LS20	.45	74S153	.95
7476	.40	75491	.65	74LS21	.45	74S157	.98
7480	.75	75492	.65	74LS22	.45	74S158	.80
7481	.85	74H00	.20	74LS32	.50	74S194	1.50
7482	.95	74H01	.30	74LS37	.45	74S196	2.00
7483	.95	74H04	.30	74LS38	.65	74S257 (8123)	2.50
7485	.75	74H05	.25	74LS40	.70	8131	2.75
7486	.55	74H08	.35	74LS42	.95		
7489	1.05	74H10	.35	74LS51	.75		
7490	.55	74H11	.25	74LS74	.95		
7491	.70	74H15	.45	74LS75	1.20		

C MOS

QTY.		QTY.		QTY.		QTY.	
4000	.15	4017	.75	4034	2.45	4069/74C04	.45
4001	.20	4018	.75	4035	.75	4071	.25
4002	.25	4019	.35	4037	1.80	4081	.30
4004	3.95	4020	.85	4040	.75	4082	.30
4006	.95	4021	.75	4041	.69	4507	.95
4007	.25	4022	.75	4042	.65	4511	.95
4008	.75	4023	.25	4043	.50	4512	1.50
4009	.35	4024	.75	4044	.65	4515	2.95
4010	.35	4025	.25	4046	1.25	4519	.85
4011	.30	4026	1.95	4047	2.50	4522	1.10
4012	.25	4027	.35	4048	1.25	4526	.95
4013	.40	4028	.75	4049	.65	4528	1.10
4014	.75	4029	1.15	4050	.45	4529	.95
4015	.75	4030	.30	4052	.75	MC14409	14.50
4016	.35	4033	1.50	4053	.95	MC14419	4.85
				4066	.75	74C151	2.50

I²L, LINEARS, REGULATORS, ETC.

QTY.		QTY.		QTY.	
MCT2	.95	LM320K24	1.65	LM373	3.95
8038	3.95	LM320T5	1.65	LM377	3.95
LM201	.75	LM320T12	1.65	78L05	.75
LM301	.45	LM320T15	1.65	78L12	.75
LM308	.65	LM323K	5.95	78L15	.75
LM309H	.85	LM324	1.25	78M05	.75
LM309 (340K-5)	1.50	LM339	.75	LM380 (8-14 Pin)	1.19
LM310	.85	7805 (340T5)	1.15	LM709 (8-14 Pin)	.45
LM311 (8-14 Pin)	.75	LM340T12	.95	LM711	.45
LM318	1.50	LM340T15	.95	LM723	.40
LM320H6	.79	LM340T18	.95	LM725	2.50
LM320H15	.79	LM340T24	.95	LM739	1.50
LM320H24	.79	LM340K12	1.25	LM741 (8-14)	.45
7905 (LM320K5)	1.65	LM340K15	1.25	LM747	1.10
LM320K12	1.65	LM340K18	1.25	LM1307	1.75
LM320K15	1.65	LM340K24	1.25	LM1458	.65
				LM3900	.95
				LM75451	.65
				NE555	.45
				NE556	.85
				NE565	1.15
				NE566	1.25
				NE567	.95
				TA7205	6.95
				76477	2.95
				95H90	9.95

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There are several well-known techniques for matching an antenna to its source. One of these is by using a stub. In this interesting article, K2VJ answers a basic question.

What's A Stub?

BY V.J. LUCIANI*, K2VJ

There are at least two good ways to answer the title question. One is via an exhaustive mathematical analysis and the other is an old-fashioned, down-to-earth concepts technique. You can guess we aren't going to take the first method. In fact, there are equations to confuse the issue in this description of stubs because concepts are what we apply in practice, and concepts are generally what you encounter in general, advanced, and extra class ham exams. So we suggest a few minutes of your time for the information contained herein, some of which you might do well to file for further reference.

Stubs are resonant circuits, and that answers the title question. Stop here, if you wish, but you might have an interest in what there is about stubs that makes them resonators and, more important where to use them.

But since they are resonant circuits, we need to take a backard step in order to be able to take that forward leap. Therefore, let's go into resonant circuits a bit, particularly that part about resonant circuits when they are operated off resonance. That is, we want to answer the question of what resonant circuits look like when they are operated at, above, or below their resonant frequencies.

We start with fig. 1, which assumes a source input frequency of 7.0 MHz. In the parallel circuit shown inductive reactance (X_L) and capacitive reactance (X_C) cancel at resonance. Nothing new about that. In fact, you may well remember that concept from each and every FCC exam. They want to make sure you know that much.

Neglecting losses, the impedance of a parallel resonant circuit is infinite and, for purposes of discussion, we will generally refer to that infinite impedance condition as an open circuit.

In order to make the parallel circuit of fig. 1 resonant at a frequency below the source frequency, say 6.9 MHz, we can increase either the inductance or the capacitance.

By adding either L or C, we start a new ball game because when the circuit was originally tuned to the input frequency it was resonant and presented a pure resistance to the source. (Get it all together about parallel resonant circuits—neglecting losses, they present an infinite impedance. Not neglecting losses, the parallel resonant circuit cancels out reactances and all that's left is the resistance of the circuit.)

So when we detune by adding either L or C (the source frequency staying as it was, of course), the source would no longer see a circuit tuned to its frequency. It would, therefore, no longer see a pure resistance. It would see a reactance. And if it sees a reactance, then this must mean that either the inductance or the capacitance predominates.

It's quite important to know which, either L or C, predominates when either L or C is added. So let's take a first look if we lowered the resonant frequency of the parallel circuit increasing the inductance.

If you remember that inductive reactance increases with inductance, then adding inductance results in an increase in X_L. But does the source see inductance or capacitance when the tank circuit is tuned below the source frequency by increasing the inductance?

You quessed wrong if you guessed it sees inductance. It sees capacitance, even though we increased the inductance. We need to analyze that further because it is the basis for understanding resonant transmission lines- stubs.

The explanation, in conceptual terms, goes like this. If X_L were greater than X_C, which it is when we add inductance to lower the resonant frequency of the tank circuit below the source frequency, then Ohm's Law takes over and more current flows through the smaller reactance of the capacitor than through the larger reactance of the inductor. If more current flows through the capacitor than through the inductor, then the capacitor predominates and

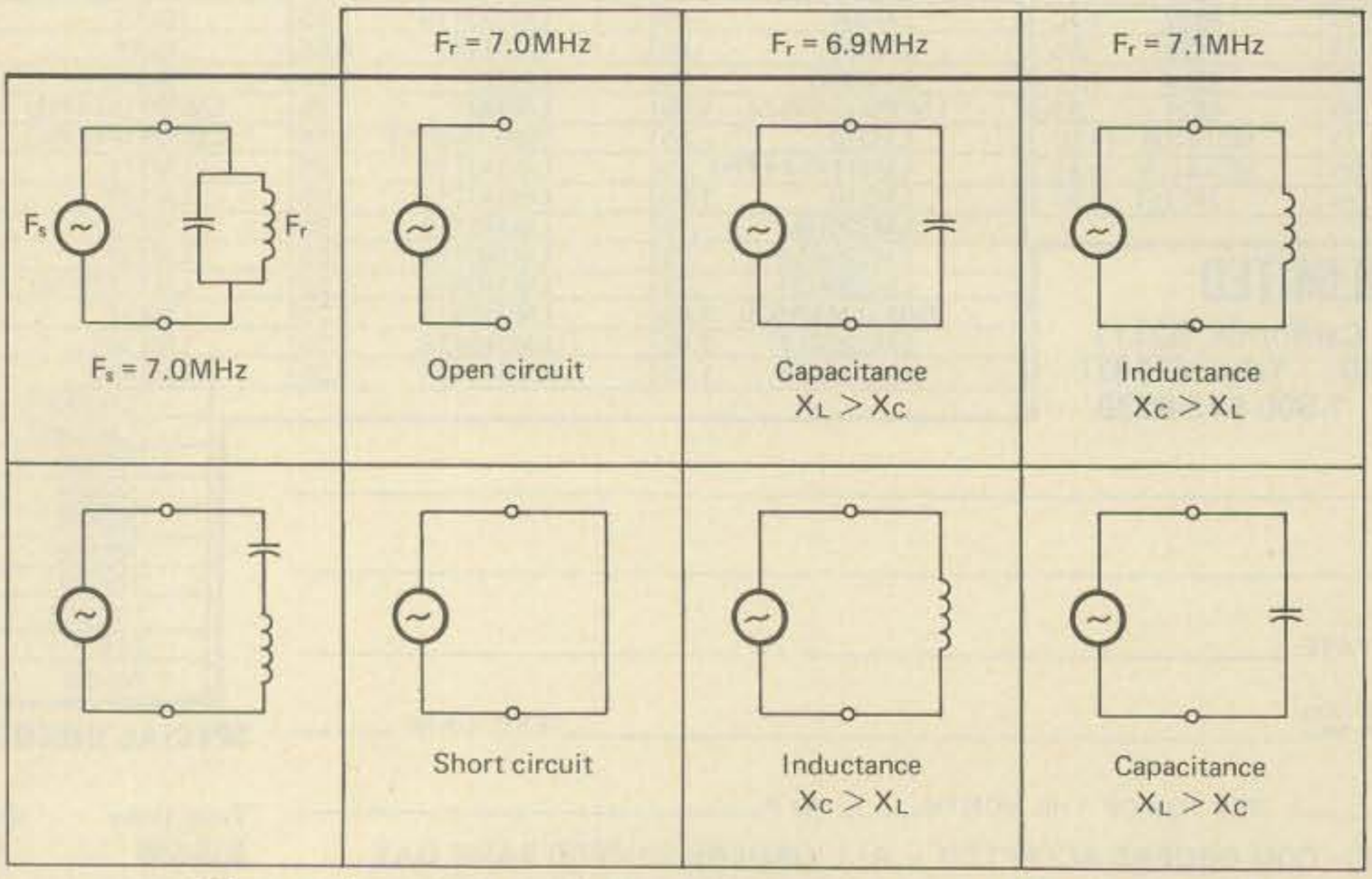


Fig. 1 - A potpourri of resonant and reactive L-C circuits.

*RD 1, P.O. Box 111H, Egg Harbor City NJ 08215

the source must therefore see a capacitance.

If you didn't buy that explanation, let's try it another way because we need to convince you we're right.

We lower the frequency of the tank circuit by increasing the inductance, but this time assume we use an infinitely large inductor. An infinite inductance has an infinite reactance, and anything with an infinite reactance takes on the characteristic of an open circuit. If the inductor becomes an open circuit, not much current is going to flow through it. In fact, it's all going to go through the capacitor and if it goes through the capacitor then the source sees capacitance predominating. That's exactly what the source sees whenever the resonant frequency of a parallel circuit is tuned below the frequency of the input signal. Capacitance.

The other case is where we lower the resonant frequency by adding capacitance. This is easy. Well, easier.

Capacitive reactance varies inversely with capacitance. Increase capacitance, you decrease X_C. Decrease X_C and Ohm's Law pushes the predominating current through the capacitor. Which means the source still sees a capacitance, even when we added capacitance.

Take the concept of extremes again, and let's say we added an infinite capacitance to the resonant circuit in order to lower its resonant frequency. By adding an infinitely large capacitance, X_C would drop to zero ohms, which turns out to be my favorite circuit condition- the short circuit. Even without Ohm's Law, you know for sure you can hardly get more current through anything besides a short circuit. So if all the current passes through the capacitor, that lets the inductor sitting there like a dummy doing nothing, so, again, the sources sees a capacitance predominating.

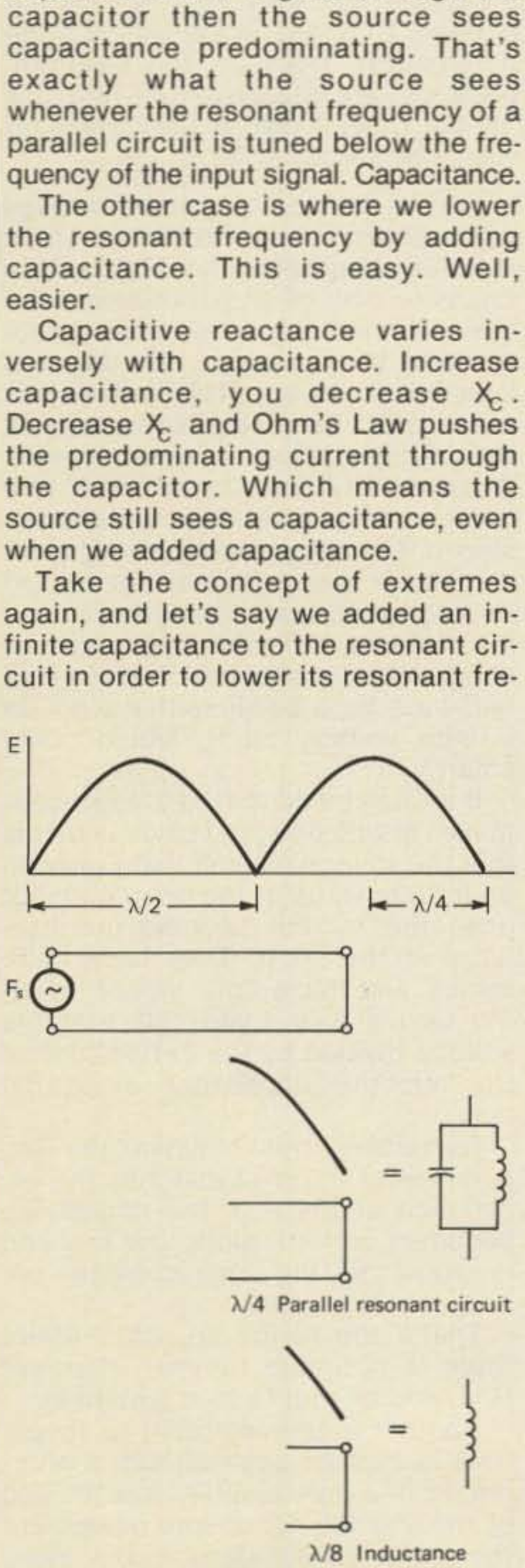


Fig. 3 - The effect of adding a quarter-wave and a halfwave length of transmission line, terminated in a short.

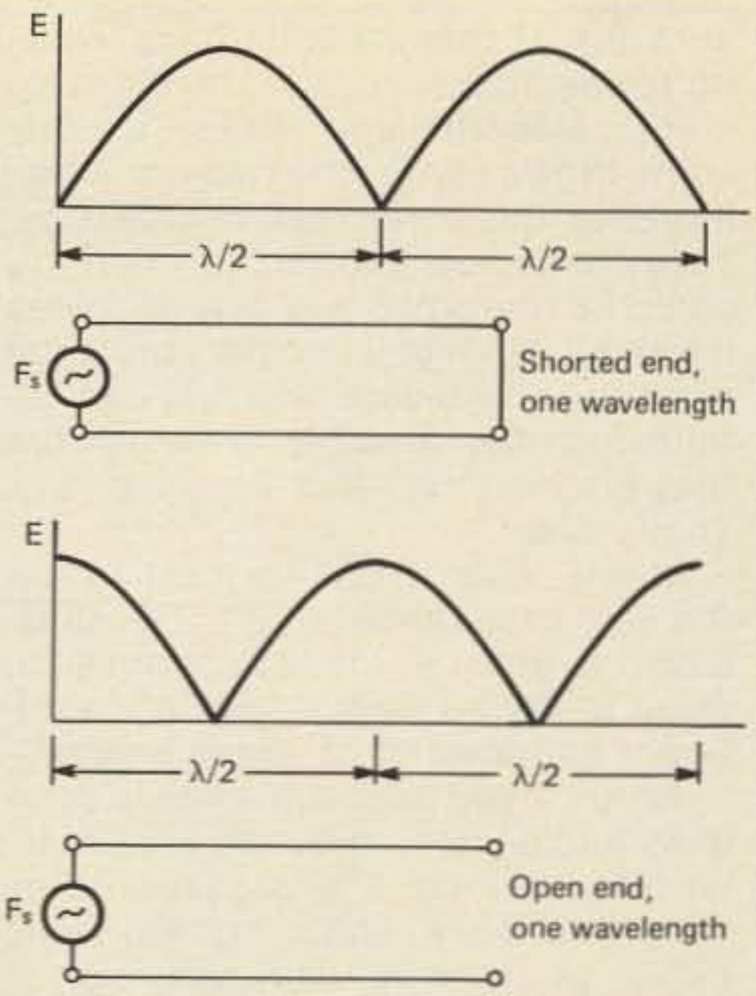


Fig. 2 - This diagram illustrates the generation of standing waves along a shorted and an open terminated transmission line.

Well now that we've hit the same conclusion from four approaches, we can get on to say that when the circuit is tuned below the resonant frequency of the source, the predominating element is capacitance. Would you care to guess what predominates when a parallel resonant circuit is tuned above the input frequency? Take heart, you should be right on this one. It sees an inductance.

That's about all we care to say about parallel resonant circuits, which is just as well because that about exhausts what we know, anyway. We do know a bit about series resonant circuits and would like to convince you of that in the next few sentences on series circuits.

First off, you could expect that for whatever you have in a parallel circuit, you get its complement in a series circuit. For example, the series resonant circuit tuned to the same frequency as the input signal takes on the characteristic of my favorite electronic circuit, the short circuit. (Remember, we are ignoring losses.).

To digress, and maybe to show how some of this theory gets put to work in ordinary things, you should tie together the fact that as you tune your transmitter finals to resonance, you get a dip in plate current because, at resonance in a parallel tank, $X_L = X_C$, and what's left is basically the resistance of the inductor and the losses in the capacitor.

Fine, now we'll get cute by supposing we could get the d.c. resistance of the coil down to zero ohms, which we can do with some metals under superconduction, at -460° F. Not hardly the average ham shack talent.

Since we're dreaming, suppose we also put the capacitor in a perfect vacuum to get rid of its losses. You would be in for quite a surprise when you resonate your final tank circuit. Plate current would go from its maximum detuned value to flat-out zero at resonance. You'd know for sure where the dip was because that old plate current would drop into a bottomless hole. And very abruptly, too. By the same token, if you tuned a series tank circuit to resonance under such ideal conditions, you would need to be most generous with circuit breakers because the plate current, at resonance, would want to reach an infinite value. None of this is important to stubs, but it is the kind of concept that we always did consider to be important to understanding. Besides, it reaffirms theory in a different way, one that's easier to read and better to remember.

Back to the work at hand. If we have so far convinced you that a series

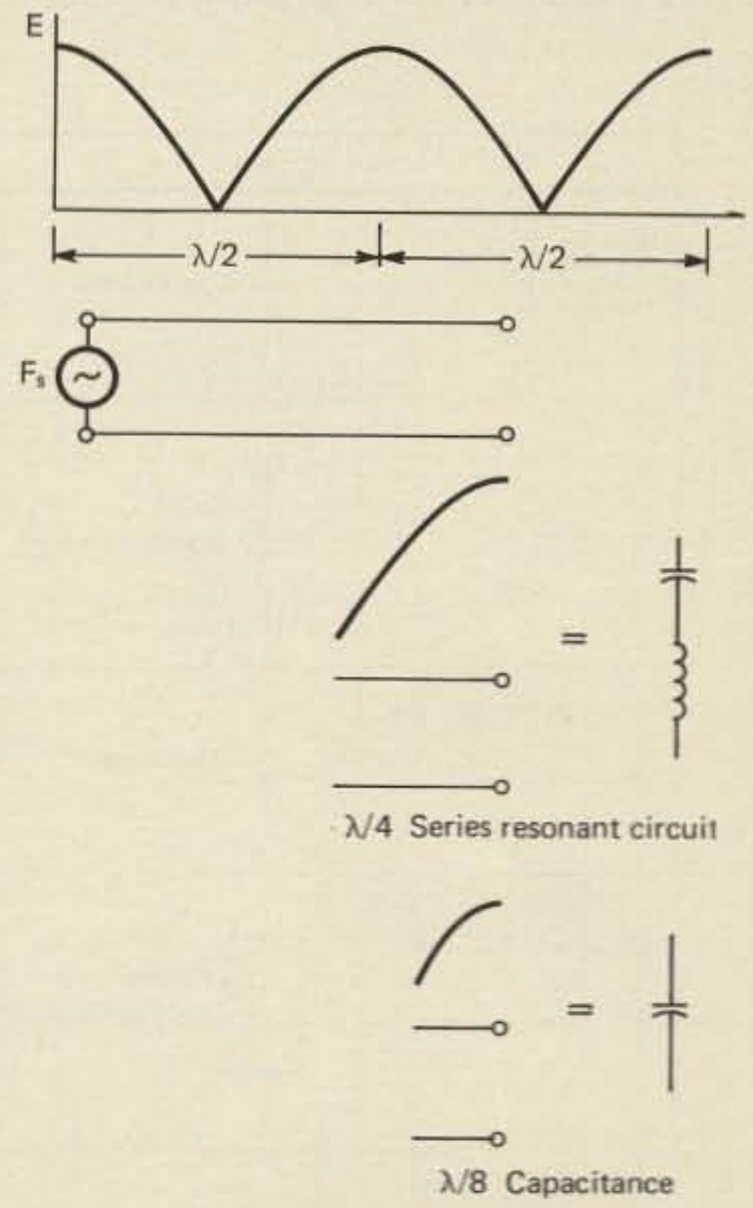


Fig. 4 - The same situation as in fig. 3, except that the transmission line is terminated in an open circuit.

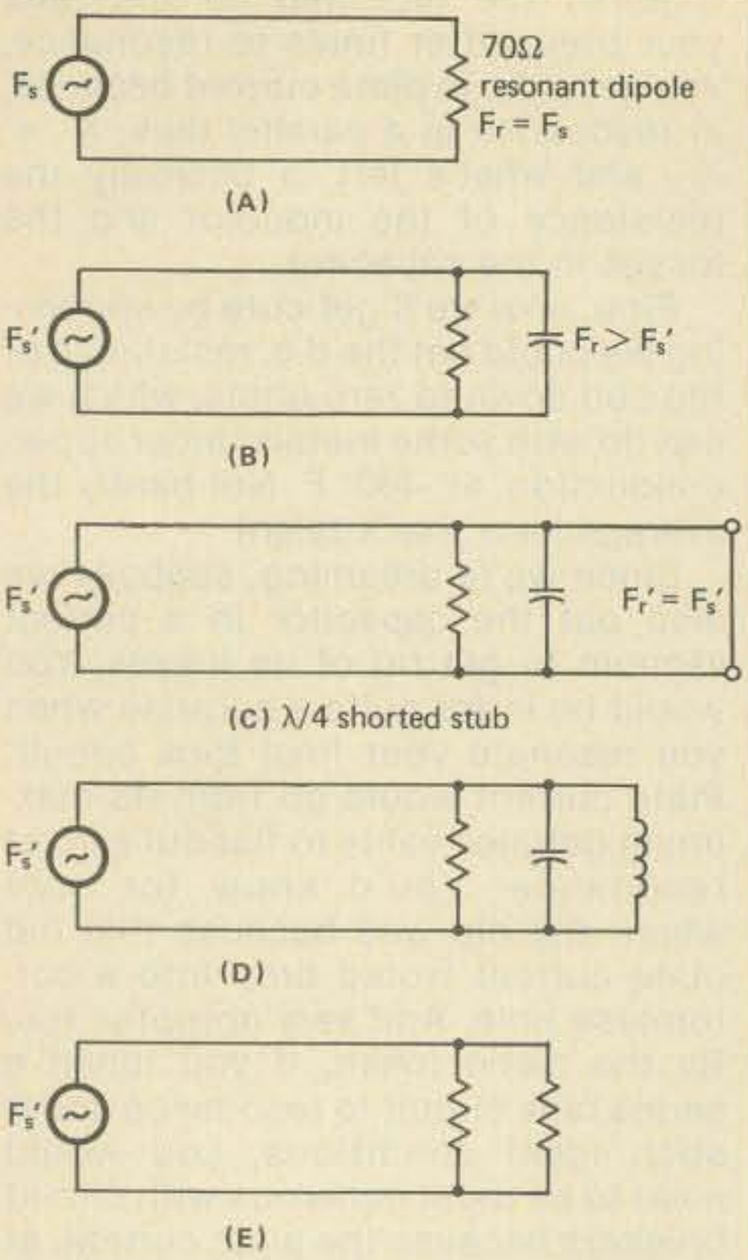


Fig. 5 - Various methods of presenting a purely resistive load to a source. See text for an explanation.

resonant circuit presents a short circuit to the source, take it from there to develop the explanation of why the off-resonance characteristics of fig. 1 for the series circuit are true. If you can believe what we put in there, just accept it. But fig. 1 is quite important; it is the basis for analyzing resonant sections of transmission lines. Now, on to the stub.

R.f. transmission lines usually come in two styles: the two-wire open line and the core-filled coaxial line. They are basically the same when you consider that a two-wire line becomes a coaxial line if you parallel one of the wires in a two-wire line with an infinite number of other lines so that they enclose the other line coaxially. That's coax.

In d.c. work it is important to get the d.c. resistance of the transmission line down to the lowest possible value to thwart Ohm's Law. It's a different ballgame at r.f. There's more.

Anytime you have two wires in proximity and separated by any kind of insulator, you have a capacitor. Any time you have changing magnetic fields, as there is when carrying r.f., you have inductance. In r.f. we are concerned not so much with the d.c. resistance of the conductors as we are those other physical characteristics that cause the transmission line to develop a capacitance and inductance. Since we aren't going to concern ourselves with resistance, let's take a look at the C and the L of it.

We could talk a lot about this distributed C and L on a transmission line and about losses, inefficiencies, propagation delays and a host of other characteristics. But we won't.

We will mention that the characteristic impedance of coax is equal to the square root of the inductance divided by the capacitance (no equations, please), but even that isn't too important here. The only point we want to make is that there is inductance and capacitance all along the length of a transmission line and these "inductors" and "capacitors" are frequency dependent. You already know this; you know that a half-wave section of coax on 160 meters is a lot longer than a half-wave section for two meters.

At the risk of boredom, let's quickly review the basics of standing waves. Take two transmission line sections, each one wavelength long, connected to an r.f. source. One section is shorted at the end, the other section is open. Naturally, there will be standing waves because the load impedances are infinite for one and zero for the other. Look at their standing waves as shown in fig. 2.

For the shorted section the voltage at the short is zero and the current is infinite (theoretically). It is the characteristic of an r.f. transmission line with standing waves that the line repeats itself every 180 degrees, which is a halfwave. If we have a short at the end, then every halfwave back the signal sees a short circuit. (Theoretically you could find that point of short circuit on a transmission line that's carrying a megawatt and grab it, even with you feet dunked in salt water, and it wouldn't hurt a bit. There's no voltage across the short. Watch out for the open circuit a half-wave back because that's got an infinite voltage on it, which could smart.)

If we can be permitted to talk about losses at this time, the obvious fact is that the voltage doesn't really grow to an infinite value at the open end, nor does the current become infinitely large at the short. They have finite values, and these finite values, using old Ohm's Law again, say that the voltage divided by the current define the effective impedance along the line.

Remember this: "When the impedance of the load matches the impedance of the line, the impedance becomes uniform along the line and is equal to the characteristic impedance of the line."

That's the happy situation where there is optimum transfer of power from source (rig) to load (antenna).

Another important point of theory here is that an open circuit, a short circuit or a pure reactance at the end of the line will not absorb power. But there will be standing waves along that line.

Now finally, we are ready to approach the stub by looking at reactive loads as represented by various sections of transmission lines.

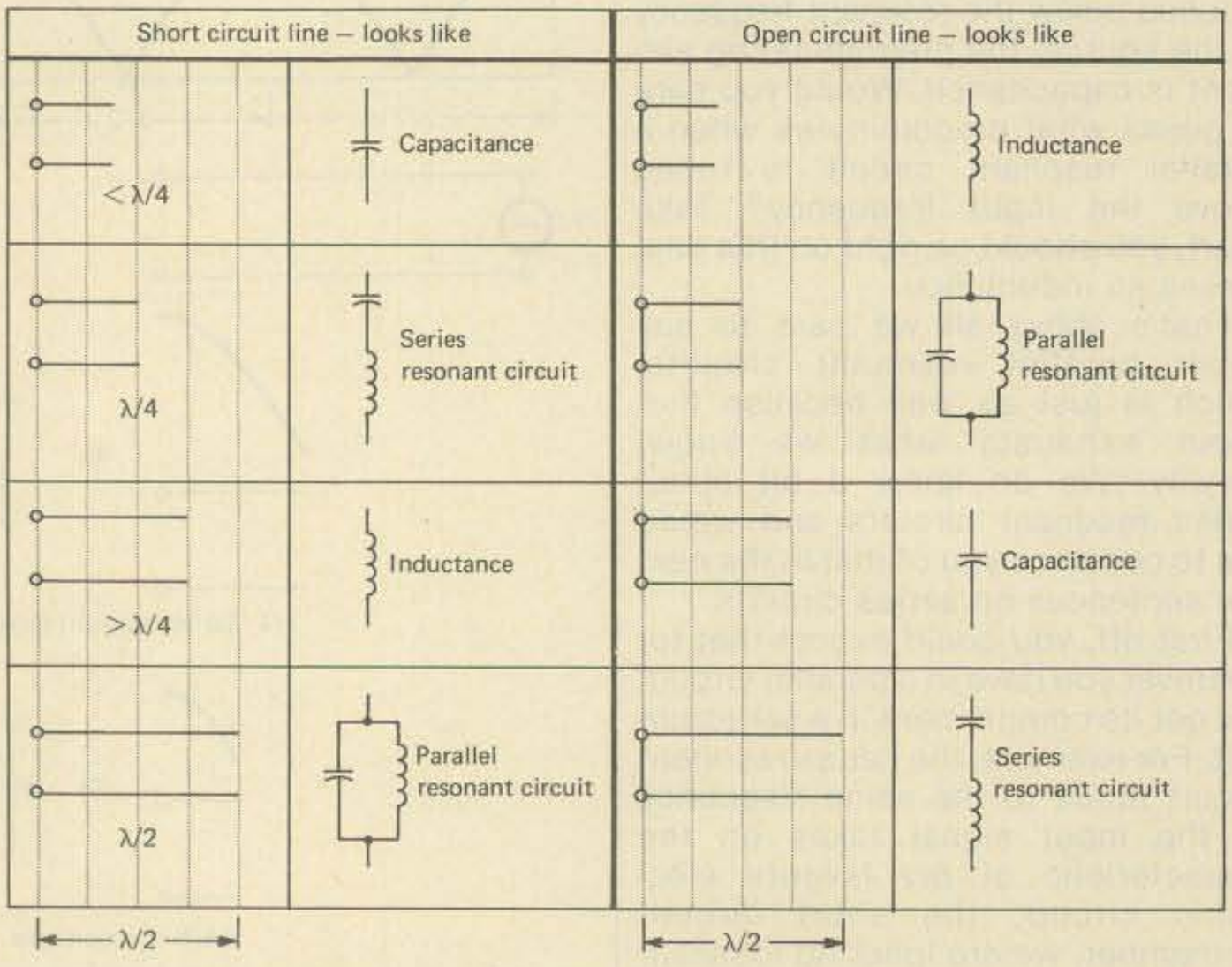


Fig. 6 - This chart shows a variety of stubs and how they present themselves to a source.

Quaterwave and halfwave sections of transmission lines act as tuned circuits. Formally stated: "When sections of line are used as tuned circuits, their action depends on the existence of standing waves to produce the effect of high-impedance or low-impedance tuned circuits."

Sections of line, therefore, can be used as impedance transformers when their ends are shorted or open.

In fig. 3, quarterwave and eighthwave sections are shown removed from the line so that we can look at these separately. When the quarterwave is shorted at one end, it has zero impedance at the short and infinite impedance at its other end. Which resonant circuit in fig. 1 presented an infinite impedance when the tank circuit was tuned to the source frequency? Right, the parallel resonant circuit. That's the point to remember: "A shorted quarterwave section of transmission line looks like a parallel resonant circuit one quarterwave from the short."

Now look at the eightwave section. An eightwave is less than a quarterwave (astounding) but that same physical length of eightwave at 7 MHz would be a quarterwave at 14 MHz. The deduction, then, is: The eighthwave is a resonant circuit tuned to a higher frequency than the source frequency.

Back, again, at fig. 1, when we had a parallel resonant circuit tuned to a frequency higher than the input frequency, what component did it represent? Right again, an inductance. You are beginning to see perhaps why we floundered through some resonant circuit characteristics earlier.

Fig. 4 shows the case for the open-circuited quarterwave and eighthwave sections. You should not be surprised to learn that the open-end quarterwave looks like a series resonant circuit, and the eighthwave open-end looks like a capacitance. In fact, if you butted a shorted eighthwave to an open eighthwave you would be adding pure inductance to pure capacitance to get you back to a shorted quarterwave parallel resonant section.

Certain games are played with less-than-quarterwave sections such as tuning out the reactance of an antenna by adding a section of line having equal and opposite reactance with, finally, the stub. Take an example application to see what can be done with the stub.

Assume we have a well-constructed dipole cut precisely for 7.002 MHz, where, at that frequency, the antenna provided a perfectly resistive load as represented by the resistor in fig. 5a.

Suppose you acquired the phone bug and wanted to work exclusively at

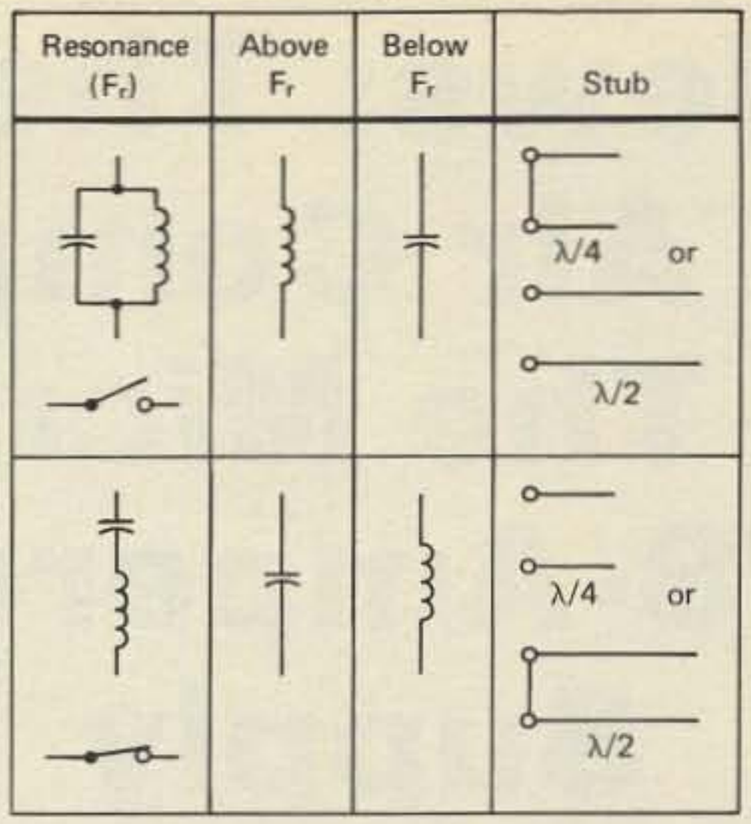


Fig. 7 - A pictorial summary of various resonant circuits and their relationships to frequency and transmission line stubs.

7.255 kHz. At this frequency the antenna will no longer look purely resistive but will take on a reactance which, in this case, will make the source see a capacitor across the resistor as shown in fig. 5b. (Fig. 1, again, where f_s is higher than f_r.).

The game plan will be to connect a stub that will have an inductive reactance equal to the capacitive reactance of the antenna so that they cancel and we can get back to a purely resistive load again at the new frequency. This means use of a section of shorted line less than a quarterwave, as shown in fig. 5c, where the effect is to present an inductance across the capacitance as shown in fig. 5d. Lo and behold, we now have a parallel resonant circuit consisting of the capacitance of the off-frequency antenna and the inductance of the shorted stub. These reactances cancel and now, for sure, we are back to a resistive load, fig. 5e. More than that, the resistive impedance of the parallel resonant circuit is so large that it has no practical shunting effect on the 70-ohm resistive impedance of the dipole.

For your convenience, and also because a few thousand of our best words can always be replaced by a picture, fig. 6 and 7 put it all together in chart form. Study them.

Not much has been said about halfwaves except, like cucumbers, they repeat on themselves. A shorted halfwave starts out as a series resonant circuit at the short and repeats as a series resonant circuit each halfwave away. In between, at a quarterwave, it is a parallel resonant circuit. All you need to remember is that the transmission line alternates every quarterwave between series and parallel resonance. Obviously, you have to know what it starts out as, whether shorted, open or terminated, to know what it will be any distance away.

That completes our conceptual view of stubs. We would stop here except we inadvertently used a term that opens up the other side of transmission line study: "terminated." Terminated implies resistive loads and this is what we do with transmission lines . . . match loads. It would all be in vain if we went to a lot of work to get a non-reactive antenna when, in the process, the resistance of the antenna, line and transmitter were horribly mismatched. Remember this: If the load is not matched to the line, the length of line becomes critical because of standing waves, in which case incorrect transmission line length may affect power output. When the load is matched to the line, the length of line is not critical. This is one way to know something about s.w.r; add a section of line and, if the tuning and power out change, you have it . . . standing waves.

We have no intention of getting into design aspects of stubs. If you wish to know precisely how long to cut a stub, (1) consult your handbook and, (2) we are pleased this article may have interested you sufficiently to learn more about stubs.

CQ Reviews: The *Archer* 12-Volt Air Compressor And The *Micronta* 12-Volt/8-Ampere Power Supply

BY ALAN M. DORHOFFER*, K2EEK

If you're anything like me, you like to have the right tool for the right job. If anything, I'm a genuine tool freak. I buy tools at the slightest provocation for any reason in the hopes that someday a task will come along for which I have the absolute correct instrument that will accomplish the job perfectly . . . if only once in a lifetime.

Recently when I received Radio Shack's new flyer, I skimmed through it as usual and stopped at two items that seemed a natural addition to my shop. One, the *Archer* 12 Volt air compressor (catalog number 61-2648) and the Micronta 12 volt 8 amp d.c. power supply (catalog number 22-125). These two items seemed perfect tie-ins for many jobs.

The Archer compressor is primarily designed to be used in recreational vehicles and camping purposes whereby you can power the unit from the automobile battery. Standard equipment included with the compressor are ten feet of air hose and various nozzles and adapters for inflating tires, beach balls, air mattresses, sports equipment etc. The power cord terminates in a cigarette lighter plug for easy connection. It operates from a nominal 12 v.d.c. and requires 6 to 9 amps. The unit does not require lubrication and is an oil-less piston type of compressor. Table I lists the approximate CFM delivery.

PSI	CFM	PSI	CFM
0	.70	20	.40
5	.60	25	.35
10	.53	30	.30
15	.45	35	.27

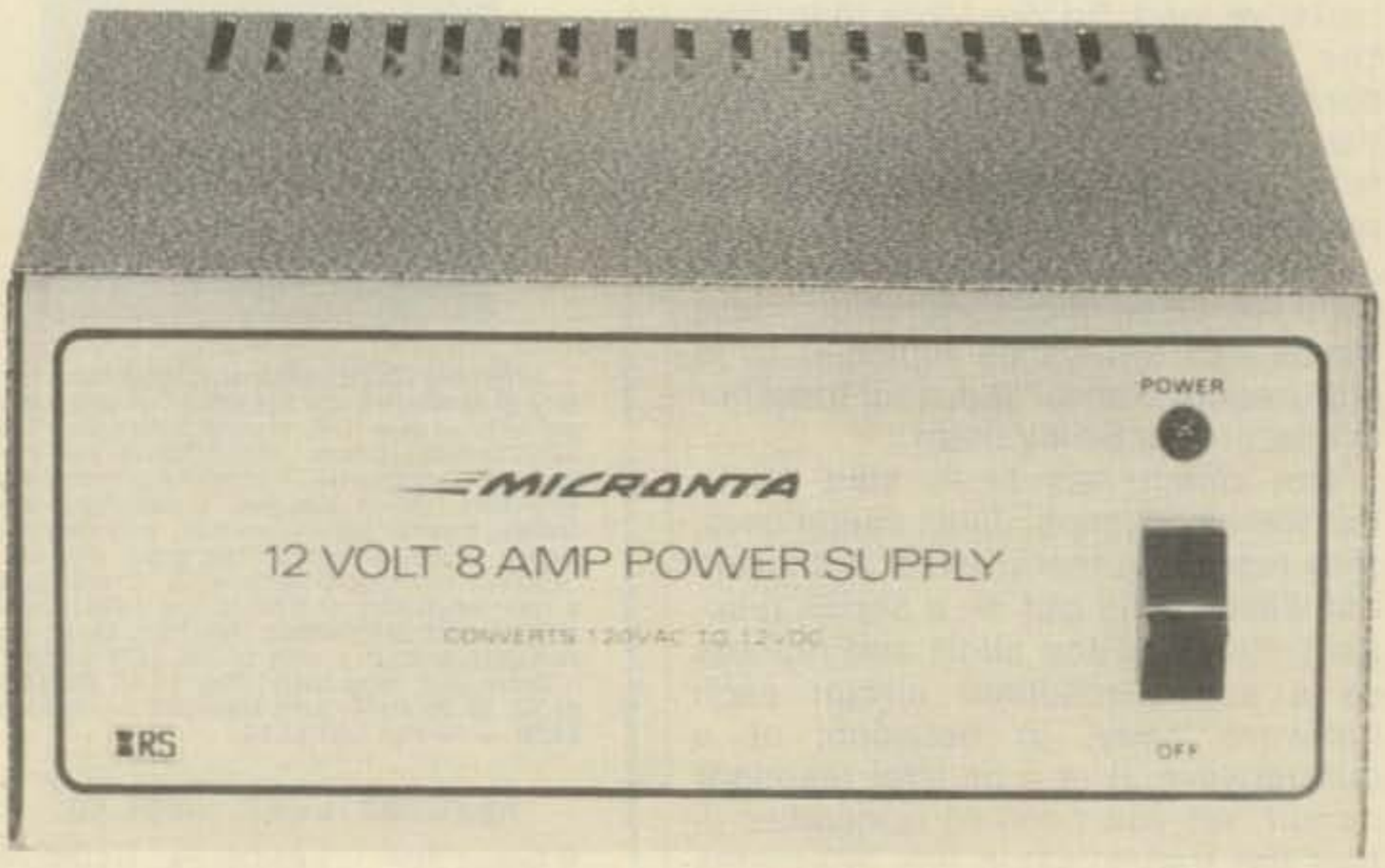
Table I - Approximate CFM delivery for the Archer air compressor.

The *Micronta* 12 volt power supply is small and compact. It will deliver a full load of 8 amps @ 12.5 v.d.c. when 120 v.a.c. is applied. Output voltage will vary depending on the input voltage. With inputs of 105 through 135 v.a.c. output voltage will appear from 9 through 15 v.d.c. at full load. The ripple voltage at half load (4 amps) is 1 V p-p and at full load (8 amps) is less than 2 V p-p. The power supply is ruggedly constructed and contains a heavy duty power transformer plus a 35 amp bridge rectifier. The front panel has an on-off indicator above the slide-switch for power. The rear panel has heavy-duty protected terminals plus a manually resettable circuit breaker for component protection. It is an ideal bench supply for almost any electronic project as well as a battery eliminator for repairing 12 volt equipment.

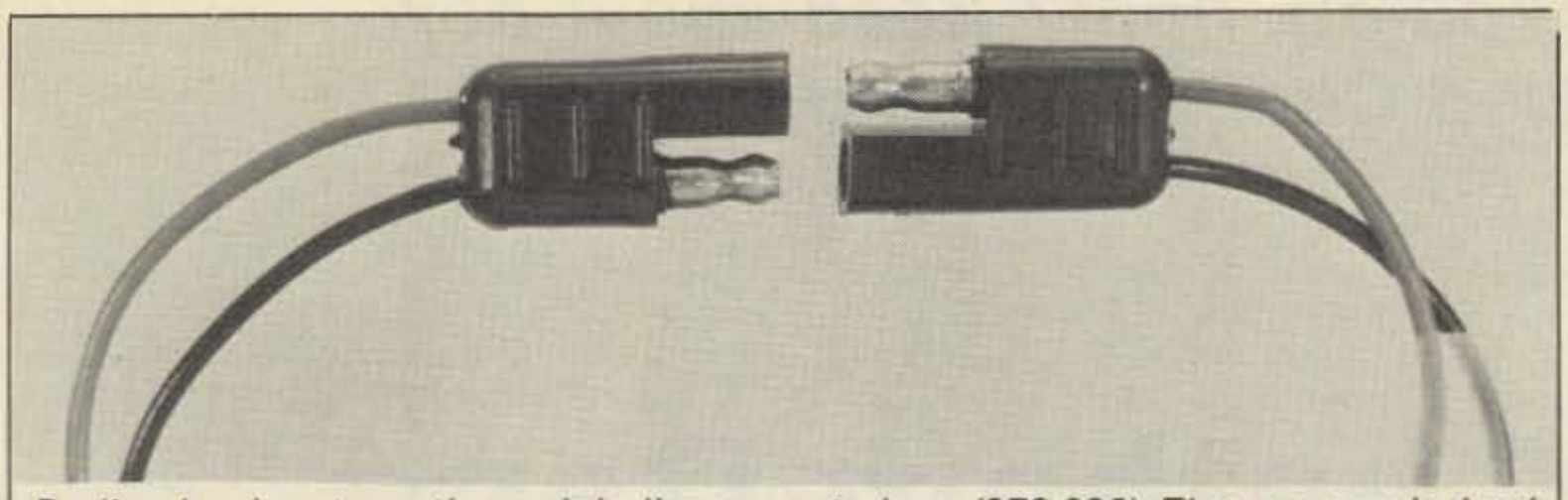
Other Uses

Although I drive a van and can see the uses for a portable air compressor that works off of my battery, it's also one of those things that I would use once in a rare while. Granted that the emergency use may

*Editor, CQ



The Micronta 12 volt, 8 amp power supply. The unit measures 3 3/4" × 8 × 6 5/8 and is housed in a sturdy metal cabinet.



Radio shack automotive quick-disconnect plugs (270-026). These are polarized connectors available from many sources.

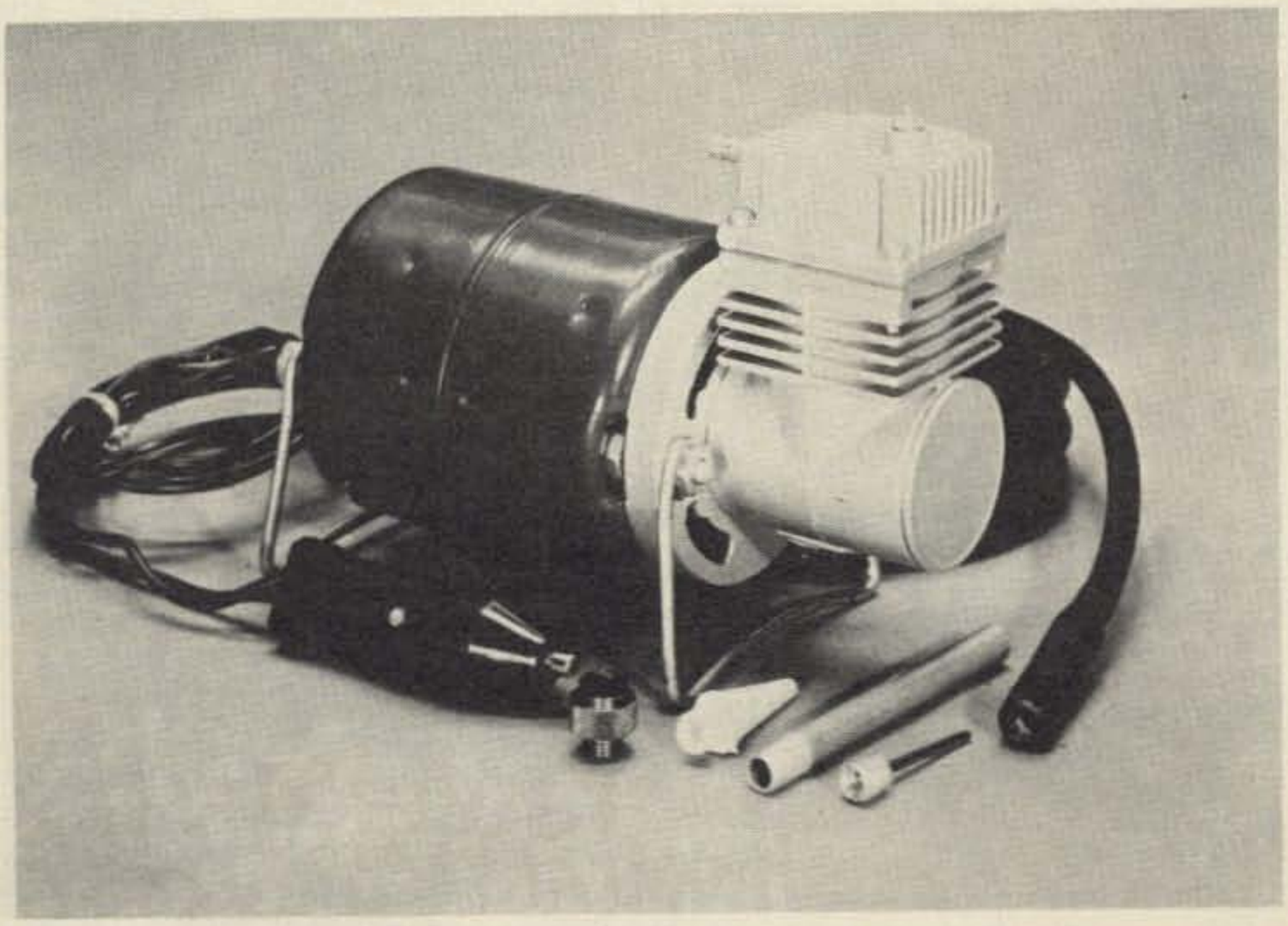
be worth the price, there are, nonetheless, far more uses around the shack and shop for a compressor than meet the eye.

The first thing I did was to pick up two sets of automotive quick-disconnect plugs (Radio Shack 270-026, or equiv.). I cut the wire going to the cigarette lighter plug then reconnected them with the quick-disconnect plugs. The other set of quick-disconnects were terminated with spade-lugs. Now I can run the compressor off of the van battery or the bench supply by unplugging and replugging the right terminations.

In the shack, the compressor is used to clean out equipment that has gathered dust and dirt over the years, blow out the bits and pieces of solder, metal and debris in construction projects and the clean off the work bench itself.

Other jobs around the house can be made simpler and easier with the compressor/power supply combination. Wood working projects can be cleaned of saw-dust prior to finishing-easier than with a brush, tools cleaned, model trains, cameras and antiques can be cleaned rapidly and simply. Though I'm not into making models, I can see where some sort of little paint sprayer could be attached to paint them. The combination is small enough to carry all over the house for a myriad of tasks, yet easy to separate when you want to take the compressor in the mobile. Another use that I've put the combination to is to pump up the tires on a bicycle and moped that lay dormant all winter; not very electronic, but it did save me trying to get them to the local gas station.

The Micronta 12 volt, 8 amp power supply sells for $59.95 and the Archer 12 volt Air Compressor is priced at $39.95. If you're priced small compressors alone you will see what makes these two items attractive additions to any shack. CQ



The Archer 12 volt mini air compressor is quite small as compared to the cigarette lighter plug in the foreground. The compressor comes with three feet of power cord, ten feet of air hose and the various adapters shown.

Who needs ZL3/C? You do, right? Read about how 22,000 amateurs added Chatham Island to their countries' list.

That Chatham Gang

Part I

BY JAN GOULD*, WA6YQW, ex-ZL3HI/3

The Chatham Islands are situated about 500 miles east of Lyttelton, N.Z. There are ten islands in the group.

The Islands are named for the British ship Chatham, the Captain of which first sighted the group in 1791. By 1861 the Chatham Islands were populated by some 400 Maoris, 160 Morioris, 17 half-castes and 46 Europeans. The present population is now around 500, total, the Morioris have long ago disappeared.

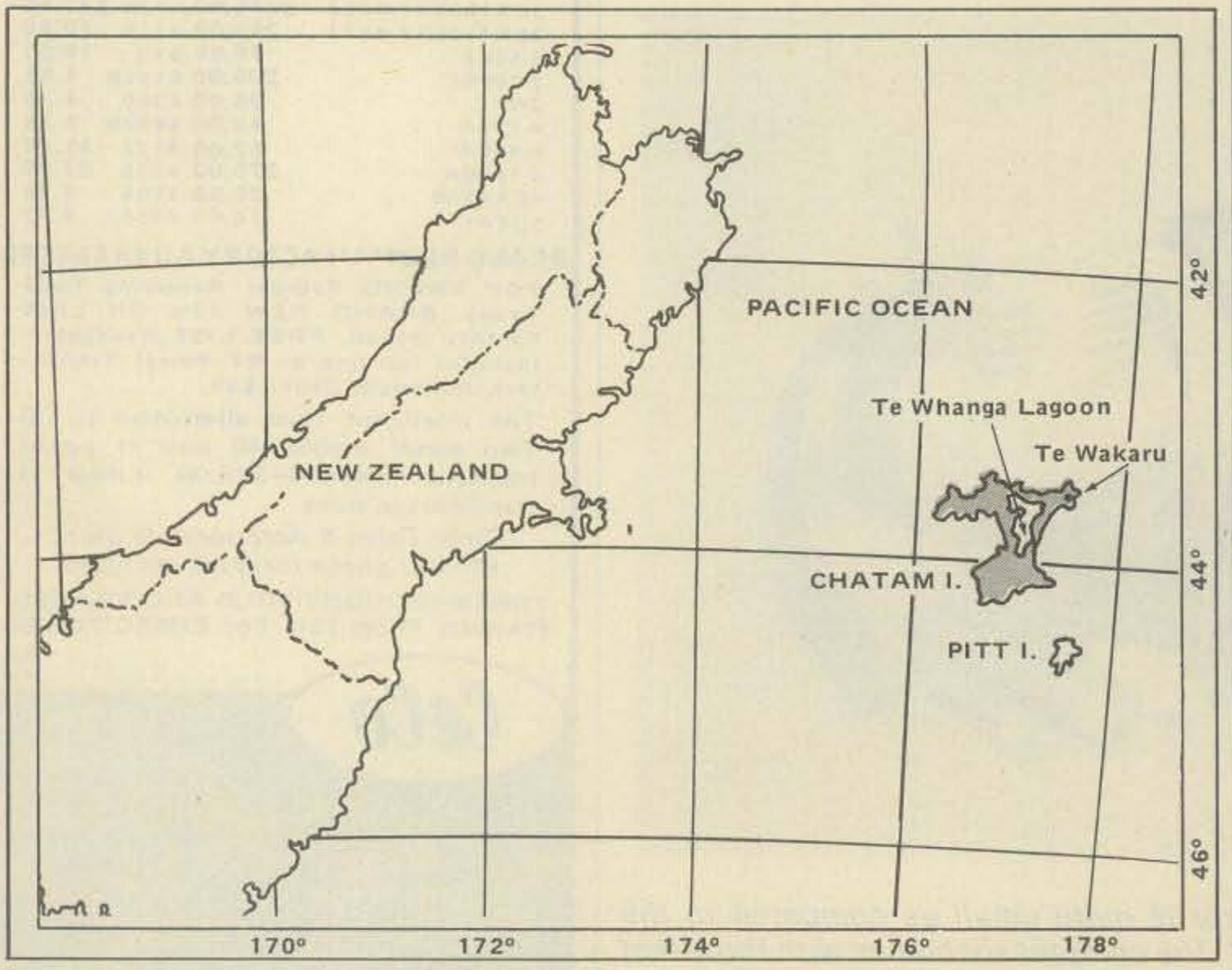
Most of the present population lives in the environs of Owenga and Waitangi and along the narrow strip of lowland that encloses the western side of the Te Whanga Lagoon. Current industries include fishing and sheep farming, both of which are the main support of the people. -K2VG

The locals there claim that you can taste the peat in the water on the Chatham Islands. Having only a nodding acquaintance with peat, disguised in an occasional libation of Scotch, I couldn't detect it. But, the great 40,000 square acre Te Whanga lagoon on the principal island is choking with the grey stuff. From the air it appears that the lagoon is surrounded by jagged hills of schist, ringed and joined by sand bars. This is Chatham...dark, dismal and assaulted by relentless winds...45 minutes out of sync with most of the world...hardly a south sea island of paradise!

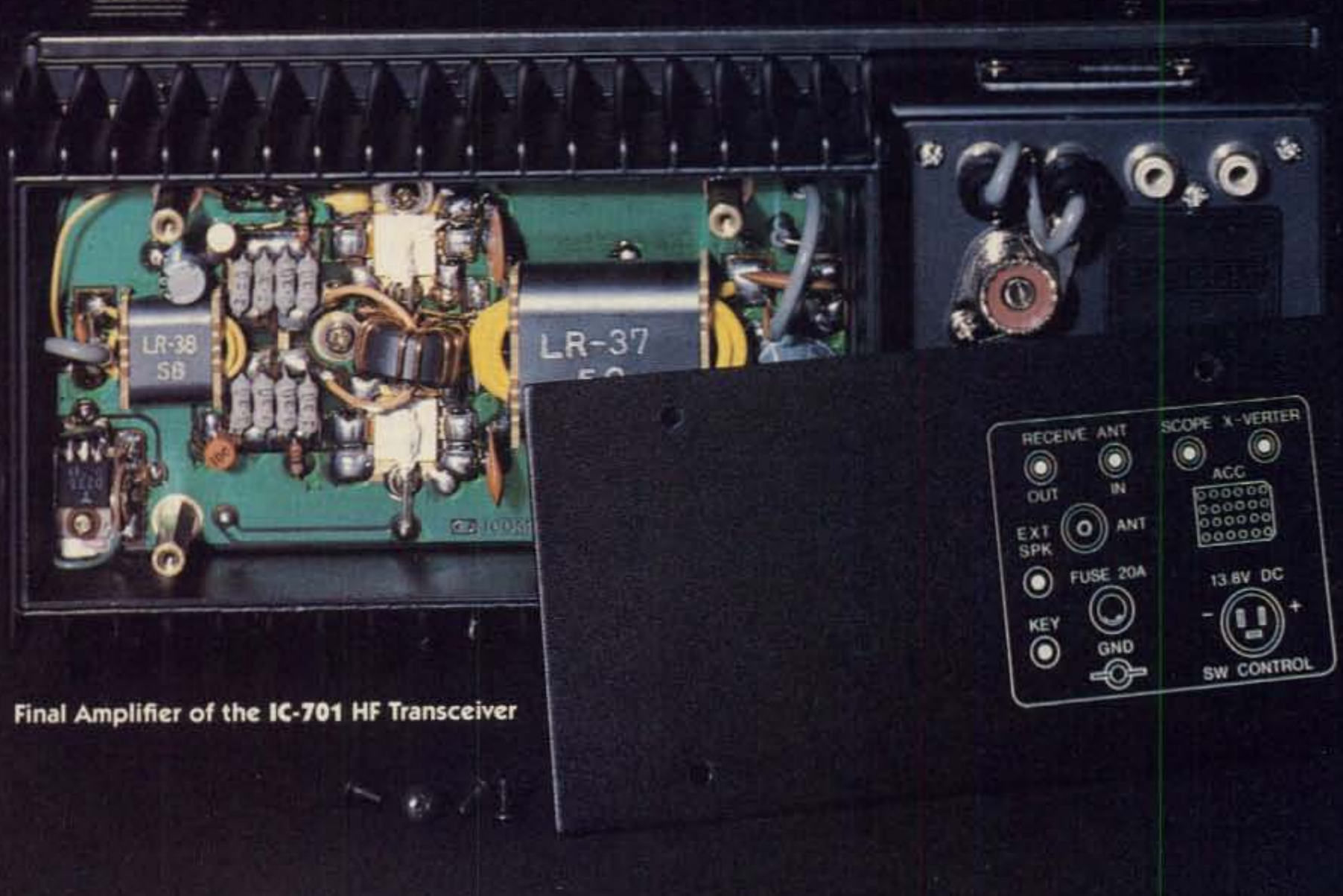
We began discussing it in March of '78 and Chuck, ZL1ADI, quickly put cerebral wheels in motion. Inquires by the dozen. Letters to the Minister of Transportation, the Department of Internal Affairs, his secretary helping to compile a correspondence file four inches thick, the decisions about who would accompany us as the team, a few hundred small agonies and ecstasies and seven months later you're all ready to set up shop. Right? Wrong! You have to get there, first!

In April I booked a roundtrip flight to Auckland where I would be joining Chuck and the other Zedders who would make up our eclectic group: Marion, 1BKL; Carol, 1AJL; Ron, 1AMO; Joe 2AH; Jim, 4NF and later, to our benefit, Brian, 3NR/C, the resident Radio Inspector on the island. It was decided that 28 October, the first day of the *CQ* WW, would be the "debut" of The Chatham Gang, with "ZL3HI/C" to remain an additional 8 days after. DX bulletins went to the ARS publications with the general information along with our plans for a program to make a special effort to include as many Novices as possible, wherever possible. Clearances, permits, assignment of the special call sign, arrangement for reciprocal license, generously interlaced with questions *ad infinitum*, plane skeds from Auckland to Chatham, advance

*1542 Beacon Ave., Anaheim CA 92802



The Final Warranty



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shipping of most of the gear. Plans, talking and more talking, until it seemed that every conceivable subject had been so throughly covered it became redundant. Even W9UCW's 160 meter "Minooka Special" had been promised us, fresh from the Mellish Reef DXpedition. Each detail so carefully attending to, nothing could possibly go haywire. Well....not much.

Ointment Wid Flies

Chuck's initial attempts to set up communication with the island via mail were frustrating. The hotel didn't respond, nor was immediate word received from the resident RI. It was learned months later that he was on holiday when the first letter arrived and an assistant apparently failed to call it to his attention upon his return . . . it was in the files. As it turned out, he was very happy about the plans and asked to join us as guest operator. He is the only ham on the island, so normal appearance on any band could cause a horrendous pileup. He opts for limited contacts, usually on 80 meters. No, Chatham wasn't "fished out." We're grateful for his full cooperation, before and during our trip. Without him on the receiving end, some of the gear might never have been located. One shipment, sent air freight from Auckland, was arbitrarily split up by someone in the shipping department, and the largest box containing two rigs and an amplifier was missent by boat. The bottom line is that had it missed that particular sailing, the next one wouldn't have arrived until the expedition was dead and buried in log sheets. We were luckier with an earlier mass shipment from the States . . . it only took a lot of time.

In the Almost Ran column: It wasn't until the 20th of October, that Chuck learned his letter to Antenna Supermarket had gone to the land of Limbo due to a change of their QTH and an answer that arrived by surface mail vs. airmail. The delayed reply was that the company would be happy to donate whatever we needed. Problem: Could those antennas possibly arrive within the next few days? This was Friday and the factory would be closed over the weekend. Solution: It was still Thursday in the States. Some super fast footwork by K9RT spelled TELEPHONE PDQ, and minutes later we had an answer. They would open the factory, over the weekend if necessary, to prepare the shipment which would be sent by air and reach us on the following Monday. How's that for cooperation! They even prepaid the freight and tossed in some extra unsolicited dipoles. However, another entry had to be made in the expedition's debit column. Duty had to be paid before it would be released to us by customs. Mental note: Reread chapter in Book of Etiquette headed "Gift Horses" and show a little class.

Also in the Lost and Found Dept: A late disappearance of another large box containing, among other necessities, all of the log sheets printed and donated to us by ZL2ACW. It was traced to an air freight warehouse in Wellington, the jumping off place, but not until one day before we departed for the Chathams. Someone forgot to get it out of the warehouse . . . they "lost" it and without 1ADI's persistance, it might still be langouring in that hangar.

His tenacity also uncovered a piece of premeditated sabotage that, undetected, would have sent us on the DXpedition with an expired license! It was incredulous and reads like a Grade B movie plot, but it was a direct attempt to get us scratched at the finishing wire. Chuck kept a constant "vigil" with the Postal Department, N.Z.'s counterpart of our FCC,

Surprise! Author Jan Gould at her operating table.

making certain that permits and licenses were valid, etc. It's their custom to mail a written notice, in advance of your amateur license expiration date; you then drop by and pay your fee for the renewal. Less than 24 hours before the flight to Wellington, he made an appearance at the PO and was informed that his *own* personal license was due to expire at noon the next day! The PO then presented him with a letter, bearing "his" name signature, notifying the PO that, "I am no longer interested in amateur activities...do not renew my license ...do not send any further notices to my home address..." Do not pass GO, do not collect $200.00! Not exactly verbatum, but you get the connotation. The letter had been sent enough in advance of their normal notification period to preclude his receipt of such a notice. *Ergo:* Too many months of hard work and too many thousands of dollars, personal funds, were at stake to have been lulled into lethargy at the witching hour. It did, however, call for a large round of aspirin on the rocks!

4NF went over to Chatham a few days prior to our arrival to get together with the RI and make some advance antenna preparations and we were in touch with them via 80 from Auckland. If Jim had belabored the point about WX condx, we would have all packed longjohns! He had been trying to equip the TenTecs with vox, but vetoed it as not being acceptable. He and Brian had an inverted vee, a 40 dipole and some slopers assembled, up and tested.

The six of us remaining on the mainland would fly to Wellington on the 26th and then, the last lap by Safe Air's "Bristol Freighter" to Chatham the morning of the 27th.

(To be continued)

Shrouded in mist and fog, our operating site's on a windy bluff overlooking Waitangi Cove. Enter hotel . . . stage left.

TS-120S... *A big little rig.*

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- All solid-state with wideband RF amplifier stages. No final dipping or loading, no transmit drive peaking, and no receive preselector tuning! *Just dial your frequency and operate!*
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- Noise blanker. You'll wonder where the ignition noise went.

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TS-120S

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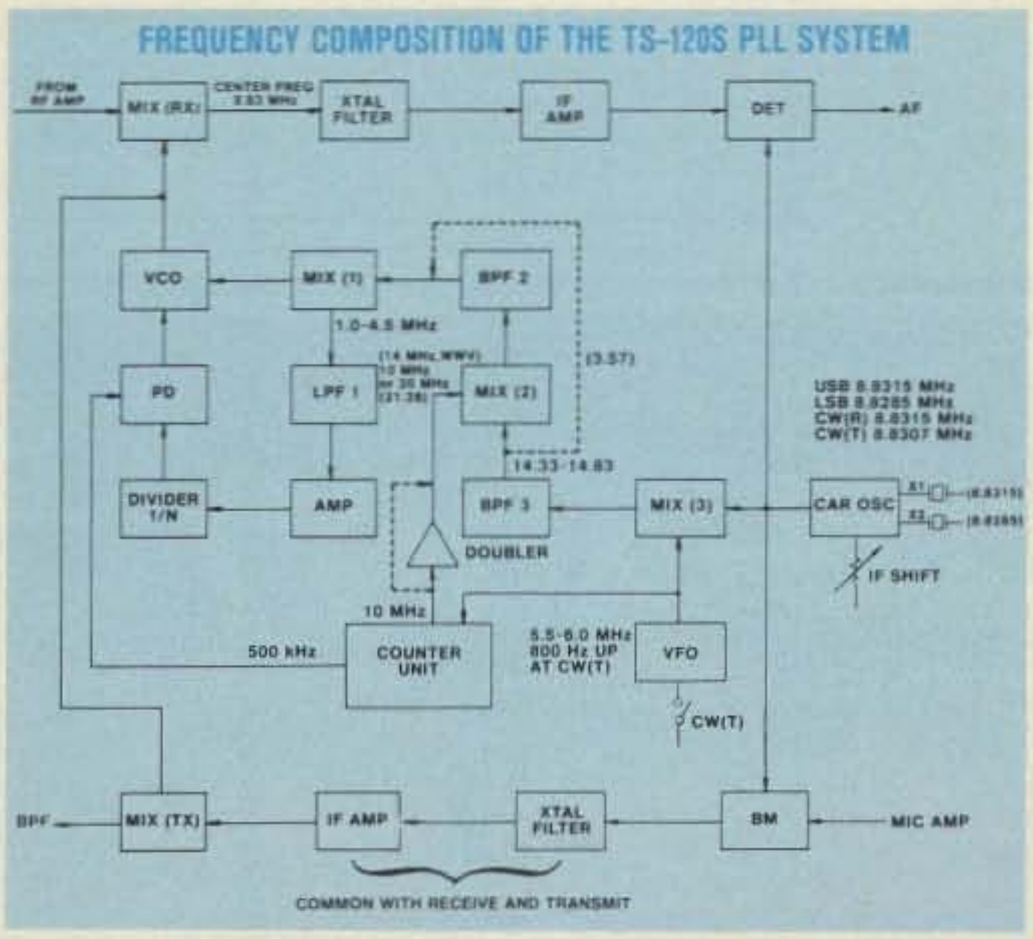
A single-conversion PLL (phase-locked loop) system is employed in the TS-120S. Only one crystal is required, instead of a heterodyne crystal element for each band, resulting in simplification of circuitry, and a marked improvement in overall stability. The single-conversion PLL system also improves the spurious characteristics during transmission and reception, and makes IF shift operation and mono-dial indication available on any model.

The VCO frequency is obtained from the PLL circuit by synthesizing the VFO and CAR frequencies and reference oscillating frequencies of 10 MHz and 500 kHz supplied by the counter. Bandswitching is accomplished by changing the preset value of the programmable divider in the PLL. Therefore, when switching bands, the frequency (except, of course, the 1-MHz and 10-MHz order digits) remains the same. The frequencies for each band and PLL stage are shown in the table.

FREQUENCY COMPOSITION OF THE TS-120S PLL SYSTEM



First, MIX (3) mixes the CAR and VFO frequencies, using a double balanced mixer to reduce spurious signals. The output of MIX (3), after passing through a bandpass filter (BPF 3) is applied to the input of MIX (1) on the 3.5 and 7.0-MHz bands. On the 14-MHz and WWV bands, MIX (2) mixes the output of MIX (3) with a 10-MHz signal from the counter-unit oscillator. On the 21 and 28-MHz bands, MIX (2) mixes the output of MIX (3) with a 20-MHz signal from a doubler connected to the counter-unit oscillator.

The output of MIX (2) – or MIX (1) on the 3.5 and 7.0-MHz bands – is mixed with the VCO output at MIX (1), providing output frequencies shown in the table. The output passes through a lowpass filter (LPF 1) and is amplified, and the resulting digital signal is divided by a programmable divider, producing a 500-kHz output.

"Information" from the band switches is converted into BCD signals in the counter and the division ratio as shown in the table is preset. The loop-filter consists of transistors mounted on the outside to minimize signals. A Motorola MC4044P functions as the phase comparator. Five VCO circuits with high-output transistors cover all of the bands.

If the output of the phase comparator unlocks, VCO output is switched off to prevent emission at unwanted frequencies and, at the same time, the digital display blanks to warn the operator.

What is the concept of the TS-120S digital counter for displaying frequencies?

The TS-120S digital counter employs a VFO frequency counting system. First, the VFO frequency is mixed with a 5-MHz signal obtained from the reference oscillator chain and is converted to 0.5 to 1 MHz. This signal passes through a lowpass filter, is amplified, buffered, and shaped into a digital (square) wave, passes through a 0.1-second gate circuit, and is applied to a four-digit counter. The signal is counted from 10 Hz to 100 kHz and is fed to a preset counter to derive the carrier output.

The 100-kHz order digit presets at 5 to display the operating frequency on the 3.5, 28.5, 29.5, and WWV bands, and at 0 for display on 7.0, 14.0, 21.0, 28.0, and 29.0 MHz. The 1-MHz and 10-MHz order digits are determined by a matrix operating with bandswitch information.

The counter outputs are switched by the multiplexer and converted from BCD to seven-segment information by the decoder to light the fluorescent display tubes. The large digits have good luminous intensity and a dark filter, providing fatigue-free viewing over long operating periods. The display can be read easily, even in the car and other sunlit locations.

The reference oscillator produces a 10-MHz signal and performs time-base division, and generates gate pulses, latch pulses, and reset pulses, which are applied to the counter. The PLL circuit produces 10-MHz and 500-kHz outputs. The marker circuit produces a 100-kHz signal which synchronizes the 25-kHz multivibrator to obtain a marker signal as accurate as the reference frequency.

The 1/10 division at the first stage of the count-down chain utilizes low-power Schottky TTL, and other divisions use CMOS ICs for low power consumption and minimum spurious emission. With the IF shift circuit, the CAR frequency is independent of both transmitting and receiving frequencies.

When the VFO frequency is counted, the operating frequency is indicated as accurately as the reference oscillator frequency, provided that the 10-MHz reference is calibrated to WWV.

True operating frequencies are displayed accurate to three digits (100-Hz order), regardless of CW transmitting and receiving frequencies or the position of the band switch or mode switch. When the VFO is tuned to the extent that the 1-MHz and 10-MHz orders are switched (beyond the band edge), these digits are blanked out.

FREQUENCIES FOR EACH BAND AND PLL STAGE

BAND	RANGE (MHz)	VCO (MHz)	MIX (1) INPUT (MHz)	MIX (1) OUTPUT (MHz)	DIVIDER RATIO	DCBA
WWV	14.5–15.0	23.33–23.83	24.33–24.83	1.0	1/2	1 1 1 0
3.5	3.5– 4.0	12.33–12.83	14.33–14.83	2.0	1/4	1 1 0 0
7	7.0– 7.5	15.83–16.33	14.33–14.83	1.5	1/3	1 1 0 1
14	14.0–14.5	22.83–23.33	24.33–24.83	1.5	1/3	1 1 0 1
21	21.0–21.5	29.83–30.33	34.33–34.83	4.5	1/9	0 1 1 1
28	28.0–28.5	36.83–37.33	34.33–34.83	2.5	1/5	1 0 1 1
28.5	28.5–29.0	37.33–37.83	34.33–34.83	3.0	1/6	1 0 1 0
29	29.0–29.5	37.83–38.33	34.33–34.83	3.5	1/7	1 0 0 1
29.5	29.5–30.0	38.33–38.83	34.33–34.83	4.0	1/8	1 0 0 0

for the experimenter

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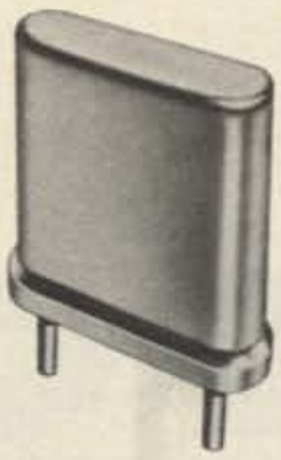

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Novice

"How to" for the newcomer to Amateur radio

Part III of III

This is the third and final part of this long article about code. The first part covered the advantages of code, what code is, word count system, and code tests. The second part provided tips on how to learn the code, including things one should do and should not do. Each part of the article is useful by itself but the whole article should be read to gain maximum benefit.

Code Practice Equipment

Headphones. It is advisable to use a headset when practicing code. Headset use minimizes annoyance to other people in your home and helps you concentrate better on your code practice since you will not be disturbed by household noises. If you are going to purchase a set of headphones for later use in your amateur station, get a good set of communications headphones. Wide audio range (high fidelity) earphones are not good for our purpose. We need extremely sensitive headphones with limited audio range reproduction capability. Comfort and light weight are also of major importance in selecting headphones since they are sometimes worn for long periods of time. A dual headphone set is better than the single earphone type and it is best to select a set which has soft muffs which increase wearing comfort and better isolate one from household noises.

*2814 Empire Ave., Burbank, CA 91504

This is 16-year-old Wayne Ditsworth (WBØYWP) of Cedar Rapids, Iowa. Wayne worked 27 states with a crystal controlled 90 watt transmitter and an old (1938 vintage) National receiver, which he borrowed from a local club. He now owns a Yaesu FT-401-B and all the accessories, which he bought with income from his paper route. He has already earned TAD, WAC, WAS, and WPNX awards. He has worked 71 countries. Most of his contacts were made using a random length longwire antenna on 15 meters but he now has a 3-element tri-band beam up 60 feet. Wayne's dad is WBØZVN and his 13-year-old brother (Todd) is WDØFAN. Wayne is trying to master enough radio theory and I hope he has passed the General examination by the time this item is printed.

Keys. Do not get a junky handkey; it would not be a bargain at any price. There are some Japanese manual telegraph keys (TK-11, etc.) available at less than $4 which can be satisfactory. However, the keying contacts usually do not line up very well on these keys and one must take care to select a key which has good contact alignment. Select a handkey which has adjustable contact spacing, adjustable keying tension, and good pivots that can provide a smooth keying action. Do not select a key that is mounted on a high base plate because it is much more comfortable to send when the top surface of the key knob is close to the desk or table surface on which your arm rest. Position your handkey where you can easily reach it while comfortably seated at your operating position with your elbow on the table. You can actually practice the sending motion without a handkey. Simply sit in close to the table or desk, place your arm in a comfortable position with your elbow on the table, and practice raising and dropping your wrist as you would do it to send specific code symbols. This simple practice procedure is surprisingly effective in helping finger tappers overcome early bad sending habits. Another effective way to overcome finger tapping is to exaggerate the length of the dahs when sending.

Bugs and Keyers. There are several other keying devices besides the manual telegraph key (handkey). The semi-automatic key remains popular with some of the more proficient operators. These are commonly referred to as bugs because the trademark of the company (Vibroplex) which manufactured thousands of them is a bug. The bug produces a series of evenly spaced dits when the sending lever is moved to one side and the operator moves the same lever in the other direction to manually produce each required dah. In other words, the dits are automatically produced and the dahs are manually sent; that is why this device is called a semi-automatic key. Some fully automatic keys have been produced that operate with a pendulum action that is similar to that of the semi-automatic key when it produces dits; however, dits and dahs are automatically produced when the sending lever is moved to one side or the other. There is now a wide variety of keyers available and they provide many desirable features that are not available with handkeys or bugs. Some keyers have the paddle (sending instrument) built in but the paddle must be separately obtained with many keyers. It is easier to master a keyer than a bug and both bugs and keyers are easier to use at high speeds than handkeys. Keyers can include features such as a sidetone oscillator (which lets one hear the code being sent during practice or real transmissions), monitor volume level, monitor tone level, speed adjustment, weight adjustment (lengths of dit or dah relationship), and programming (which permits a repetitious call to be automatically sent at the flick of a switch). The versatility of modern keyers is truly amazing. It is advisable to use a handkey until a code receiving proficiency of about 17 w.p.m. has been developed. When this point is reached, it is best to switch to a bug or

INTERNATIONAL MORSE
(continental code)

LETTERS		á or å	·–·–
A	·–	ch	––––
B	–···	é	··–··
C	–·–·	ñ	––·––
D	–··	ö	–––·
E	·	ü	··––
F	··–·	FIGURES	
G	––·	1	·––––
H	····	2	··–––
I	··	3	···––
J	·–––	4	····–
K	–·–	5	·····
L	·–··	6	–····
M	––	7	––···
N	–·	8	–––··
O	–––	9	––––·
P	·––·	0	–––––
Q	––·–		
R	·–·	FIGURES IN ROUTINE REPETITIONS	
S	···	1	·–
T	–	2	··–
U	··–	3	···–
V	···–	4	····–
W	·––	5	·····
X	–··–	6	–····
Y	–·––	7	––···
Z	––··	8	–··
OPTIONAL LETTERS		9	–·
ä	·–·–	0	–

PUNCTUATIONS AND OTHER SIGNS	
Period	·–·–·–
Comma	––··––
Colon	–––···
Question mark	··––··
Apostrophe	·––––·
Hyphen	–····–
Fraction bar	–··–·
Brackets	–·––·–
Double hyphen	–····–
Underline	··––·–
Understood	···–·
Error	·····
End of message	·–·–·
Invitation to transmit	–·–
Wait	·–···
End of work	···–·–
Starting signal	–·–·–
Separation signal	·–·–·
*Semicolon	–·–·–·
*Quotation mark	·–··–·

Numerals and punctuation marks are the same in the codes for all languages.
*Not official but in general use.

GREEK

GREEK LETTER	MORSE SYMBOL	
A	·–	Alpha
B	–···	Beta
Γ	––·	Gamma
Δ	–··	Delta
E	·	Epsilon
Z	––··	Zeta
H	····	Eta
Θ	–·–·	Theta
I	··	Iota
K	–·–	Kappa
Λ	·–··	Lambda
M	––	Mu
N	–·	Nu
Ξ	–··–	Xi
O	–––	Omicron
Π	·––·	Pi
P	·–·	Rho
Σ	···	Sigma
T	–	Tau
Υ	–·––	Ypsilon
Φ	··–·	Phi
X	····	Chi
Ψ	––·–	Psi
Ω	·––	Omega
HΥ	···–	Eta Ypsilon
ΥI	·–––	Ypsilon Iota
OΥ	··–	Omicron Ypsilon
AI	·–·–	Alpha Iota
AΥ	·–·–	Alpha Ypsilon
EΥ	····	Epsilon Ypsilon
OI	–––	Omicron Iota

JAPANESE MORSE
(sometimes referred to as Kata Kana Radio Code)

A	KA	SA	TA	NA	HA	MA	YA	RA	WA
ア	カ	サ	タ	ナ	ハ	マ	ヤ	ラ	ワ
I	KI	SI	TI	NI	HI	MI	I	RI	(W)I
イ	キ	シ	チ	ニ	ヒ	ミ	イ	リ	ヰ
U	KU	SU	TU	NU	HU	MU	YU	RU	U
ウ	ク	ス	ツ	ヌ	フ	ム	ユ	ル	ウ
E	KE	SE	TE	NE	HE	ME	E	RE	(W)E
エ	ケ	セ	テ	ネ	ヘ	メ	エ	レ	ヱ
O	KO	SO	TO	NO	HO	MO	YO	RO	WO
オ	コ	ソ	ト	ノ	ホ	モ	ヨ	ロ	ヲ
N		NIGOH	HAN-NIGOH	HYPHEN	PERIOD	BRACKETS	QUOTES	PARAGRAPH	QUESTION MARK
ン		″	•	ǀ	·	()	″	¶	?

RUSSIAN

RUSSIAN LETTER	MORSE SYMBOL	
А	·–	A
Б	–···	B
В	·––	V
Г	––·	G
Д	–··	D
Е,З	·	E
Ж	···–	J
З	––··	Z
И	··	I
Й	·–––	Y
К	–·–	K
Л	·–··	L
М	––	M
Н	–·	N
О	–––	O
П	·––·	P
Р	·–·	R
С	···	S
Т	–	T
У	··–	U
Ф	··–·	F
Х	····	H
Ц	–·–·	TS
Ч	–––·	CH
Ш	––––	SH
Щ	––·–	SHCH
Ъ,Ь	–··–	Mute
Ы	–·––	I
Ю	··––	YU
Я	·–·–	YA

keyer. If you plan to use both a bug and a keyer, it is good to use your left hand with one and your right hand with the other. The differences in timing and sending action does not seem to cause too much trouble when one does not use the same hand for sending with both a bug and a keyer.

Code Practice Oscillators. If you already have a transmitter with a sidetone oscillator built in, you can usually use that sidetone oscillator for code practice by simply setting the function switch to a non-code mode. If you have a receiver you can make a satisfactory code practice device by inserting your handkey in series with one of the audio leads connecting to the speaker or headset. Tune the receiver to a constant beat signal, such a WWV on 2.5, 5, 10, 15, or 20 megahertz. Every time you depress (close) the key contacts, the tone will be heard. If this system is used, remember that normal receiver operation is restored by leaving the key contacts closed. Many electronic keyers have provisions to allow a handkey to be connected for keying a built-in sidetone oscillator. If you are just getting started and have nothing to produce a code practice tone, build or buy a simple code practice oscillator (CPO). Circuits, kits, and manufactured CPOs are readily available and there is little to be gained from spending a lot of money on a CPO. The CPO should have variable tone, variable volume, and a headset jack that disconnects any internal loudspeaker.

TURKISH

A	·–
B	–···
C	–·–·
Ç	–·–··
D	–··
E	·
F	··–·
G	––·
H	····
I	··
J	·–––
K	–·–
L	·–··
M	––
N	–·
O	–––
Ö	–––·
P	·––·
R	·–·
S	···
Ş	––––
T	–
U	··–
Ü	··––
V	···–
Y	–·––
Z	––··

AMERICAN MORSE

A	·–	W	·––
B	–···	X	·––·
C	·–··	Y	·–·–
D	–··	Z	··· ·
E	·	&	· ···
F	··–·	1	·––··
G	––·	2	··––·
H	····	3	···–·
I	··	4	····–
J	·––·	5	·····
K	–·–	6	–····
L	·–··	7	––···
M	––	8	–·····
N	–·	9	––––·
O	–––	0	–––––
P	·––·	Period	·–·–·–
Q	––·–	Comma	––··–·
R	·–·	Hyphen	–····–
S	···	Question mark	··––··
T	–	Exclamation mark	·–·–·–
U	··–	Colon	———···
V	···–	Parenthesis (	–·––·–
		)	–·––·–·
		Quotation	·–··–·
		End of quotation	·–··–·
		Colon dash	·––·–·
		Capitalized letter	·–·–··
		Small letter	··–·–·
		Colon followed by quotation	·––·–·
		Semicolon	–·–·–·
		Paragraph	·––·–
		Apostrophe	·––––·
		Dollar	···–··–
		Cents	·–·–·
		Pound sterling	·––·–·
		Shilling	····–·
		Percent	––––·

ARABIC

ARABIC LETTER	MORSE SYMBOL		ARABIC LETTER	MORSE SYMBOL	
ا	·–	Alif	ض	···–	Dad
ب	–···	Ba	ط	··–	Ta
ت	–	Ta	ظ	–·––	Za
ث	–·–·	Tha	ع	·–·–	Ain
ج	·–––	Jeem	غ	––·	Ghain
ح	····	Ha	ف	··–·	Fa
خ	–––	Kha	ق	––·–	Qaf
د	–··	Dal	ك	–·–	Kaf
ذ	––··	Dhal	ل	·–··	Lam
ر	·–·	Ra	م	––	Maam
ز	–––·	Zay	ن	–·	Noon
س	···	Seen	ه	··–··	He
ش	––––	Sheen	و	·––	Waw
ص	–··–	Sad	لا	·–···–	Lam-Alif
			ي	··	Ya

Dit-to-Dah Relationship.

The dah is generally said to be three times as long as the dit. This relationship only holds true at about 15 w.p.m. The length of the dit is constant; it is the time required to lift the wrist after depressing it to send the dit. Since it takes about the same length of time to depress or raise the wrist, the spaces between dits and dahs in a symbol are about a dit length. At a code speed of about 2 w.p.m., the dah is commonly about 6 times the dit length and it shortens to about 5 times the dit length at 5 w.p.m. The dah length is reduced to about 4 times the dit length at 9 w.p.m. and is about 3 times the dit length at 15 wpm. The dah is about twice as long as the dit at 35 w.p.m. and is reduced to about 1.5 times the dit length at 55 w.p.m. The dit length does not vary in good code, nor does the space between dits and dahs in a code symbol. The dah length does vary with code speed, as does the space between words. The space between words is basically twice the length of the dah being sent, plus one dit length. If you are sending code at 5 w.p.m., the space between two words should be about 11 dits long and it is most easily obtained at this slow speed by taking your hand off the key between words. Good code sounds smooth and pleasant at any speed. Expend the time and effort required to develop good code receiving and sending capabilities. Give yourself the option to operate code whenever you wish to do so; don't be forced into other modes of operation due to poor code ability.

The International Morse Code (also called the Continental Code) bears that name because it is based on the English language alphabet and English is the internationally accepted language for radio use. There is no mysterious method which allows foreigners to understand transmissions sent in the International Morse Code. If the receiving operator does not understand the language in which the material is sent, he will have to translate it to know the meaning. Morse codes exist to match several other languages including Arabic, Greek, Japanese, Russian, and Turkish (See Figure (1). In addition, some operators still use the American Morse Code which was originated by Samuel F. B. Morse and was extensively used in wire telegraphy.

It is legal to use known codes, other than the International (Continental) Morse Code as long as all operators involved in the contact agree to the use of another code, all identifications are in the International Morse Code, and a code based on an internationally recognized language is used. In other words, you cannot make up a code based on a language that is not internationally known; that would be a cipher, which is illegal.

The International Morse Code contains many symbols that are not included in the code examination administered to amateur radio license applicants. This code also includes several symbols which are not commonly used by amateurs.

The International Morse Code symbols one must know to pass the FCC examination are as follows:

A	.-	Alfa
B	-...	Bravo
C	-.-.	Charlie
D	-..	Delta
E	.	Echo
F	..-.	Foxtrot
G	--.	Golf
H	....	Hotel
I	..	India
J	.---	Juliett
K	-.-	Kilo
L	.-..	Lima
M	--	Mike
N	-.	November
O	---	Oscar
P	.--.	Papa
Q	--.-	Quebec
R	.-.	Romeo
S	...	Sierra
T	-	Tango
U	..-	Uniform
V	...-	Victor
W	.--	Whiskey
X	-..-	Xray
Y	-.--	Yankee
Z	--..	Zulu

	Normal Use	Repeated Use	
1	.----	.-	
2	..---	..-	
3	...--	...-	
4	....-	....-	
5	.....	.....	
6	-....	-....	
7	--...	-...	
8	---..	-..	
9	----.	-.	
0	-----	-	
?	Question Mark	..--..	IMI
,	Comma	--..--	MIM
.	Period	.-.-.-	AAA
/	Slant Bar	-..-.	DN
	Paragraph/Break (or Double Hyphen)	-...-	BT
	End of Message	.-.-.	AR
	End of Work	...-.-	SK
	Invitation to Transmit	-.-	K

An overline or underline is used to indicate that the code symbol is composed of the indicated simple letters run together. As an example, the end of work symbol is ...-.- with no separation anywhere in the symbol. When this work sign is copied, the operator simply prints SK or SK to indicate the end of work symbol. Obviously, it would be just as good to use VA or VA to indicate this same symbol, and this is done by some operators. In each case, if the code symbols for S (...) and K (-.-) or V (...-) and A (.-) are run together, they form the end of work code symbol (...-.-).

There are many International Morse Code symbols which are not included in the FCC amateur code examinations but are good to know. Some of the following symbols and work signs are frequently used by amateurs, whereas others are almost never heard on the amateur bands.

Apostrophe	.----.	WG
Attention	-.-.-	KA
Best Regards	--... ...--	73
Bracket	-.--.-	KK
Closing Station	-.-. .-..	CL
Colon	---...	OS
Distress Signal	...---...	SOS
Dollar Sign	...-..-	SX
Error Sign	..... (or)	
Error Sign	..--..	IMI
Fondest Regards (Between Females)	...-- ...--	33
From	-.. .	DE
General Call to All Stations	-.-. --.-	CQ
Hyphen	-....-	DU
Keep Out	----. ----.	99
Love and Kisses	---.. ---..	88
No	-.	N
Period (repeated use)	.-.-.	AAA
Quotation Mark	.-..-.	AF
Received	.-.	R
Safety Signal	- - -	T T T
Semicolon	-.-.-.	NNN
Separation Signal (Between Whole Number and Fraction)	.-..-	AU
Underline	..--.-	IQ
Understood	...-.	SN
Urgent Signal	-..- -..- -..-	X X X
Wait	.-...	AS
Yes	-.-.	C
Zero (Repeated use)	-	T
Repetition Sign	..--..	IMI

Symbols such as the bracket, quotation mark, and underline must be sent to indicate where they start and end in the text.

If you know amateurs who are not good code operators, you could help them to more fully enjoy operating by directing their attention to this article.

Summary

This concludes this three part code article and it is hoped that you have benefited in some way from reading it. Pass some of the major points along to others who are trying to learn how to be good code operators. I hope to contact you soon on the novice bands and you can be sure that it will be my pleasure to work you at any speed you like.

A Lilliputian boob tube. And one resourceful amateur immediately finds a way to apply it to his hobby.

The Microtelevision— Tool Or Toy To Amateur Radio

BY ROBERT J. TRAISTER*, WB4KTC

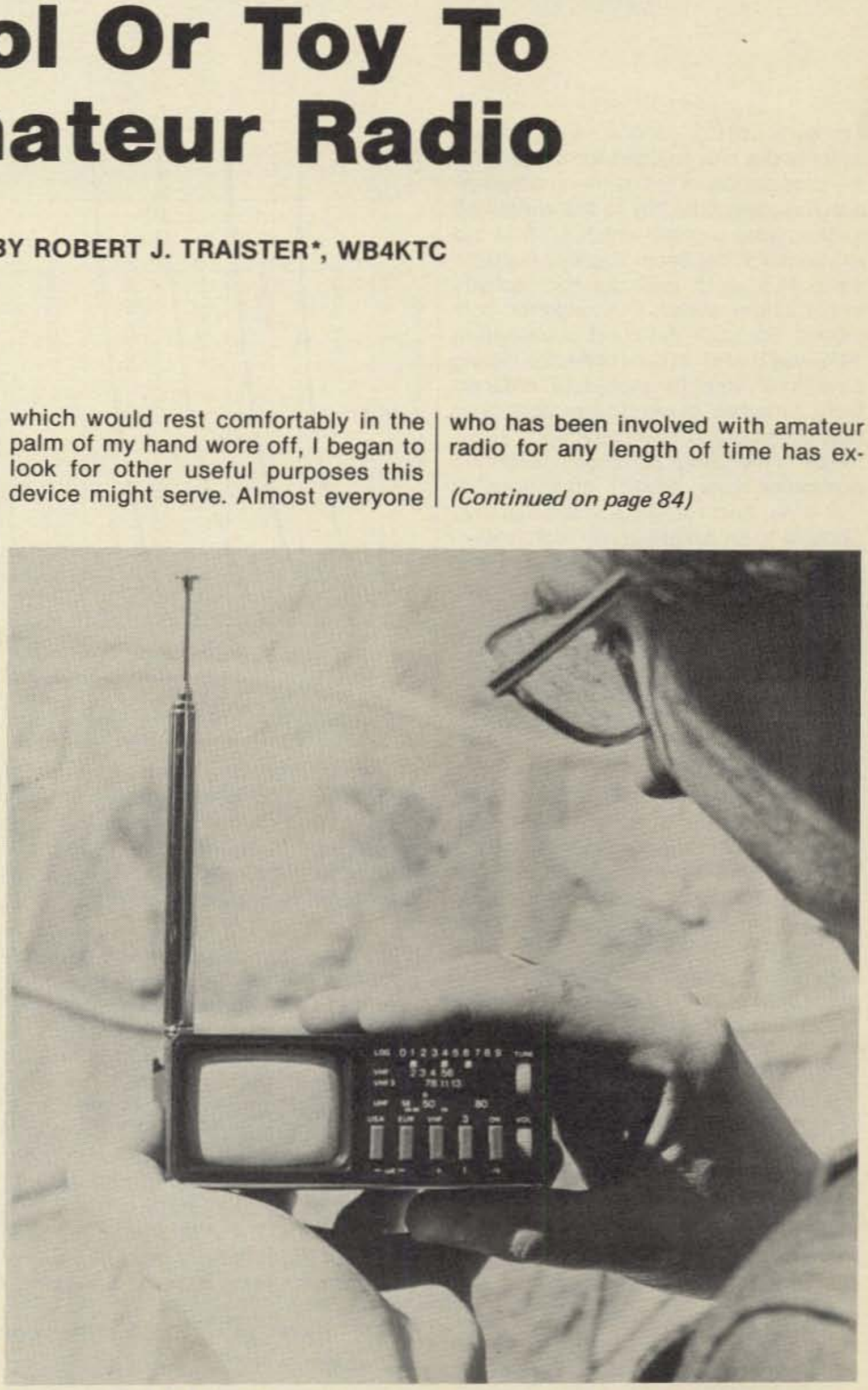
When I saw it advertised, I just couldn't resist ordering the micro-TV which was recently marketed by JS & A in Northbrook, Illinois. The set shown in the photograph must be the smallest commercially available television set ever made. It resembles, in size, a transistor radio and features full v.h.f. and u.h.f. coverage. Various switches allow for the use of this set in countries which transmit at different line rates and it may be operated from standard 115 volt house current which also serves to charge the internal batteries which are also included in the standard price along with a vinyl carrying case, a sun screen, and various plugs for 6 volt and 12 volt automative use.

The picture quality could only be described as excellent. The received image looks like a very sharp photograph. In viewing several programs, it was astounding to note that even phone numbers and headlines which are often flashed across the bottom of the screen are perfectly readable. A slide rule type of tuning is used to conserve the space that would be occupied by a fixed selector type of tuning. Sensitivity is very good and, while not quite comparable to a fixed-tuned model, provides excellent reception.

I had not originally ordered the set for amateur radio purposes, but after the novelty of using a television set which would rest comfortably in the palm of my hand wore off, I began to look for other useful purposes this device might serve. Almost everyone who has been involved with amateur radio for any length of time has ex-

(Continued on page 84)

*501 S. Royal Ave., Suite 204, Front Royal VA 22630



A true palm-of-the-hand television receiver, including the internal battery pack.

A Note On Ionsopheric Propagation Forecasts

THEODORE J. COHEN, N4XX † and GEORGE JACOBS, W3ASK*

In early 1975, Jacobs and Cohen[1] described a new method for simplifying the preparation of ionospheric propagation forecasts. The key to the simplified method was a chart which plotted the relationship between readily available solar flux and geomagnetic activity levels[2] and relative h.f. propagation conditions. Because the chart published in 1975 was based on data collected during a period of "low" to "moderate" solar activity, whereas current solar activity is now considered to be "very high" to "intense", the original chart tends to somewhat over predict conditions at this time. Accordingly, a chart more applicable to an exceptionally high level of solar activity is provided here to assist those radio operators and SWLs who desire to make their own day-to-day forecasts and 27-day recurrence forecasts for any path, and for any h.f. band, during the very active phases of the present sunspot cycle.

Background

It is well known that, in general, the *higher* the value of solar flux and the *lower* the level of geomagnetic activity, the *better* will be ionospheric propagation conditions on the h.f. bands. Conversely, the *lower* the solar flux and the *higher* the geomagnetic activity, the *poorer* will be conditions. These relationships are shown in fig. 1, where relative

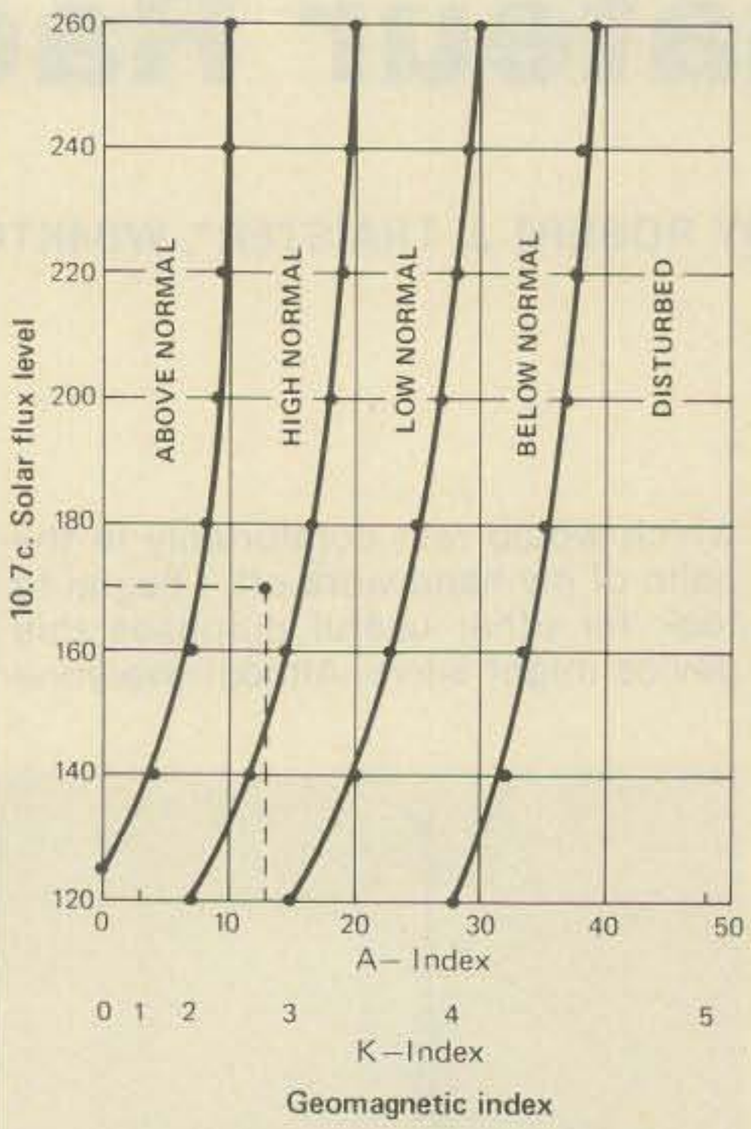


Fig. 1 - Intersection of given values of **solar flux** *and* **geomagnetic activity** *determine expected h.f. ionospheric propagation conditions. (Example: Solar flux is 170 and A-index is 13; expect* **High Normal** *conditions.)*

h.f. propagation conditions are expressed subjectively as *Above Normal, High Normal, Low Normal, Below Normal* and *Disturbed.*

This chart was derived from solar flux, geomagnetic activity levels and h.f. ionospheric conditions observed during the period September 1, 1978 through February 11, 1979. The relationship shown between these parameters in fig. 1 fits approximately 90% of the cases observed, and it can be used during the period of exceptionally high solar activity expected during the next few years.

Solar Flux vs. Zurich Sunspot Number

The measurement of radio frequency radiation from the surface of the sun on 10.7 cm (2695 MHz.) in recent years has proven to be a very sensitive indicator of solar activity, particularly on a day-to-day basis. On the other hand, telescopic observations of the sun have been made daily for more than 200 years. While these telescopic observations are not as sensitive an indicator of solar activity as solar flux measurements, they do represent a long historical chain of solar data. For this reason, the progress of a solar cycle continues to be recorded in terms of sunspot numbers. Fig. 2 shows the approximate relationship between solar flux levels measured daily on 10.7 cm at 1700 GMT by the solar observatory at Ottawa, Canada and sunspot numbers observed daily by the Swiss Federal Observatory at Zurich.

Radio amateurs and other users of the h.f. bands have found the original Jacobs/Cohen chart published in 1975 a very useful tool for forecasting

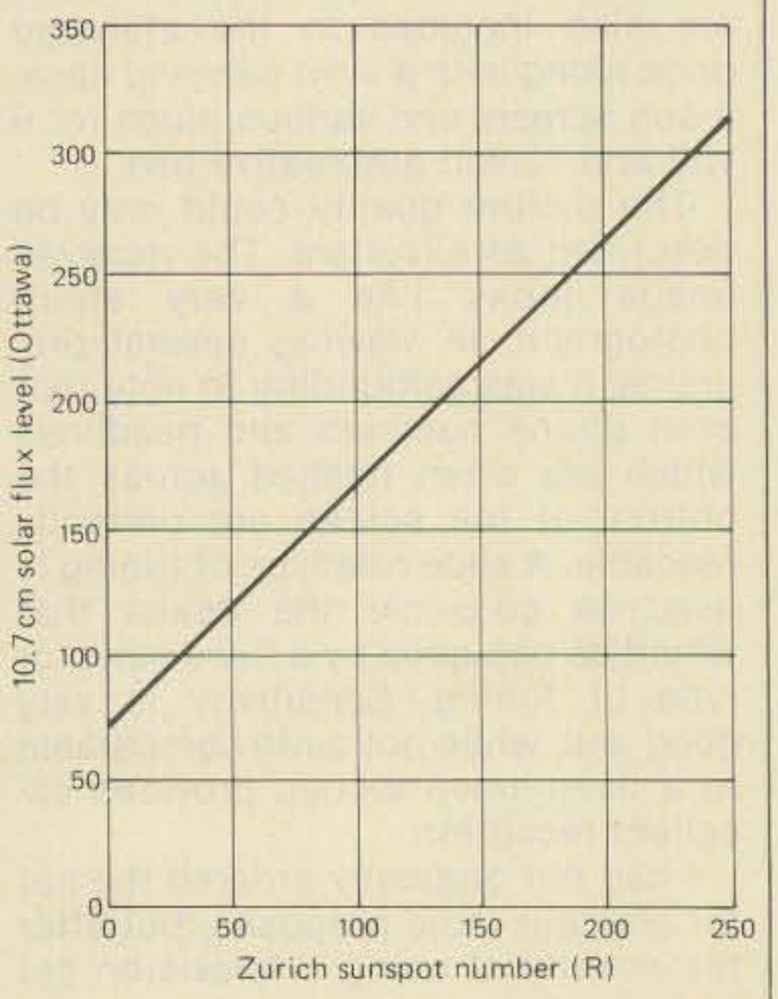


Fig. 2 - Approximate relationship between sunspot number and solar flux level.

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* Radio Propagation Editor, *CQ*
11307 Clara St., Silver Spring, MD 20902

1. Jacobs, G. (W3ASK), and T.J. Cohen (N4XX), "A Breakthrough in Simplifying Ionospheric Propagation Forecasts, *CQ*, March, 1975.
2. Current values of the solar flux and of geomagnetic activity are broadcast hourly, at 18 minutes past each hour, by National Bureau of Standards radio station WWV on 2.5, 5, 10, 15 and 20 MHz.

day-to-day propagation conditions. Fig. 1 will permit a higher degree of accuracy for similar forecasts during the present period of exceptionally high solar activity. The use of such forecasts should result in a better understanding of day-to-day changes in ionospheric conditions, more efficient use of the h.f. spectrum, and a higher percentage of successful DX contacts than might otherwise be possible.

For a more detailed discussion of ionospheric propagation, readers are referred to "The Shortwave Propagation Handbook" by the authors of this article[3]. This book explains all facets of shortwave propagation in simple language, and it is full of do-it-yourself data for predicting propagation conditions on all bands to all areas of the world.

3. Jacobs, G. (W3ASK) and T.J. Cohen (N4XX), "The shortwave Propagation Handbook," Cowan Pub. Corp., Port Washington, N.Y., 11050. Personalized copies signed by the authors are available for $7.50 postpaid from MAIL-A-PROP, P.O. Box 1714, Silver Spring, MD. 20902. Remittance from foreign countries should be made in US currency, and should include $1 extra for surface mailing; $2.50 for airmail delivery.

a monthly feature by

IRWIN MATH, WA2NDM

Math's Notes

A look at the technical side of things

I must apologize to the many readers of Math's Notes for the lapse in columns for the past few months. This lapse occurred as a result of the intense amount of work necessary to conclude the editing of this author's first full-scale book, which was published by Charles Scribner's Sons, of New York, in June of this year.

The book is entitled "Morse, Marconi, and You" and presents, much in the style of this column, a step-by-step procedure whereby the reader, using many of the same materials the inventors used, can build telegraph, telephone, and radio sets. Intended for people 12 years old and up, the reader works with wood, tin-can metal, bell wire and simple, readily available components to build functioning devices. One project leads logically into the next, often utilizing components or portions of circuitry built for earlier projects. Topics covered include telegraph sets, telephones, amplifiers, light beam communications, short wave radio and even an introduction to amateur radio.

The basic aim of the book is to serve as an introduction to communications and to spark interest by allowing the reader to gain "hands-on" experience. The book will cost $8.95 and should be available from most book stores. As a special "thank you" to loyal readers of this column, I will be glad to personally autograph copies and have made arrangements with the publishers to make a limited number of books available for that purpose. If you would like an autographed copy simply mail me a check for $8.95 plus $1.50 for postage and handling. Be sure to include sales tax if you live in New York State, and allow approximately 3-4 weeks for delivery. Delivery will probably be somewhat slow at first but should get better once the system gets rolling. Again, thank you for your patience and letters, and I expect to resume Math's Notes regularly beginning with this column - at least until the next book is ready!

Over the past years we have presented many circuits for various power supplies as this area has been the one in which we have received the most number of requests for aid. We have also described 3 terminal regulators, discreet component circuits and the like - all of which were essentially limited to a specific voltage. Now, we would like to describe two devices that can essentially perform the job as a universal regulator. By the use of one of these

*5 Melville Lane, Great Neck NY 11020

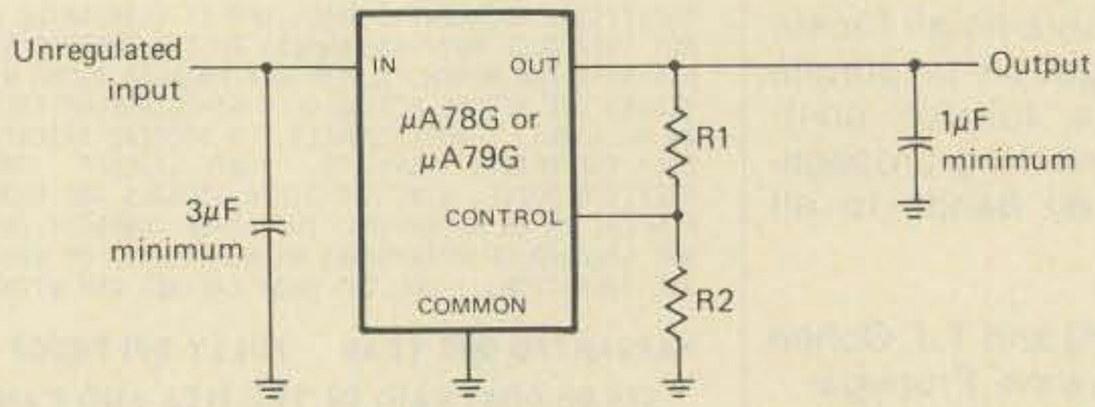

Fig. 2 – Schematic of simple regulator. Be sure to observe the correct polarity of the electrolytic capacitors.

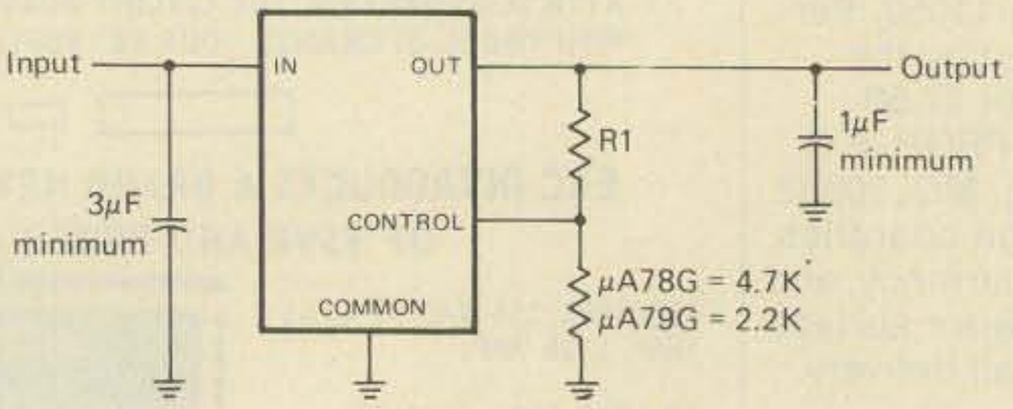

Fig. 3 – Schematic of simple regulator.

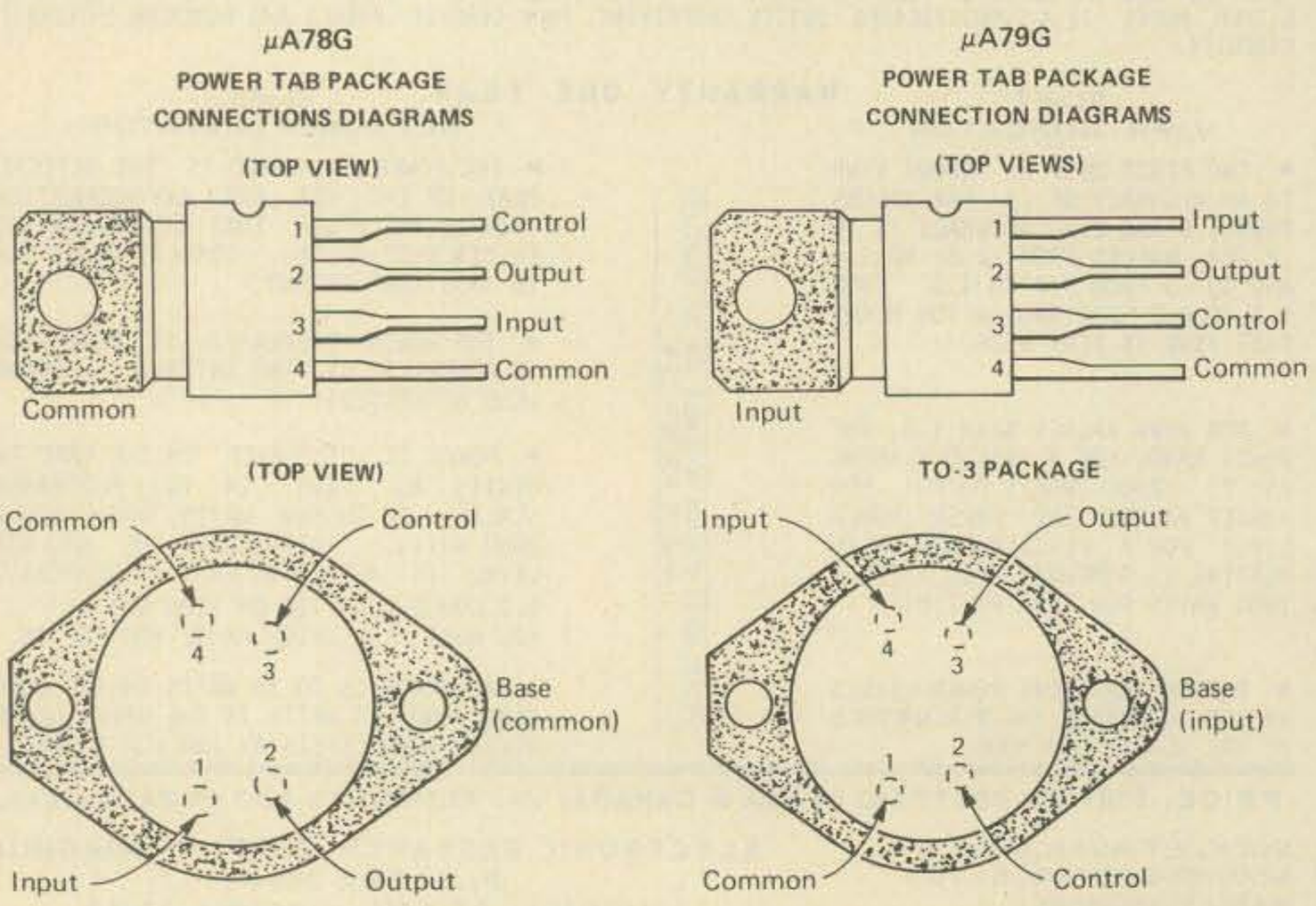

Fig. 1 – Basic pin connections for the μA78/79G Regulators.

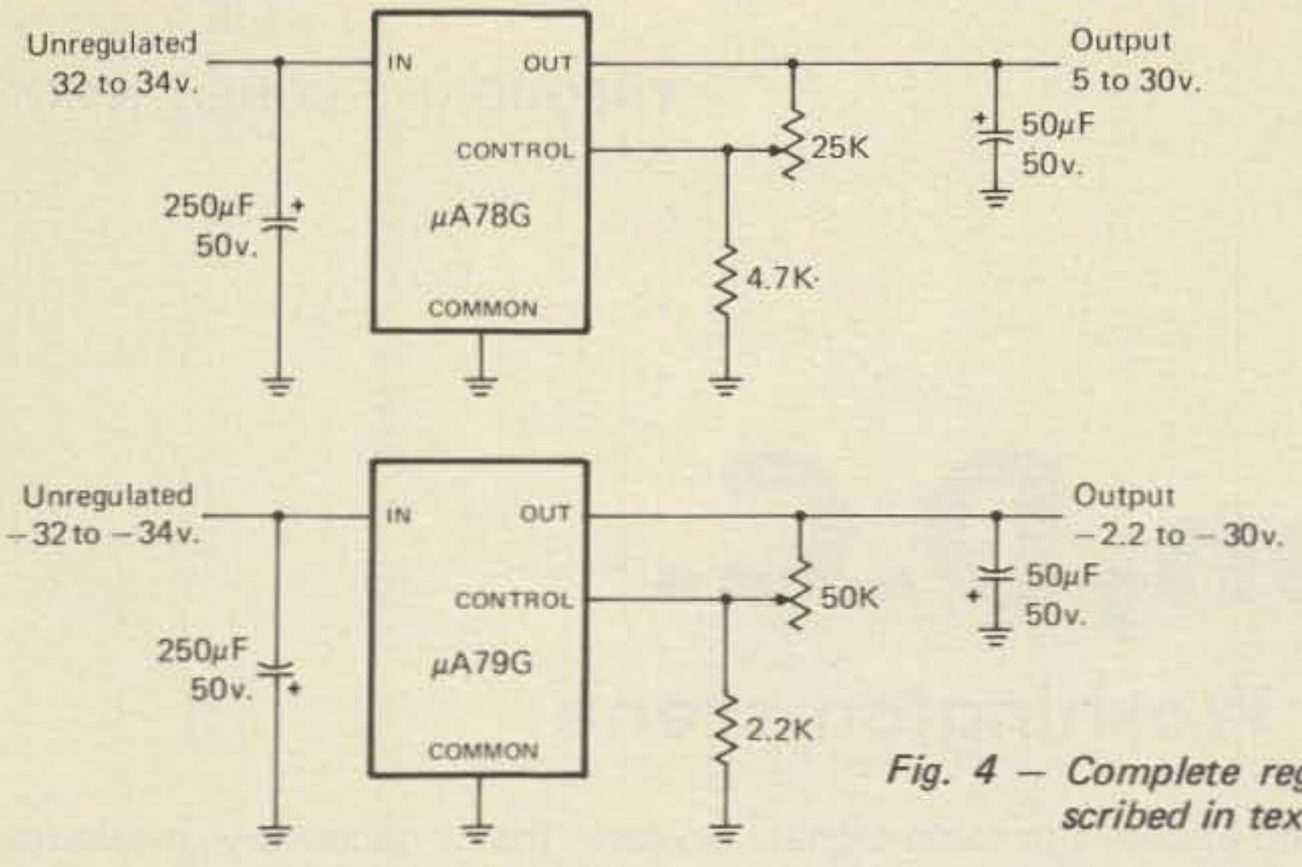

Fig. 4 — Complete regulators described in text.

two chips, almost any voltage from 3 to 30 volts can be handled by simply changing the value of two resistors. By adding an inexpensive pot to the circuit, a truly variable regulator can be fabricated.

The two chips are μA78G positive regulator, and the μA79G negative regulator. In comparison to 3 terminal devices, these are 4 terminal units. Like the 3 terminal units however, they are both short circuit proof, thermal overload proof, and available in TO-220 power tab package and the higher dissipation TO-3 case.

Pin connections are shown in fig. 1 and the basic circuit in fig. 2. The general formula for output voltage is the same for both units and is:

$$V_{out} = V_{control} \frac{(R_1 + R_2)}{R_2} \text{ where } V_{control} = 5 \text{ volts}$$

for the μA78G and 2.23 volts for the μA79G. In addition, the recommended current through R2 is about 1 milliampere. Taking these values into account, we can arrive at a simplified formula for both regulators as follows:

For the μA78G, $R_1 = V_{out} - 5$ and for the μA79G, $R_1 = V_{out} - 2.2$. Fig. 3 shows the circuits to be used with these formulas. Note that if R_1 is made variable, a variable output supply results. Fig. 4 shows a complete 5 – 30 volt regulator and a complete – 2.2 to – 30 volt regulator.

Both circuits are capable of providing about 1/2 ampere of output current and require a minimum of 2-3 volts more input than the maximum output desired. If higher current is required, the addition of pass transistors as shown in fig. 5 will do the trick. Remember to heat sink these transistors if necessary and be careful with pin connections - they are not the same for both units.

Full data for the μA78G and μA79G is available from Fairchild Semiconductor, 464 Ellis Street, Mountain View, Ca. 94042 and the data sheets give a number of additional circuit applicators which will be of interest to most experimentors. Since only two resistors are required to select a voltage, and the costs for these devices run $2.00 each in single quantity, they could prove a worthwhile replacement for the popular 3 terminal regulators now being used by many experimentors.

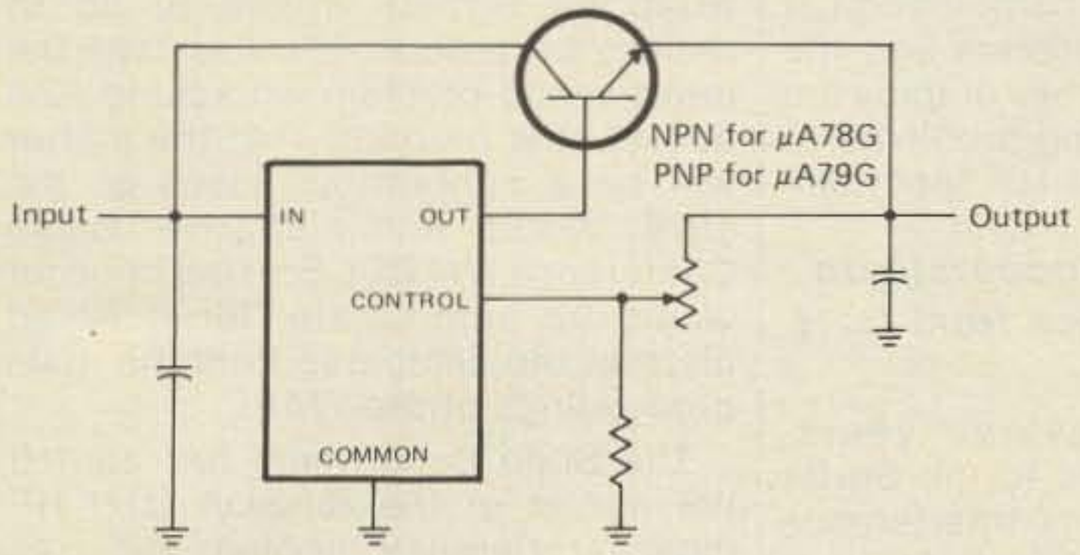

Fig. 5 — Higher current version of regulator.

73, Irwin, WA2NDM

a regular feature by

THEODORE J. COHEN N4XX

dateline... Washington, D.C.

The ins and outs of the Washington scene

Inteference from Russian OTH Radar Systems Intensifies

For many years, operations in the Amateur service and other telecommunication services have been interrupted by transmissions from an over-the-horizon (OTH), high-frequency (HF) radar system operated in European Russia. The purpose of this OTH radar system is to permit the Soviet Union to monitor ship traffic on the Atlantic Ocean. Now, a second OTH HF radar system has been brought on stream by the Soviets.

The second OTH HF radar station, according to preliminary direction-finding analyses, is either on the island of Sakhalin (a large island north of Japan) or on the adjacent coast of Asiatic Russia. The system, of course, is intended to permit the Soviet Union to monitor activity on the Pacific Ocean.

At the time of this writing, both OTH HF radar systems operted by the Soviet Union employ the same signal structure. The modulation scheme employed, however, appears to be undergoing an evolutionary development cycle, with the intent being to render the signal more immune to signals produced by services which legally have use of the bands in which the OTH radar systems operate. Unfortunately, the newer modulation schemes employed cause the radar signal to be spread in frequency (thus permitting the system to achieve "processing gain" when the signal is despread), and so, the combination of two OTH HF radar systems and the modulation schemes they employ are causing ever increasing problems to legitimate users of the HF spectrum.

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Soviets Refuse to Cooperate on Reducing Interference from OTH Radars

Over the past several years, diplomatic approaches to the Soviet Union on the matter of interference from their OTH radar systems have resulted only in comments by the Soviets that "necessary measures are being taken to reduce...interference." Most vocal in their pretests to the Soviet Union, by the way, have been the United States, and several Western European and Nordic countries. So bad has been (and is) the interference problem that the International Frequency Registration Board (IFRB) of the International Telecommunication Union (ITU) has intervened with the Soviets on several occasions...all without success.

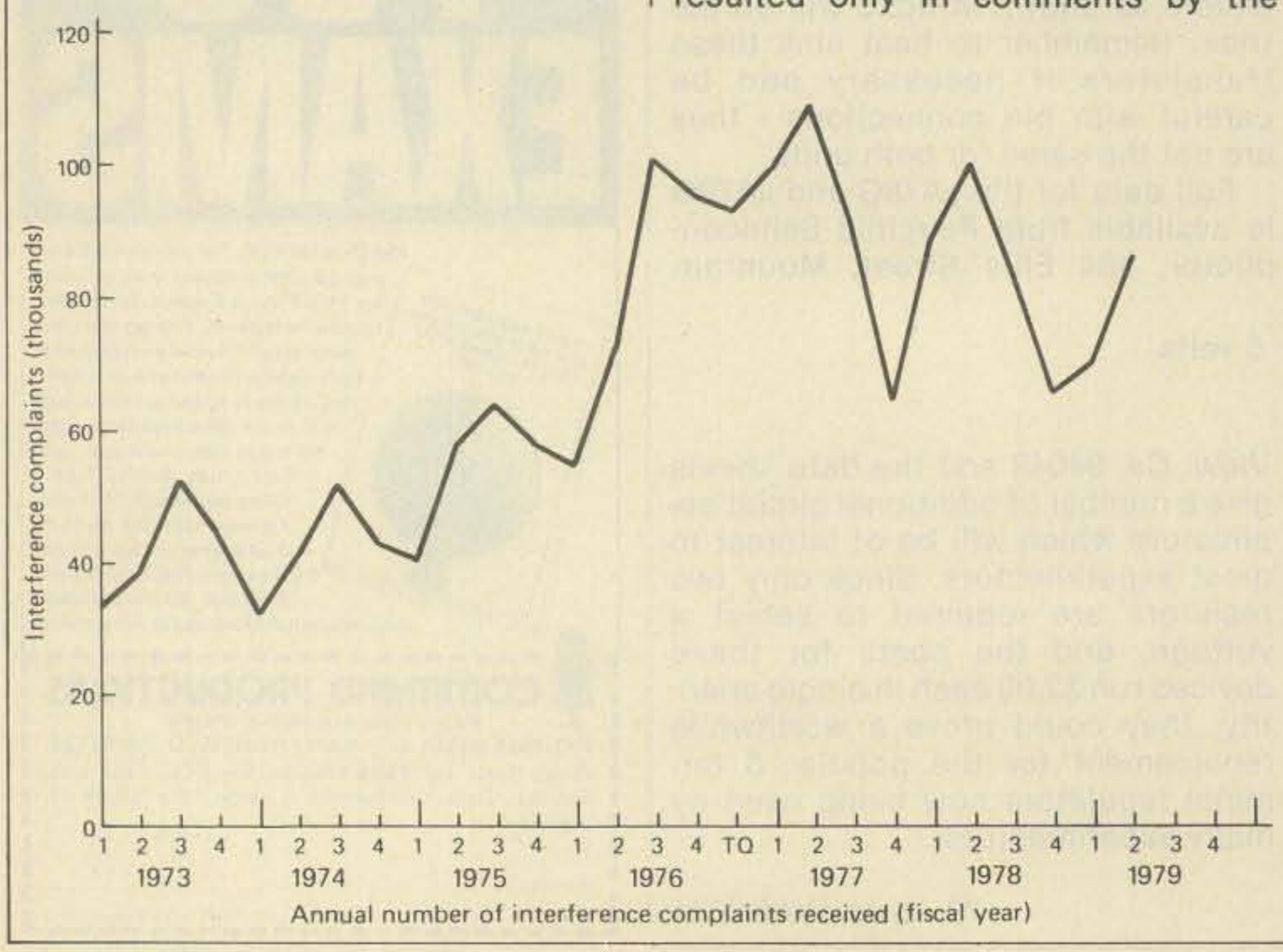
There are no signs, at present, what the Soviets intend to do to remedy the problem. Further, with the interference problem worsening (see above), it is probable that the matter will be a contentious issue at the 1979 World Administrative Radio Conference (WARC). For this to occur would be unfortunate, for it would distract the delegates from the main proceedings of the WARC.

The State Department has carried the matter of the Russian OTH HF radar interference problem about as far as it can, at this time. The matter is still considered open, however, and it will be addressed with the Soviet Union as a "matter of opportunity."

Given that the Soviets may claim that they are operating their OTH HF radar systems on a so-called "non-interference basis (NIB)," it behooves operators in all telecommunications services licensed by the United States to report immediately all instances of interference from these systems. To do this, call the central FCC Watch Office at:

(202) 632-6975,

Provide the watch officer with any information you may have on the Soviet transmissions. The watch office, it should be noted, is open 24 hours per day, 365 days per year. Armed with your protests, the U.S. State Department will be better prepared to demonstrate that the Soviet transmissions are a continuing source of interference to legimate users of the HF bands.



ARRL Files Comments on Radio Frequency Interference (RFI) Docket

In May of this year, the American Radio Relay League (ARRL) filed a comprehensive response to General Docket No. 78-369 "in the matter of Radio Frequency Interference to Electronic Equipment." Prepared by Messrs. Hal Steinman (K1FHN; Washington Area Coordinator) and Bob Booth (W3PS; League General Counsel), the League's comments represent one of the most complete treatments of the questions on RFI which were posed in the instant docket. In responding to the FCC, however, the ARRL questioned why additional information and comments on the subject of RFI were even required. After all, the FCC's Field Operations Bureau, as recently as July 1977, published a detailed report on the extent and nature of one RFI problem (*The Extent and Nature of Television Reception Difficulties Associated with CB Radio Transmissions,* FCC/FOR/PD&E 77-02, July 1977), and the electronic's literature is replete with material on the subject.

While it is not possible to review the entire response from that League, below are highlights from that document.

In response to a question on information which is available to consumers on RFI, the ARRL noted that virtually no information is available through conventional channels (advertisement, dealers, or brochures published and distributed by manufacturers). Even more disappointing is that fact that the Commission's excellent publication, *How to Identify and Resolve Radio-TV Interference Problems,* is only available after objectionable interference has been received, and after a complaint has been lodged with the FCC.

Again referring to the need for information on RFI for the consumer, the Commission asked whether consumer groups could test equipment for susceptibility to interference. The League responded that "it is highly feasible for consumer groups or orginizations, such as Consumers Union,. . . .to devise and conduct simple tests, particularly if the tests are limited to the greatest single cause of interference (which is) front end overloading of television receivers by the fundamental carrier of 27 MHz. CB transmitters." Apparently, such tests have been reported in recent TV receiver evaluation reports published in *Consumer Reports*, and the League encouraged the Commission to encourage such attacks on the RFI problem.

Turning to the methods by which a device could be rendered immune to signals from a nearby transmitter, the League indicated, as it always has, that the most practical manner in which to provide protection to an electronic device from strong rf signls was to incorporate the proper by-pass and filter components in the design and manufacturing stages. "Add-on," after-the-fact solutions are not practical because service personnel often do not know how to install the filtering components required.

Finally, in the area of voluntary action on the part of manufacturers, the League indicated that while the engineering staffs of most manufacturers are very much concerned about the susceptibility of devices to strong rf signals, production and cost-control managers all too often eliminate the components which would give a device immunity to these signals. In sum, the League felt that to resolve the RFI problem which now plagues the country, legislation granting stand-by authority (to take positive, forceful action on RFI matters) is required if the Commission is to realize any success whatsoever in its battle with RFI.

While the League's filing, for the most part, presented a timely overview of opinions on RFI from within the Amateur service, it is unfortunate that several major contributions by the ARRL and its members in the area of RFI reduction were not mentioned. Conspicuous by its absense was any mention of the work of the ARRL RFI task Group, and of the fact that the RFI Assistance List prepared by Mr. Hal Richman (W4CIZ) is now regarded by the Commission as one of the most significant contributions Amateurs have made to the literature on RFI (the list is contained in the FCC's recent publication on RFI, while a modified list has been published in English and French by the Canadian government).

FCC Reports RFI Statistics for Second Quarter of FY 79

Mr. Jeffrey Young, Chief, Investigations Branch, FCC, reported that the Commission received 21,156 complaints of alleged radio frequency interference (RFI) in the second quarter of fiscal year 1979 (January, February and March, 1979). This figure translates, roughly, into almost 85,000 RFI complaints on an annualized basis . . .a significant increase from the 70,000 compalints (annaualized) reported in the first quarter (see figure).

Of the 21,156 complaints received, 16,401 involved alleged interference to television receivers. Further, 13,894 of the television interference (TVI) complaints were related to the operation of a station operation in the so-called Citizens Band (CB). Amateur stations, on the other hand, were only involved in 519 of the alleged TVI complaints.

In all, CB stations were thought to be involved in 16,226 of the 21,156 RFI complaints reported, while Amateur operations were thought to be involved in 916 cases.

One interesting statistic which was observed in the second quarter data was that 363 complaints were filed by Amateur operators against other Amateur operators. One such case involves Amateurs in the Tampa, Florida, area, and the Commission has issued a Notice of Violation to one of the stations involved. The matter apparently is related to this station's "experimental" operations on the input frequency of a repeater. While the FCC's actions will, hopefully, lead to a resolution of the problem, it is regretable that the Amateur Service . . .which is known for its history of self-policing. . .even has to call upon the Commission to resolve problems such as that experienced in Tampa (and in other areas around the U.S.).

This month by
ROD LINKOUS, W7OM

DX

News of communications around the world

The contest is over and now it is time to chase down those QSL cards. Then you find you are close to a five band DX award, so, back through the logs. Now the pursuit for those QSL cards gets tougher. But, you do have an aid in that quest.

The QSL Manager's List

The DXers greatest ally in the QSLing game is a good QSL manager's list. They take many forms but have one common aim - to send the QSL card via the most direct route to the correct person to confirm the contact.

Unfortunately almost all lists have other common traits too. The most common is *error*. If the list is a complete library of DX columns from a couple of amateur magazines or DX bulletins, the errors are usually corrected in later editions.

With the event of computers, many of the recent QSL manager directories are more complete and less error prone. In the compiling stage the error rate may be high but with use and update, the error rate diminishes.

Review of a couple of recent lists was very impressive. An immediate conclusion one arrives at is the enormous amount of DX activity and DX stations using managers. Another obvious point is the large effort required in the research and compilation process. Not to mention the effort required to enter the listings into the data base.

5632 47th Ave., S.W., Seattle, WA 98136

Lenny, K5OVC, has adjusted well to his Arkansas QTH. After many years as one of New York's finest (law enforcement) during his W2OVC. Lenny is one of our top DXers running the Drake line to a 5 element KLM at 80 feet. A duobander covers 15 and 10 with slopers covering 80 and 40 meters.

It may seem that I am a little heavy on the error point. True. But a 0.1% error in a list of 1,000 manager listings can be a BIG thing. Consider a typical entry of 10 characters. The 1,000 entry list really has 10,000 chances for error. Somewhere there are 10 goofs. If all goes well half will be in the DX stations. So hope the other five aren't in the ones you need. The real life situation is 1% to 5% error iniatially and around 2% overall.

The errors come from many sources. Even if the 100 or so I use in this column are perfect, the chances of one error in the 1,000 or so characters in print are likely. When a magazine is prepared in its final form, a single typo is hard to catch. Unfortunately that one error (0.1%) may send hundreds of cards to the wrong manager.

What can be done about errors? The best approach is to select the most complete list available and use it. Be selective. Don't use a single list which uses a *single source* for inputs. Often the bigger the better. To correct the error *report it to the list preparer.* How many times have you spotted an error and let it go by? A postcard could have saved many from going astray.

QSL Management

In previous columns we have covered how to use QSL managers and how to be a manager. Recently I reviewed the manuscript of a forthcoming QSLing guide with over 9,000 QSL manager listings. The guide had a lot of interesting points to make about using QSL manager lists. A few are summarized for your use:

1. Most QSL cards sent to the wrong manager are never heard from again. Think about that. What would

At the shack of HI8LC: (l. to r.) Glenn, K3SWZ, Luis, HI8LC, Tony, HI8XDF (K3BHL) ex-XW8HJ, CP1JV.

you do if the postman delivered 300 QSL cards for someone you never heard of, especially if you weren't a DXer? Or even worse, if you were no longer an active amateur.

2. Most DX stations using managers do so for a reason. Usually the only log is in the possession of the manager. The DX station doesn't have any cards to reply with. So if a DX station has a manager, use him. Sending cards directly are often a big waste of time and money.

3. A QSL manager's list must be actively updated to be of any value. It is the only means to keep it accurate and current in a dynamic world of DX.

4. The Date of the DX-QSL manager relationship is very important. Guess how many VP2M operations have been on in the last five years. Ten or less isn't close. So be careful when you find a manager listing for that DX station as he may not be the right one for your contact. Even the same station often changes managers over the years.

5. You abuse the QSL manager if you:

a. Forget a SASE or SAE with IRC or mint postage,
b. Include several contacts on the same band and mode,
c. Do not use correct date and time (in UTC or GMT) or
d. Are not patient.

Tricks of the DX Trade

It seems appropriate to review some of the past items covered under this title with respect to QSL manager's lists. They may save newcomers and oldtimers alike some time and money.

Select a good and complete listing. Send your inputs, either new or corrections, into the list preparer to make it grow, both in completeness and accuracy. Consider yourself a member of the writing staff. The investment in postcards and time will return many times.

If you use DX bulletins or DX columns, use the issue closest to the operating period. Remember, most DX columns are written 60 to 90 days ahead of the publication date. If it is several months back, also check later issues in case the original listing was in error. Often this is the only means a publication has to correct errors.

QSL managers are people. This is an often forgotten fact. They provide a service - cost-free to the user. In today's world this is an unparalleled operation. It is truly something for nothing. The manager shouldn't have to spend any more than he has to in providing you that free service. *Don't* make him send you more cards than are necessary. *Don't* make him use

Carmelo "Carm" Bonello, 9H1ED, when not being caught under the pileup is in the thick of things chasing DX from his Malta QTH. He recently received the CQ DX award for SSB and is awaiting a zone 2 QSL to finish WAZ. The antenna farm, in addition to yagis on 144 MHz., a 12AVO verticle, dipoles on 20 and 40, and a 130 foot tower.

his envelopes. Send him the reply envelope. *Don't* make him address it. Pre-address the reply envleope. *Don't* waste his time chasing a contact through lots of log sheets because he couldn't decipher your date. *Do* say thanks! But above all, *don't* give him a hard time on the air about your card

The WPX Program

Mixed

735...W6DN
736...WA8QIY
737...W0UBT
738...WA2UDT
739...PA0CYW
740...WA5WMC
741...W0JIE
742...WB4FOT
743...N4TJ

S.S.B.

1150...W6DN
1151...K0JN
1152...WB8ZRL
1153...K1RB
1154...JA4VZX
1155...AG4L

C.W.

1819...JA1AFF
1820...AC2U
1821...DJ5QK
1822...N1RI
1823...W2XQ
1824...WA4NEU

WPNX

153...KA3AJZ
154...KA3ANG

WPX Award of Excellence

K0JN

Endorsements

Mixed: 400 W0UBT, PA0CYW, WA5WMC, W0JIE, WB4FOT, WA2UDT. 450 W6DN. 500 N4TJ. 550 W6YMH. 650 WA8QIY. 750 WA4QMQ. 800 WA4QMQ. 850 N6JM. 900 WA2AUB. 1500 W2NC. 1600 W2NUT.

SSB: 300 WB8ZRL, K1RB, JA4VZX, AG4L. 350 W6DN, KL7AF, WA4NQG. 400 DK5WQ. 450 WD8CRY. 600 K0JN, G4CHP. 700 F5JA, PT2TF, ZP5RS, WA2AUB. 750 WA4QMQ. 1200 I4ZSQ.

CW: 300 AC2U, W2XQ, WA4NEU. 350 WA8LWK, KL7AF, N1RI. 400 JA1AFF, DJ5QK. 500 I1QJC, JH3JEX. 550 N4YB, G3FVC. 600 WA2AUB. 800 OK1DH. 1000 OK2BLG. 1100 K4IEX. 1150 W3ARK. N6JV. 1450 W8KPL.

10 meters: N6JM, WA8QIY.
15 meters: JA4VZX, WA8QIY
20 meters: SM6AYM, K0JN, I8YZP, WA8QIY.
Africa: VE7IG.
Asia: JH3JEX, I8YZP, WA8QIY, W2HAZ, EP2TY.
Europe: I8YZP, W6YMH, DJ5QK, WA8QIY.
No. Amer.: WA4NQG, VK3SM, WA8QIY, WA2UDT, W2XQ.
Oceania: JH3JEX, KL7AF, WA8QIY, W2HAZ, W6YMH.
So. Amer.: N6JM, JA1BN.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations add extra postage if air-mail desired) to "CQ WPX Awards", 5014 Mindora Dr., Torrance, CA 90505. U.S.A.

you sent last week. He usually likes to DX too. Use one sided QSL cards or make sure *all* the QSO data and your call appear on the same side.

DX bulletins make the best source of the latest QSL manager listings. Realizing there is a higher chance of error, cross checking may help. A rapid response may well be worth it.

From the Pileup

601FG on the air 14205 around 1500Z daily per I0WDX who runs him. VP8SO, South Orkneys, on daily 1900Z 14275 run by G3KTJ his QSL manager. (WA7ZLC/mm) GT are UK license holders using their stations on the Isle of Man during June 30, thru July 8, 1979.(Geoff) Abu Ail, the Red Sea islands, is on the planning boards, *(ed:Hope by the time you read this, you have your QSL.)* by OE6EEG, also DJ9ZB, F6DBS and J28AZ. (WCDXB) China crew gains another. HB9APN, Lambert, is at the Swiss Embassy in Peking. He has been reported on as HB9APN/a/BY. (HB7MQ) EA9GJ is usually found around 14280 from 2300Z on Wednesdays. (WCDXB) Tom, VR6TC, may be a little more active now that others have cleaned up some of the need. (QRM) Spanish stations now have some 160 meter privileges. Look about 1820 to 1835 kHz. (EA8CR) The

The WPX Honor Roll

The WPX Honor Roll is based on the current confirmed prefixes which are submitted by separate application in strict conformance with CQ Master preifx list. Scores are based on the current prefix total regardless of an operator's all-time count. Honor Roll must be up-dated annually by addition to, or to confirm present total. If no up-date, file will be placed into "inactive" until next up-date.

Mixed

1760	K6JG	1433	W9DWQ	1200	N9AF	1062	DL1MD	860	PY4OD
1745	W4WV	1428	N4MM	1199	N6JV	1023	YU1ODS	848	W6ANB
1729	K6XP	1415	DJ7CX	1150	W0AUB	1016	SM7TV	831	JA1AG
1701	F9RM	1401	PA0SNG	1123	I2PHN	1015	W0SFU	830	W0IUB
1606	YU2DX	1400	W4BQY	1121	YU1AG	1000	SM6DHU	811	W9WHM
1525	W2NUT	1400	K2VV	1120	YU2OB	950	JH1VRQ	811	YU3EY
1512	VE3GCO	1368	W8LY	1109	I6SF	949	WA6TAX	782	K8LJG
1492	W3PVZ	1331	K5UR	1095	K6ZDL	940	WA2AUB	782	YU4EBL
1491	W2NC	1269	N6CW	1095	I0JX	938	W0SD	755	YU2CBK
1485	W7LLC	1254	W9FD	1094	WA0KDI	925	I3ANE	749	CT1LN
1477	YU1BCD	122	AA4A	1066	WA1JMP	902	K7NHG	605*	I4BFY
1476	ON4QX	1225	N6AV	1065	K5DB	902	K6DT	600	WB9CGL
1451	N4UU	1225	N2AC	1063	W8CNL	873	N6JM		

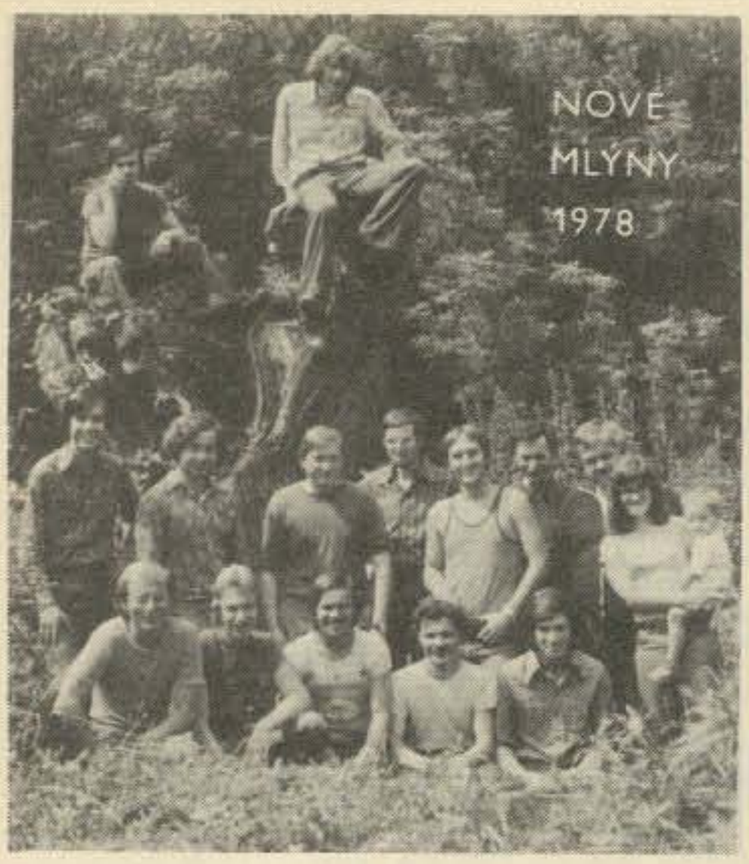
S.S.B.

1600	F9RM	1250	N4MM	1051	WB2NYM	909	PY3BXW	750	JH1VRQ
1600	W4UG	1200	I4ZSQ	1017	F2MO	908	I0MBX	722	WA2AUB
1519	K6XP	1193	PA0SNG	975	WA6TAX	900	WB4KZG	720	N2AC
1505	I0AMU	1182	YU1BCD	967	I2PHN	896	DJ7CX	709	ZP5RS
1456	K6JG	1150	K2VV	957	W6RKP	825	YU1ODS	702	N4NO
1374	I0ZV	1142	W9DWQ	952	N4UU	809	YU1AG	666	PA2TMS
1339	I8KDB	1117	K5UR	950	N2SS	808	OZ5EV		
1300	I8YRK	1107	ZL3NS	948	DL1MD	789	W2NC		
1282	K2POA	1059	WB4SIJ	938	OE2EGL	755	W4BQY		

C.W.

1427	W8KPL	1192	N4UU	1031	DJ7CX	916	YU1AG	676	SM0GMG
1350	W8LY	1162	N6JV	1018	K5UR	905	N4MM	668	LZ1XL
1341	K6JG	1158	W9FD	1012	VO1AW	877	I6SF	660	DL1MD
1328	DL1QT	1090	W3ARK	1000	K2VV	788	YU1ODS	658	EA2OP
1315	W2NC	1087	W4BQY	986	N4NO	729	PY4OD	649	KH6HC
1297	ON4QX	1076	N2AC	976	WA0KDI	728	I5IZ	647	W9OYZ
1273	K6XP	1070	G2GM	973	K6ZDL	700	WB4KZG	623	JE1JKL
1202	YU1BCD	1056	WA2HZR	936	IT9AGA	698	OK2BLG		

Deseceo operators of KP4AM/d included: KP4AM, KP4DSD, KP4Q, KV4KV, N4EA and N4ZC. They ran over 21,000 QSOs. (KP4AM) The new QSL manager for 4U1UN is W2MZV who put over 3,000 4U1UN cards in the February mail. (WCDXB) Greece call division indicate areas. SV1-Stera Hellas (includes Athens), SV2-Macedona, SV3-Peloponese, SV4-



OK 160 Meter ORP DX Club's 5th Annual Meeting, held on Aug. 4-6 '78 at OK2PGF's weekend house. Bottom row: (l. to r.) OK1DWF, OL5AUY, OL5AWC, OK2PGU, OL8CGB. Middle row: OK2BCM, OK2BQU, OK1DXW, OK2PGF, OK1MIX, OK1AXD, OK2SBB, OK2PGN, Jr. op. "Zuzanka". Top row: OK1DFF, ex-OL6ATD.

Thesalia, SV5-Dodecanese (includes Rhodes), SV6-Ipiros, SV7-Thace, SV8-all other Greek islands, SV9-Crete and SV0-all reciprocal licenses. (Long Skip) LU3ZY's land-based status seems okay, as Corbeta Uruguay is an Argentina South Sandwich base camp named after the ship that rescued a party marooned in the islands back in the early 1900s. (HRR) Well known DXer quits the JARL staff over a "point of honor". *(ed: Seems like the Newington exodus Oriental style.)* (QRM) DXpeditions are giving more attention to 160. Recommend they give special attention to having the *best possible* 160 antenna and ground. It makes all the difference in the world. (160DXB) TN8BL, Congo, is active about 14120 around 2100Z speaking French. Dislikes DXing. (Long Skip) 3B8CF, Mauritius, Jacky shows daily on 14024 and goes QRT at 0400Z sharp. (Long Skip) FW8AD is Eddy (FK8CR) QSL via W7OK. (Geoff) 1S1DX, Spratly, crew got escorted out on first try. Glad they were persistant. (QRM) The VQ9 gang (JJ, KK, MR and RL) from Diego Garcia keep Chagos active. (Long Skip) EP2LI asked to leave Iran. He got out with no gear. Now looking at A7. (QRM) VU2IJ and VU2AT attended a recent Northern California DX Club meeting. *(The DX-er)* A51PN, Prahdan is said to have indicated that he will operate regularly (Thursday Saturday and Sunday) on 14065 from 1200 to 1230Z and 14225 from 1230 to 1300Z. (K5OA) CE9AT, South Shetlands about 14280 around 0000Z on Tuesday and Thursday. (Long Skip) J6 is new St Lucia call. (QRM) Best time to catch 9X5PP in

Naiel Malhas, JY5US, operates this compact station from his Amman, Jordan QTH. Naiel is an architectural engineer-interior designer. He helped clear up his JY7US call. It was used as a special prefix celebrating the 42nd birthday of J1.

Neil McMillin, WB0SNG, got with Bob, W0SFU, the CQ DX awards checkpoint to verify his recent awards application. Neil's wallpaper attests to his DXing success. Use of the local checkpoints not only speeds things up but it makes shipping easier. (ed: Wonder if he had to take down those great cards on the wall.)

Rwanda is around 2000Z about 14265. (K2OF) Starting about 2310Z, every Wednesday around 14210, WB9OQU takes a list to run 4S7EA starting at 2330Z. WB9OQU shipped a two element quad so signals are up. He is also the manager. (WCDXB) Sunrise DXing on 160; most DX stations are using 1800 to 1810 kHz. lately. (160DXB) KH6GB/KH1 is on QRPp from Baker-Howland. QSL via KH6-JUO. (WA4OUF) *Ed, ex-W3KVQ and ex-W2KV who is still the current QSL manager is now N7EB from Sun City, Arizona. See QSL info.* (QRM) CO8RA is my father. I handle his cards. (KA8BAC) The VE8 gang has united to form a club. The Yellowknife crew report beams on all but 75/80. A wire beam will go up on 75/80 as soon as it warms up. Have a lot of room up here. VE8RJ is the president with the following members VE8's: RZ, EJ, CP, BY, BH and NE. (VE8RJ) The Alaska DX Association sort of made its first multi-multi shot with AL7J running up a good score. Over 6,000 QSOs. *(ed: Some shot!)* (KL7AF) Another vacation and DXpedition gives those who need Grenada a shot June 17-30th. QSLs via K5KG. Operators K5KG and W5SJS. (K5KG)

Contributors (shown in parentheses) are : *160DXB* - 160 DX Bulletin by W1BB, Geoff - *Geoff Watt DX News, HRR* - Ham Radio Reports,

The WAZ Program

Single Band WAZ

10 Meter Phone

6...K6YRA

20 Meter Phone

218...K2BXG
219...KL7JDR
220...LA9GV
221...VE7DGI
222...VE6DW
223...K8GG
224...K2SP
225...K4IQN
226...N8CC

15 Meter C.W.

11...JH1BBT

20 Meter C.W.

74...JA0DBQ
75...JA7BMR
76...W1YN
77...JA5CAX

40 Meter C.W.

12...W4DR

All Band WAZ

S.S.B.

1633...JA0LXP
1634...JA0NPQ
1635...W4BFR
1636...K9TT
1637...WB8VZX
1638...I8JH
1639...W7WHB
1640...W7GXC
1641...DJ6FX
1642...N9BX
1643...WA9TAA
1644...WA4MAV
1645...JA6OTW
1646...SM6DSS
1647...JA2DYI
1648...JA2UYS
1649...SM7TV
1650...WA9PWN
1651...W1VKQ

C.W. and Phone

4522...EA7OH
4523...K6ZX
4524...W1BL
4525...PY2ZGF
4526...VE2IJ
4527...K8RCT
4528...I0ER
4529...WB4FOT
4530...W6SWM
4531...DK5PD
4532...DF5WG
4533...DL7EW
4534...W2BXC
4535...W2PD
4536...N2DT
4537...WD8AHS
4538...K9US
4539...K1IK
4540...CO2OM
4541...W1IHN
4542...W0SA
4543...W6SIJ
4544...W1YN

All Phone

511...WA4MMO
552...WA6DTG

The complete rules for WAZ are found in the May issue of CQ Magazine (1976) application blanks and reprints of the rules may be obtained by sending a self addressed stamped envelope, size 4¼ x 9½ to the WAZ Manager, Leo Haijsman 1044 South East 43 Street, Cape Coral, Florida, 33904. Applicants forwarding QSL cards direct to the WAZ Manager should include sufficient postage for the safe return of their QSL cards. Please note that effective January 1, 1979 the processing fee for CQ DX certificates was raised to $2.00.

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Fritz, DK1OU, recently wrote asking for some help with WAS. New Mexico and South Dakota are the last two. Fritz prefers a weekend c.w. schedule. He will QSL with a pair of special acknowledgements. How about some quick responses.

Long Skip - editor VE3FRA, *QRM* - anonymous Quiet Radio Monitor, *The DXer* - The Northern Cal DX Club and *WCDXB* - West Coast DX Bulletin by WA6AUD. Thanks to those DXers noted by their calls for the information.

DX Extra

DE N2KK BT I *(ed:David)* operated from M1C on March 4 and on March 10 thru the 13th. All QSL's for my operation go to K2FV. On the 4th I was on 20 s.s.b. in the ARRL DX test. March 10 thru 13 was QRV on 80 meters only. My favorite band. Worked 185 W/VE on 80 s.s.b. 7 W6's! Was 58 in California. soon to be QRV from 3V8 - Tunisia and FC0 - Corsica on 80. Probably also HV - Vatican. I recently received FH0 and FR0 permission. I'll be there in late fall. Recently got number 40 zone on 80 SSB. Need 3 QSLs. AR David is also known as C3INF, F0CGP, FC0CGP, FH0CGP and 3V8KK. When David gets the 40th QSL he will be one of the first ten. With 5BWAZ this fall, 80 should be hot and David's plans will make him pretty popular.

DE K7CW BT I will be in Brazil for two years working on a seismic ex-

Nao Akiyama, JH1VRQ, one of Japan's top DXers stands next to the 10 GHz dishes used by 8J3ITU. (Photo by VE3CXL)

Dominic "Dom" McLaughlin, GI4DQO, smiles about the DXing game. He recently qualified for a DX award using a FT 101-B to a pair of roof top dipoles (triband) of W6SAI's design. Dom proves low power and patience can make up for not having a big rotary.

A recent letter from Betty Christian included the picture of the family. Among the four girls is Tom Christian, VR6TC. Until the recent DXers visited Pitcairn, Tom was the mainstay for a VR6 QSO. With his many duties and the growing family Tom still finds time to give many a new country after his schedules.

Shinichiro "Yama" Yamazaki, JA1SGU, recently qualified for the CQ DX endorsement with 154 countries on cw. Running the neat station to a 3 element yagi at 15 meters, Yama is a consistantly big signal from Tokyo.

ploration crew looking for oil. Hope to be on K7CW/PR8 until PR8 call comes through. Heraldo, PY1CKY, our helicopter mechanic, is helping me with the language and license. Hope to activate at PY0 before tour is up. AR Paul is an outstanding c.w. operator who will give many a new prefix and maybe a new country.

DE OX5AF BT I now have my 4BTV vertical up and am operating on 40 thru 10. I have not gotten the 80/75 resonator for the antenna. From what I hear, those bands are not good up here, being so close to the magnetic pole. AR Dan is a consistant c.w. signal from Greenland.

DE WA4JTI BT Gary Dixon, K4MQG, beat me out by *one* day of getting the first 5BWAZ in the 4th call area. But, anyhow, I visited him at his QTH in Charlotte and drank some of his good old Jack Daniel's, so that doesn't make me feel so bad. Hi! I have 161 band zones with 115 confirmed *(ed: in March)* AR Leo W4KA still wonders how so many got those Russian cards so fast.

Could This Be You?

The following letter from a fellow DXer illustrates a *real* problem that creates more trouble than one realizes. The letter from one DXer to another is shared here in hopes it may prevent at least one similar case.

"I would like to express my unhappiness over an incident that occurred several days ago, an incident of which you no doubt took little notice. It is, unfortunately, the kind of incident which is too often repeated on the amateur bands. I had called an African station which I needed on 15 meter s.s.b., and he responded by repeating *several times,* 'QRZ the W1 station, you are not too strong OM'. As I answered again, you called him and completely covered me up with your very loud signal. He came back to you. What made me especially angry was your comment that you had worked him a week or two before on the same band and it was 'nice to see him again'.

I am only running low power to an indoor dipole. Largely with the indoor dipole and also a mobile whip, I have worked 296 countries in my eight years as a ham. Obviously, I have had to depend on careful listening and sometimes the patience and courtesy of other hams. I consider myself fortunate, therefore, that more of the 'big signals' on the bands are not as greedy and inconsiderate as yourself, or my DXCC total would certainly be much smaller. Operating practices such as yours make me wonder if my efforts are worth it."

The midwest DXer was probably surprised that he didn't get away with it that time. I hope you didn't recognize yourself. The Alligator award (all mouth and tiny ears) goes to those who do recognize themselves.

73, Rod, W7OM

The CQ DX Awards Program
S.S.B

671...GW3SLA
672...W6DN
673...WB0SNG
674...OZ2TY
675...WB7FAT
676...GI6VU
677...WD9ACQ
678...N5HI
679...K1UO
680...9G1JU
681...9G1JI
682...KB5DN

C.W.

361...GI4DQO
362...JA1GTK
363...K0SVX
364...W0YWW
365...AF2L
366...AF5M
367...WA2EYA
368...WA2ORX

S.S.B. Endorsements

310...W9DWQ/318
310...W4SSU/316
310...F9RM/315
310...SM6CKS/315
310...N4WF/312
310...W6RKP/312
300...XE1KS/307
300...W8ILC/300
275...WA4WTG/289
275...JA1GTF/287
275...K1UO/283
275...W2CC/275
200...I5BDE/247
200...W6DN/237
200...9G1JU/207
200...WA4TLI/200
28MHZ...WA4QMQ/105
3.5/7Mhz...GI6VU/131
3.5/7MHz...JA1GTF/113

C.W. Endorsements

310...ON4QX/317
310...W9DWQ/310
275...N6FX/299
150...ASFM/179
150...K0SVX/179

Complete rules and application forms for the CQ DX Awards Program can be obtained by sending a business size, No. 10, envelope, self-addressed and stamped to: "CQ DX Awards", 911 Rio St Johns Drive, Jacksonville, Florida 32211 U.S.A..

QSL Information

Thanks to Long Skip, VE3IPR and The QSLer for the following:

A4XVI - to GM4DLG
A7YXX - to DJ9ZB
A35DP - to WB7BBO
AH7AE - to KM6AE
AP2LJ - to WA8AJG
C5AAJ - to G3LQP*
C5AAR - to G3LQP*
C5ABK - to G3LQP*
C5ABX - to K6MEP
C5ABZ - to K6MEP
C5AJ - to DL7AH
C5AR - to G3LQP*
CF2YM/2 - to VE2YM
CO8RA - to KA8BAC
CR3A - to SM0GMG
EL9C - to W9YD
EP2LC - to WA2HZR
EP2SL - to G3XCS
FK7AC - to W7OK
FW8AD - to W7OK
FY7AK - to F2QQ*
FY0BHI - to F2QQ*
G5AQW - to W0CW
H5AA - to ZS4MG
HL9KE - to K4WSB
HM0AA - to DK5ML
HR0QL - WA6AHF
HS1ABD - to K3EST
IY7EX - to I7DPO
J3ABN - to WB4SGV
JT1AN - to W7PHO
JX9WT - to LA9WT
JY6TC - to HB9AGA
K1CO/PJ7 - to K3RYA
KG4RM - to WB2GTW
KH6GB/KH1 - to KH6JUO
KZ5RO - to WB2DCP
LU1ZR - to LU4AA
LU1ZS - to LU4AA
LU3ZY - to LU2CN
N4UM/C6A - to WA4YWE
N6VR/6W8 - to K6MEP
OX3OB - to LA3JN
OX5AF - to AB1Q
P29EV - to K6ZDL
P29MN - to K4MQG
PJ5CO - to W4GSM
PJ8CDC - to W1CDC
PJ8QM - to W2QM
PJ8RT - to K4GKD
PY2PE - to F6BFA
PY0BXC - to PY7BXC
S79R - to G3LQP*
ST0HF - to G4GFI
SV5JH - to DJ9ZB
T2T - to W5RBO
TA1MB - to WB9ZKK
TF0DF - to TF3CW
TG7AA - to WB6DSV
TJ1AD - to WB4WHE*
TK7G - to FG7AS
TR8RG - DA1CZ*
UG6GAF - to UB5UAL
VK6NDZ/LH - to VK6AS
VK8TO - to W6MSG
VK0PK - to VK3OT
VP1KG - to YASME
VP2DXA - to WB8LDH
VP2DXB - to WB8LDH
VP2DXC - to WB8LDH
VP2DXD - to WB8LDH
VP2DXE - to WB8ZJW
VP2MCH - to KA0CHK
VP2MCW - to W0CW
VP2MJC - to W0CW
VP2SE - to WA1SQB
VP5HX - to WA1SQB
VP8AI - to WD4AHZ
VP8SU - to G3RCA
VP9WB - to K3QMX
VQ9JJ - to W5RU
VQ9MR - to N5GU
VQ9R - to G3LQP*
VQ9TC - to W3HNK
VR1AW - to W5RBO
VR1BD - to W5RBO
VR6BJ - to W0PAH
VR6HI - to ZL1ADI
VR6RW - to ZL1AMO
VS5OO - to N2OO
VS5XU - to DL1LD
VU2DUE - to W5RU
W5TRY/TI2 - to N5IQ
WA6VNR/6W8 - to K6MEP

No-69-70

Here are the latest standings on the race for 5BWAZ

Callsign	Total Zones Confirmed & Reported
ON4UN	154
D4CBS	152
W1NG	150
WA4JTI	130
W8GT	120
N4RR	110
K4XO	104
K4MQG	102
K7UR	101
AA6AA	100
N6DX	100
WD8EOJ	100
VE3GCO	100

WA7UWE/C6A - to WB4LIB
WB8ZJW/VP2L - to WB8ZJW
WH4AAA/KH7 - to W5RU
YJ8KC - to ZL1BAB
YJ8PD - to VK3OT
YN1Z - to K4CLA
ZB2G - to K2FJ
ZD7BW - to G3PEU
ZD8MM - to K4ILX
ZF1CW - to W0CW
ZF1JC - to W0CW
ZF2AI - to W0CW
ZF2AV - to W0CW
ZS3AG - to WA2JUQ
ZS3LK/3 - to DJ4PI
ZS6N - to WA1UVX
1S1DX - to VK2BJL
3D6IX - to WB5IEV
4C5J - to XE1J
4M3AZC - to YV3AJ
5H3GK - to SM5AWO
5R8EA - to OZ6MI
5U7AG - to K1VSK
5V7HM - to DF5FD
5W1AX - to KH6LW
5Z4QS - to WB1ASW
5Z4QT - to JA3KWJ
5Z4YL - to I8JN
6W8HT - to F6ETD
6Y5GL - to VE2RD
6Y5MB - to VE2AUF
6Y5SS - to VE2YM
6Y5YM - to VE2YM
7X4AN - to DJ2BW
7Z2AP - to I8YCP
8Q7AF - to WB4ZNH
9H1ED - to WA1YXX
9H1FN - to WA1YXX
9K2EX - to SM0BYD
9K2FX - to W4KA
9L1KB - to WB4WHE*
9L1SL/B - to WB4WHE*
9L1SL/C - to WA0CAE
9N1MM - to N7EB*
9X5OM - to DK3OM
9Y4XX - to N6AA

(* denotes new address)
AZ8CW - J Ahumada, P.O. Box 10124, Washington DC 20018
DA1CZ - H Alousque, CH Rollerstr 2, 7590 Achern, West Germany
F2QQ - 25 Rue Mauriceau, 92600 Asnieres, France
G3LQP - 32, Albert Rd, Sutton Surrey SM1 4RX, England
N7EB - 12802 Sun Valley Drive, Sun City, AZ 85351
WB4WHE - Rt 6, Birchwood Lane, Sevierville, TN 37862

WANTED DX STATION TO MANAGE:

KA8CWR - Mike Cameron, 817 Garfield St, Port Huron, MI 48060

WD8NKT - Bob Cregar, 1103 S. Jefferson, Bay City, WI 48706

Sada, JA6GDG, is not only a DXer of note but the author of one of Japan's DX newsletters. Many of Japan's top DXers read his DX tidbits every ten days. The framed certificates include the most sought after DX awards. Saga runs a meat shop in Tagawa, Fukuoko. (Photo by JA6KXY).

a monthly feature by

A. EDWARD HOPPER, W2GT

Awards

News of certificate and award collecting

The "Story of the Month" for August, as told by Larry is:

Larry K. Miller, W6ANB/W7CB
All Counties #221, 4-14-79.

"What a thrill, what a lot of work, what a lot of fun. USA-CA All Counties! Ya'hoo!

The first statement that must be made is, "Thank you Robie & June WD9ITQ", without your patience and efforts I would still be looking for four counties. Even though we tend to remember the most recent and forget the most distant, Robie and June will always be remembered for that extra effort. Also Bill, K7JJ driving until 1000Z to put out Foard, Texas, a last one for many of us.

It took 8 days shy of 11 years to work them all. My first mobile contact was with W5DAU/M0 in Cerro Gordon, Iowa on March 11, 1968. The log indicates W8DCD was net control. The last county was Metcalfe, Kentucky with WD9ITQ. Interestingly I worked the last county in California three times before I got a QSO from a "good' station, thanks to W6HDV.

My introduction to County Hunting came in August of 1967 when I ran the county line of Alpine and Mono, California. I thought at the time that these people are nuts. One had to be touched in the head to want to QSO with each U.S. County. However, a few short months later, there I was calling the mobiles and just as nuts as the rest. By the way, the net controls on that fateful day in August of '67 were W8DCH, W0YLN, W0SJE and WB2SJQ, plus W8DCD as mentioned previously. There may have been others, but my log has only these calls listed.

As far as the ham career is concerned, I was first licensed in August of 1947 as W6ANB and have held that call ever since. Building (yes, some of us still do), contesting, DX chasing (334 confirmed), prefix chasing (900+), and antennas take most of

1974 Photo of Lou, W9ZD; Irene, WA9EZP & K4FSJ, Bill (Thanks to Irene).

my time when I'm not chasing counties. I hold the Extra Class license. If you hear W7 Charlie Brown, that is also me, Hi!

Professionally I am the Principal of Roosevelt Elementary School in beautiful Santa Monica, California. The only school in town with a 3 element yagi on top of the auditorium. This is an outstanding school (public), by the way, with an excellent teaching staff.

Personally, I am blessed with a beautiful family. My wife of 30 years Charlene; children, Russell, Christine, and Rick, plus 3 grandchildren. None of the family are hams, but wait till the grandchildren are a little older.

"Mat", CT1TZ & "Ad", CT1RM in Lisbon Feb. '79 (Thanks to Dorothy, WB9RCY)

The single most significant factor in chasing counties is the people. The kindest, most helpful and friendly group of hams I have met. I must also mention the YLISSB members in the same breath because of my long and pleasant relationship with that fine group.

Thanks to you all for making the achievement so much fun and rewarding. I am truly grateful.

What comes next??

Awards Issued

Larry Miller, W6ANB/W7CB added to his fine collection, USA-CA-3000 endorsed All SSB, All Mobiles and All Counties endorsed All SSB.

Cecil Vincent, W0UM, ex WA0ZOL, also added USA-CA-3000 and All Counties endorsed Mixed, to his fine collection. He also added All SSB to his USA-CA-2500.

Special Honor Roll
All Counties

#221 Larry K. Miller, W6ANB 4-14-79.
#222 Cecil L. Vincent, W0UM 4-18-79.
#223 Charles A. Hemenway, WA9GOH 4-24-79.
#224 Dave E. Snydal, VE4XN 5-4-79.

Chuck Hemenway, WA9GOH waited until he had them all and collected USA-CA-500 through All Counties endorsed All 2XSSB.

Dave Snydal, VE4XN also waited until he had them all and acquired USA-CA-500 through USA-CA-2500 endorsed All Mobiles, All SSB, All 20. USA-CA-3000 endorsed All Mobiles, All SSB and All Counties endorsed All Mobiles.

Irene Kennedy, WA9EZP (photo and Story in *CQ* January 1967) picked up USA-CA-2000, 2500, and 3000.

Skip Skaptason, VE4SK obtained USA-CA-500 through 3000 endorsed All 14, All SSB.

Al Churchman, WA6AQR was issued USA-CA-2500 and 3000 endorsed All SSB, All 14, All Mobiles.

Dave Christensen, WA9WGJ claim-

* *P.O. Box 73, Rochelle Park, N.J. 07662.*

ed USA-CA-1500 endorsed All SSB.

Antonio Petroncari, I2PJA qualified for USA-CA-1500 endorsed All 2XSSB (#1 to Italy).

Gus Gutermann, K6CR gained USA-CA-1500 endorsed All A-1.

USA-CA-1000 Certificates endorsed Mixed, were sent to:

John Alexander, W8GZF.
Pat Creapo, WD9BCG.

The Radioclub of the Technical University, OK3KAG (Chief Operator OK3CIR) qualified for USA-CA-500 endorsed All A-1.

USA-CA-500 Certificates, endorsed Mixed went to:

Jacinto Rocha, Jr., PY2BZD.
Lois Smith, WB9YSY.
Yves Bijault, F2NB (old FF8AJ), #5 Award to France.

Chris Turner, VE3EQF.
Joe Cauchi, 9H4L (1st USA-CA to 9H).
Masayoshi Haneda, JE1BSD.
Helio Carlota, PY2DBU.

USA-CA Honor Roll

3000		2000		1000	
W6ANB	248	WA9GOH	360	W8GZF	534
W@UM	249	WA9EZP	361	WD9BCG	535
WA9GOH	250	VE4SK	362	WA9GOH	536
WA9EZP	251	VE4XN	363	VE4SK	537
VE4SK	252	1500		VE4XN	538
VE4XN	253	WA9WGJ	414	500	
WA6AQR	254	I2PJA	415	PY2BZD	1340
2500		WA9GOH	416	OK3KAG	1341
WB9OOE	314	VE4SK	417	WB9YSY	1342
WA9GOH	315	K6CR	418	F2NB	1343
WA9EZP	316	VE4XN	419	VE3EQF	1344
VE4SK	317			9H4L	1345
VE4XN	318			JE1BSD	1346
WA6AQR	319			WA9GOH	1347
				VE4SK	1348
				VE4XN	1349
				PY2DBU	1350

Awards

Worked Oswego County Award (WOSC): This Award is available to any amateur radio operator who works at least *13* of Oswego County's (N.Y.) 24 towns and cities. A Gold Seal endorsement is available for working all 24 cities and towns.

All direct two-way contacts (made without the aid of a repeater) made after January 1, 1978 count for the award. All contacts must be made from the same station at the same fixed location, or, if mobile, from within five miles from the licensed location. Contacts with all fixed or mobile stations count on any band. Multiple contacts with the same station, portable or mobile in a number of town or city locations is permitted for the purpose of making additional town or city contacts.

A special endorsement is available if contacts with all cities or towns are made using emergency or battery power.

Applicants should list the time, date, frequency, mode, power used, along with station contacted and location (town name or city). The list of 13 or 24 contacts should be mailed to the award custodian along with a self-addressed stamped return envelope. QSL cards are not required but the spot log check requests to the stations listed may be made by the award custodian. There is no charge for this award. The award is sponsored by Radio Station WOSC (1300 on your AM dial), Oswego County's pioneer broadcast station. The rules and qualification specifications may be changed from time to time by the Award Custodian. In the case of ques-

Dorothy, WB9RCY near Lisbon, Feb. '79 (Note 2 M ant. on roof.)

tions and disputes, the decision of the WOSC Award Custodian is final. The Fulton Amateur Radio Club will act as custodian for the award, but unless otherwise advised, send applications to: W-13, WOSC 1300 AM Radio, 1 West Bridge Street, Oswego, New York 13126. The Official WOSC List of Oswego County Towns and Cities:

Oswego Town	Richland
Hannibal	Sandy Creek
Granby	Boylston
Minetto	Orwell
Scriba	Albion
Volney	Parish
Schroeppel	West Monroe
Palermo	Constantia
New Haven	Amboy
Hastings	Williamstown
Mexico	Redfield
City of Oswego	City of Fulton

Isle of Man Millennium Award: Being offered by the Isle of Man Radio Club and available to all stations in Europe who during 1979 work 4 *GD* calls plus 1 *GT* call. Outside Europe, stations work 3 *GD* calls plus 1 *GT* call. GD calls are not valid for the award if worked during the *GT* optional callsign period, June 30, 1979 to July 8, 1979. Claims should be made enclosing 12 IRCs or 4 US dollars (or equivalent in International currency notes) together with an extract of the log to: Colin Matthewman, GD4FWG, Hon. Secretary, Isle of Man Amateur Radio Club, 20 Terence Avenue, Douglas, Isle of man. All claims must arrive before March 31st, 1980 and certificates will be dispatched shortly after that date. (Thanks to B.W. Southwell, W6OJW for this data. He will be on the Isle of Man during the afore mentioned period and will be operating with a GT5 call. All contacts made with W6OJW/reciprocal GT5 will be QSLed if cards and s.a.s.e. or s.a.e. & IRC are sent to the home QTH or W6OJW, 200 South 7th Street, Dixon, California 95620.)

Massachusetts Chapter of the **National Awards Hunters Club** has discontinued *All Awards*. This includes The College Bowl Award, Worked All Prefixes U.S. (WAPUS), Worked All Massachusetts Cities and Towns, The Family Award, and Massachusetts Bicentennial Award. It is hoped that these Awards will be picked up by another Mass. Radio Club in the near future. *Do Not* apply to the Mass. Chapter N.A.H.C. which is now defunct. (Thanks to Bob, W1DKD for this sad news).

Worked Oswego County, New York.

I.N.O.R.C. Award: This Italian Navy Old Rhythmers Club Award photo and rules were listed in March 1979 *CQ*. In order to help those interested in this nice Award, regular schedules are being made to help:

A. At least one INORC station will be on the spot daily at 1500Z on 21050. Failing that frequency due to poor band conditions, the schedule will be transferred to 14070.
B. Wednesday and Saturday at 0600Z on 14070.

Thanks Nicola Mastroviti, IT9XNM, INORC President for this data.

Notes

Late word is that Bill Williams, N4UF is taking over as Custodian for the CQ DX Award - former Custodian Rod Linkous, W7OM will continue to help with the CQ DX Column.

How was your month?

73, Ed., W2GT

a monthly feature by

GEORGE JACOBS, W3ASK

Propagation

The science of predicting radio conditions

The first signs of what may prove to be the slowing down of the present sunspot cycle as it nears its peak seems to have occurred during April. The Swiss Federal Observatory at Zurich reports a monthly *mean* sunspot number of 103 for April. Daily values ranged from a low of 61 to a high of 138. This is a somewhat lower range of solar activity than observed during the past several months. It results in a *smoothed* sunspot number of 111, centered on October, 1978, up three points from the last reading. The Zurich Observatory is now predicting a smoothed sunspot number of 157 for August, 1979. This is somewhat lower than previously predicted, but still within the range of the second most intense period of solar activity ever reported.

It appears now that the present sunspot cycle, Cycle 21, is quite likely to reach its peak by this coming winter, with a smoothed sunspot number in excess of 160. We'll have more to say about this in the next month or two.

August DX Conditions

Late August and early September are days when DX forecasters usually like to hide! This is the most difficult period for which to make accurate predictions because conditions can change drastically from day-to-day. On some days, conditions on the h.f. bands will sound much as they did during June and July, typically summertime. On other days, they will sound more typically fall-like, with somewhat higher daytime and lower nighttime usable frequencies. Since this is a period of transistion, this month's *DX Propagation Charts* cover only the *one* month period from August 15 through September 15, rather than the usual two month span. *Short-Skip Charts* for use during August appeared in last month's column.

Good DX openings to most areas of the world should be possible on *three* bands during the daylight hours, *10, 15* and *20* meters. *Fifteen* meters is expected to be the best of these bands for most of the daylight hours. Look for optimum DX openings on *20* meters for a window of about an hour or two after sunrise, and again during the late afternoon and early evening hours, although the band should remain open for DX to one area of the world or another just about around-the-clock on most days. Some fairly good *10* meter openings should be possible, particularly during the afternoon hours.

As September approaches, conditions on all three bands should improve during the daylight hours, but expect the bands to close somewhat earlier as a result of the increasing hours of darkness.

From Sundown to Midnight, expect good DX conditions on *20, 40* and *80* meters. It should be a toss-up between *20* and *40* meters for top honors.

From Midnight to Sunrise the best DX band should be *40* meters. Expect plenty of DX also on *80* meters, and *20* meters should remain open to southern and tropical areas during this time period as well.

By late August, it should also be possible to work some DX on *160* meters during the hours of darkness. Conditions on this band, as well as on *40* and *80* meters, tend to peak just as the sun begins to *rise* on the *light,* or eastern side of the path.

V.h.f. Ionospheric Openings

August should be a very active month for meteor showers, with at least five different ones expected to peak during the first three weeks of the month. At least one of these, the *Perseids,* should be an intense shower with a great deal of activity. It is expected to last for five days, with maximum intensity likely to occur during the afternoon of August 12th. Maximum periods for other meteor showers expected during the month are August 5, 12, 18 and 20.

Ionization produced by the thousands of meteors expected to enter the earth's atmosphere during these showers, particularly during periods of maximum intensity, is expected to make possible numerous meteor-scatter type openings over several hundreds of miles on the *10, 6* and *2* meter bands.

Although on the decrease, fairly frequent sporadic-E ionization is expected to continue during August, resulting in some good short-skip openings on *10* and *6* meters over distances of approximately 600 to 1300 miles. During periods of very intense and widespread sporadic-E ionization, two-hop openings may also be possible up to distances of about 2600 miles. An occasional opening on the *2* meter band may also occur during August, over distances ranging between approximately 1000 and 1400 miles. While

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for August 1979

Propagation Index	Expected Signal Quality (4)	(3)	(2)	(1)
Above Normal: 5, 20, 22	A	A	B	C
High Normal: 2-3, 6, 19 21, 23, 24, 26, 29-30	A	B	C	C-D
Low Normal: 1, 4, 7, 9-10, 12, 17-18, 25, 27-28, 31	B	C	D	D-E
Below Normal: 8, 11-13, 15-16,	C	D	D-E	E
Disturbed: 14	C-E	D-E	E	E

Where expected signal quality is:

A—Excellent opening, exceptionally strong, steady signals greater than S9+30 dB.

B—Good opening, moderately strong signals varying between S9 and S9+30 dB, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S9, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and 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 day of the month. For example, an opening shown in the charts with a *propagation index* of 3 will be fair (C) on Aug. 1st, good (B) on 2nd & 3rd, fair (C) on the 4th, excellent (A) on the 5th, etc.

For updated information dial Area Code 516-883-6223 for DIAL-A-PROP, subscribe to bi-weekly MAIL-A-PROP, P.O. Box 1714, Silver Spring, MD 20902.

*11307 Clara Street Silver Spring, MD 20902

this type of short-skip propagation may occur at any time of the day or night during August, there is a tendency for sporadic-E ionization to peak between 8 a.m. and noon and again between 6 and 9 p.m., local daylight time.

Auroral displays produce ionization in the earth's atmosphere which is often capable of reflecting v.h.f. radio signals over distances upwards to 1,000 miles, or so. Auroral displays and associated auroral-scatter propagation are most likely to occur during August when h.f. conditions are BELOW NORMAL or DISTURBED. Check the "Last Minute Forecast" appearing at the beginning of this column for those days that are expected to be in these categories during the month.

There is a fairly good chance for some *6* meter transequatorial (TE) openings during late August, with conditions expected to improve considerably by mid-September. The optimum times for TE openings between the U.S. and Latin America should be the early evening hours, shortly before and just after sundown. TE openings favor locations in the southern tier states, although some may be possible to states further north. 73, George, W3ASK

August 15—September 15, 1979
Time Zone: EDT (24-Hour Time)
EASTERN USA TO:

	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Central Europe & North Africa	09-15 (1)	08-10 (1) 10-15 (2) 15-18 (3) 18-19 (2) 19-20 (1)	09-15 (1) 15-16 (2) 16-18 (3) 18-23 (4) 23-03 (3) 03-05 (2) 05-07 (3) 07-09 (2)	19-20 (1) 20-21 (2) 21-22 (3) 22-01 (4) 01-02 (3) 02-03 (2) 03-04 (1) 20-21 (1)* 21-22 (2)* 22-00 (3)* 00-01 (2)* 01-03 (1)*
Northern Europe & European USSR	12-15	08-10 (1) 10-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	09-14 (1) 14-16 (2) 16-19 (3) 19-20 (2) 20-22 (1) 22-01 (2) 01-06 (1) 06-09 (2)	20-21 (1) 21-22 (2) 22-00 (3) 00-01 (2) 01-03 (1) 21-02 (1)*
Eastern Mediterranean & Middle East	12-16 (1)	08-10 (1) 10-13 (2) 13-16 (4) 16-18 (3) 18-19 (2) 19-20 (1)	07-09 (2) 09-16 (1) 16-17 (2) 17-20 (3) 20-23 (4) 23-00 (3) 00-02 (2) 02-07 (1)	19-21 (1) 21-00 (2) 00-01 (1) 22-00 (1)*
Western Africa	12-17 (1) 17-19 (2) 19-20 (1)	08-10 (1) 10-15 (2) 15-17 (3) 17-21 (4) 21-23 (3) 23-01 (2) 01-03 (1)	13-16 (1) 16-17 (2) 17-19 (3) 19-02 (4) 02-04 (3) 04-06 (2) 06-09 (1)	19-21 (1) 21-02 (2) 02-03 (1) 22-01 (1)*
Eastern & Central Africa	16-17 (1) 17-19 (2) 19-20 (1)	09-12 (1) 12-15 (2) 15-17 (3) 17-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	13-16 (1) 16-18 (2) 18-19 (3) 19-22 (4) 22-00 (3) 00-02 (2) 02-05 (1)	21-01 (1)

Central & South Asia	10-12 (1) 20-22 (1)	09-10 (1) 10-12 (1) 12-13 (1) 18-20 (1) 20-22 (2) 22-23 (1)	07-08 (1) 08-10 (2) 10-12 (1) 18-20 (1) 20-22 (2) 22-02 (1)	06-08 (1) 20-22 (1)
Southern Africa	09-11 (1) 11-15 (2) 15-17 (1)	08-11 (1) 11-13 (2) 13-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	06-08 (2) 08-15 (1) 15-18 (2) 18-21 (3) 21-22 (2) 22-00 (1) 00-03 (3) 03-04 (2) 04-06 (1)	21-22 (1) 22-00 (2) 00-02 (1) 23-01 (1)*
Southeast Asia	18-21 (1)	09-12 (1) 12-16 (2) 16-19 (1) 19-21 (2) 21-22 (1)	06-07 (1) 07-09 (2) 09-12 (1) 19-21 (1) 21-23 (2) 23-02 (1)	06-08 (1)
Far East	18-20 (1)	09-11 (2) 16-18 (1) 18-20 (2) 20-22 (1)	17-20 (1) 20-22 (3) 22-00 (2) 00-05 (1) 05-06 (2) 06-08 (3) 08-10 (2) 10-12 (1)	05-08 (1)

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 ia 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 c.w., or 1 kw, p.e.p. on sideband, into a dipole antenna quarter-wavelength above ground on 40 and 20 meters, and a wavelength above ground 15 and 10 meters. For each 10 db gain above these reference levels, the *propagation index* will increase be one level for each 10dB 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.

South Pacific & New Zealand	09-14 (1) 14-18 (2) 18-20 (3) 20-21 (2) 21-22 (1)	09-10 (1) 10-12 (2) 12-16 (1) 16-18 (2) 18-19 (3) 19-21 (4) 21-22 (3) 22-23 (2) 23-01 (1)	14-20 (1) 20-22 (2) 22-01 (3) 01-04 (4) 04-05 (3) 05-06 (2) 06-09 (3) 09-10 (2) 10-12 (1)	01-02 (1) 02-03 (2) 03-06 (3) 06-08 (2) 08-09 (1) 03-05 (1)* 05-07 (2)* 07-08 (1)*
Australasia	09-11 (1) 16-18 (1) 18-20 (2) 20-22 (1)	09-10 (1) 10-11 (2) 11-12 (1) 16-18 (1) 18-20 (2) 20-22 (3) 22-23 (2) 23-00 (1)	05-08 (2) 08-10 (3) 10-12 (2) 12-17 (1) 17-19 (2) 19-22 (1) 22-01 (2) 01-05 (4)	03-04 (1) 04-07 (2) 07-08 (1) 05-07 (1)*
Caribbean, Central America & Northern Countries of South America	09-11 (1) 11-13 (2) 13-15 (3) 15-18 (4) 18-19 (2) 19-21 (1)	07-08 (1) 08-09 (2) 09-12 (4) 12-14 (3) 14-21 (4) 21-22 (3) 22-23 (2) 23-01 (1)	06-07 (3) 07-10 (4) 10-11 (3) 11-15 (2) 15-17 (3) 17-03 (4) 03-05 (3) 05-06 (2)	19-20 (1) 20-21 (2) 21-23 (3) 23-03 (4) 03-05 (3) 05-06 (2) 06-07 (1) 22-23 (1)* 23-05 (2)* 05-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	08-10 (1) 10-12 (2) 12-14 (1) 14-16 (2) 16-17 (3) 17-18 (4) 18-19 (3) 19-20 (2) 20-21 (1)	07-08 (1) 08-11 (2) 11-15 (1) 15-16 (2) 16-18 (3) 18-22 (4) 22-00 (3) 00-01 (2) 01-02 (1)	10-16 (1) 16-18 (2) 18-19 (3) 19-02 (4) 02-04 (3) 04-07 (2) 07-09 (3) 09-10 (2)	20-21 (1) 21-22 (2) 22-03 (3) 03-05 (2) 05-07 (1) 22-00 (1)* 00-04 (2)* 04-06 (1)*
McMurdo Sound Antarctica	16-17 (1) 17-18 (2) 18-19 (1)	12-17 (1) 17-19 (2) 19-21 (3) 21-22 (2) 22-23 (1)	16-19 (1) 19-22 (2) 22-02 (3) 02-05 (2) 05-08 (1) 07-09 (1)	01-05 (1)

Time Zones: CDT& MDT (24-Hour Time) CENTRAL USA TO:

	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Southern Europe & North Africa	10-13 (1)	09-10 (1) 10-12 (2) 12-16 (3) 16-17 (2) 17-18 (1)	08-13 (1) 13-16 (2) 16-17 (3) 17-21 (4) 21-23 (2) 23-01 (1) 04-06 (1) 06-08 (2)	19-21 (1) 21-22 (2) 22-00 (3) 00-02 (2) 02-03 (1) 20-22 (1)* 22-00 (2)* 00-02 (1)*
Northern & Central Europe & European USSR	11-13 (1)	09-10 (1) 10-13 (2) 13-15 (3) 15-16 (2) 16-17 (1)	01-06 (1) 06-09 (2) 09-12 (1) 12-15 (2) 15-18 (3) 15-18 (3) 18-19 (2) 19-22 (1) 22-01 (2)	19-20 (1) 20-00 (2) 00-02 (1) 21-00 (1)*
Eastern Mediterranean & Middle East	11-13 (1) 15-17 (1)	10-12 (1) 12-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	06-07 (1) 07-09 (2) 09-16 (1) 16-18 (2) 18-22 (3) 22-00 (2) 00-02 (1)	20-23 (1) 21-22 (1)*
Western Africa	10-14 (1) 14-17 (2) 17-18 (1)	07-10 (1) 10-13 (2) 13-15 (3) 15-19 (4) 19-21 (3) 21-23 (2) 23-00 (1)	13-15 (1) 15-17 (2) 17-20 (3) 20-00 (4) 00-02 (3) 02-04 (2) 04-06 (1)	19-22 (1) 22-00 (2) 00-01 (1) 22-00 (1)*
Eastern & Central Africa	14-16 (1) 16-18 (2) 18-19 (1)	10-14 (1) 14-15 (2) 15-16 (3) 16-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	13-15 (1) 15-18 (2) 18-19 (3) 19-21 (4) 21-23 (3) 23-00 (2) 00-02 (1)	20-00 (1)
Southern Africa	09-11 (1) 11-13 (2) 13-15 (1)	08-09 (1) 09-11 (2) 11-12 (3) 12-14 (4) 14-15 (3) 15-17 (2) 17-18 (1)	06-08 (2) 08-15 (1) 15-16 (2) 16-19 (3) 19-21 (2) 21-23 (1) 23-03 (2) 03-06 (1)	20-21 (1) 21-23 (2) 23-00 (1) 21-00 (1)*
Central & South Asia	09-11 (1) 19-21 (1)	08-09 (1) 09-10 (2) 10-11 (1) 18-19 (1) 19-21 (2) 21-23 (1)	06-07 (1) 07-09 (3) 09-10 (2) 10-11 (1) 17-19 (1) 19-22 (2) 22-02 (1)	05-08 (1) 19-21 (1)
Southeast Asia	12-14 (1) 17-19 (1)	08-09 (1) 09-12 (2) 12-16 (1) 16-18 (2) 18-20 (3) 20-21 (2) 21-22 (1)	06-07 (1) 07-09 (2) 09-13 (1) 18-20 (1) 20-23 (2) 23-00 (3) 00-01 (2) 01-02 (1)	05-08 (1)
Far East	16-20 (1)	08-10 (1) 13-15 (1) 15-17 (2) 17-18 (3) 18-20 (4) 20-21 (3) 21-22 (2) 22-23 (1)	19-22 (1) 22-23 (2) 23-01 (3) 01-03 (2) 03-06 (1) 06-07 (2) 06-09 (3) 09-11 (2) 11-13 (1)	03-06 (1) 06-07 (2) 07-08 (1) 06-07 (1)*
South Pacific & New Zealand	10-12 (1) 12-17 (2) 17-18 (3) 18-19 4) 19-20 (3) 20-21 (2) 21-22 (1)	07-11 (1) 11-17 (2) 17-19 (3) 19-21 (4) 21-22 (3) 22-00 (2) 00-02 (1)	07-09 (4) 09-10 (3) 10-13 (2) 13-18 (1) 18-20 (2) 20-22 (3) 22-02 (1) 02-04 (3) 04-07 (2)	23-00 (1) 00-01 (2) 01-04 (3) 04-06 (4) 06-07 (2) 07-08 (1) 23-01 (1)* 01-05 (2)* 05-06 (3)* 06-07 (1)*

Austra-lasia	09-11 (1) 15-17 (1) 17-18 (2) 18-19 (3) 19-20 (2) 20-21 (1)	09-11 (2) 14-15 (1) 15-17 (2) 17-19 (1) 19-20 (2) 20-21 (4) 21-22 (3) 22-23 (2) 23-00 (1)	07-09 (4) 09-10 (3) 10-13 (2) 13-19 (1) 19-22 (2) 22-00 (3) 00-03 (4) 03-05 (3) 05-07 (2)	02-04 (1) 04-05 (2) 05-07 (3) 07-08 (1) 04-05 (1)* 05-06 (2)* 06-07 (1)*
Caribbean, Central America & Northern Countries of South America	09-11 (1) 11-13 (2) 13-15 (3) 15-17 (4) 17-18 (2) 18-19 (1)	07-08 (1) 08-09 (2) 09-12 (4) 12-14 (3) 14-20 (4) 20-22 (3) 22-23 (2) 23-01 (1)	07-10 (4) 10-12 (3) 12-15 (2) 15-17 (3) 17-01 (4) 01-03 (3) 03-05 (2) 05-07 (3)	19-20 (1) 20-21 (2) 21-23 (3) 23-02 (4) 02-05 (3) 05-06 (2) 06-07 (1) 20-22 (1)* 22-05 (2)* 05-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Urguay	07-08 (1) 08-13 (2) 13-15 (3) 15-18 (4) 18-19 (2) 19-20 (1)	07-08 (1) 08-10 (2) 10-13 (1) 13-15 (2) 15-17 (3) 17-21 (4) 21-23 (3) 23-00 (2) 00-01 (1)	10-15 (1) 15-17 (2) 17-18 (3) 18-01 (4) 01-03 (3) 03-06 (2) 06-08 (3) 08-10 (2)	19-20 (1) 20-21 (2) 21-02 (3) 02-03 (2) 03-05 (1) 20-22 (1)* 22-02 (2)* 02-03 (1)*
McMurdo Sound, Antarc-tica	11-15 (1) 15-18 (2) 18-19 (1)	10-15 (1) 15-19 (2) 19-21 (3) 21-22 (2) 22-23 (1)	16-18 (1) 18-20 (2) 20-02 (3) 02-04 (2) 04-07 (1) 07-09 (2) 09-10 (1)	00-04 (1) 04-06 (2) 06-07 (1)

Time Zone: PDT (24-Hour Time
WESTERN USA TO:

	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Southern Europe & North Africa	11-13 (1)	08-09 (1) 09-12 (2) 12-14 (1) 14-15 (2) 15-16 (1) 22-00 (1)	00-07 (1) 07-09 (2) 09-13 (1) 13-15 (2) 15-19 (3) 19-22 (2) 22-00 (3)	19-21 (1) 21-23 (2) 23-00 (1) 22-23 (1)*
Central & Northern Europe & European USSR	Nil	07-09 (1) 09-11 (2) 11-13 (1) 13-14 (1) 14-16 (1) 22-00 (1)	12-14 (1) 14-16 (2) 16-17 (3) 17-23 (2) 23-01 (1) 06-08 (2) 08-09 (1)	19-23 (1)
Eastern Mediter-ranean & Middle East	Nil	07-09 (1) 09-11 (2) 11-13 (1) 13-14 (2) 14-15 (1) 22-00 (1)	12-15 (1) 15-17 (2) 17-19 (3) 19-23 (2) 23-01 (1) 06-08 (1)	20-22 (1)
Western & Central Africa	10-13 (1) 13-16 (2) 16-17 (1)	08-11 (1) 11-13 (2) 13-17 (3) 17-19 (2) 19-20 (1)	13-15 (1) 15-17 (2) 17-19 (3) 19-21 (4) 21-23 (3) 23-03 (2) 03-08 (1)	21-23 (1)
Eastern Africa	13-16 (1)	09-13 (1) 13-15 (2) 16-17 (3) 17-18)2) 18-19 (1) 00-02 (1)	13-16 (1) 16-18 (2) 18-21 (3) 21-23 (2) 23-00 (1)	Nil
Southern Africa	09-11 (1) 11-13 (2) 13-15 (1)	08-10 (1) 10-12 (2) 12-14 (1) 14-15 (2) 15-16 (3) 16-17 (2) 17-18 (1)	13-15 (1) 15-17 (2) 17-20 (3) 20-22 (2) 22-00 (3) 00-02 (2) 02-06 (1) 06-08 (2) 08-10 (1)	19-21 (1) 21-22 (2) 22-23 (1) 21-22 (1)*
Central & South Asia	17-19 (1)	08-09 (1) 09-11 (2) 11-13 (1) 16-18 (1) 18-21 (2) 21-23 (1)	06-07 (1) 07-09 (3) 09-11 (1) 19-21 (1) 21-23 (2) 23-01 (1)	05-07 (1) 17-19 (1)
Southeast Asia	16-19 (1)	09-10 (1) 10-12 (3) 12-13 (3) 13-16 (1) 16-19 (2) 19-21 (3) 21-22 (2) 22-23 (1)	23-01 (1) 01-02 (2) 02-04 (3) 04-07 (2) 07-09 (3) 09-11 (2) 11-14 (1)	03-07 (1)
Far East	12-14 (1) 14-16 (2) 16-18 (1)	09-10 (1) 10-12 (2) 12-15 (1) 15-17 (2) 17-19 (3) 19-21 (4) 21-22 (2) 22-23 (1)	19 21 (1) 21-23 (2) 23-01 (3) 01-04 (4) 04-05 (2) 05-06 (1) 06-08 (2) 08-10 (3) 10-12 (2) 12-14 (1)	01-02 (1) 02-03 (2) 03-05 (3) 05-06 (2) 06-07 (1) 03-06 (1)*
South Pacific & New Zealand	10-13 (1) 13-15 (2) 15-18 (3) 18-20 (4) 20-21 (2) 21-22 (1)	08-10 (1) 10-12 (3) 12-15 (2) 15-18 (3) 18-22 (4) 22-00 (3) 00-02 (2) 02-03 (1)	07-09 (4) 09-11 (3) 11-13 (2) 13-17 (1) 17-19 (2) 19-21 (3) 21-03 (4) 03-05 (3) 05-07 (2)	22-23 (1) 23-00 (2) 00-03 (3) 03-06 (4) 06-07 (3) 07-08 (1) 23-01 (1) 01-06 (2)* 06-07 (1)*
Australasia	13-15 (1) 15-18 (2) 18-20 (3) 20-21 (1) 21-22 (1)	07-08 (1) 08-10 (2) 10-17 (1) 17-19 (2) 19-21 (3) 21-23 (4) 23-00 (3) 00-03 (1)	12-20 (1) 20-22 (2) 22-23 (3) 23-04 (4) 04-06 (3) 06-08 (2) 08-10 (3) 10-12 (2)	23-01 (1) 01-02 (2) 02-06 (3) 06-07 (2) 07-08 (1) 01-03 (1)* 03-05 (2)* 05-06 (1)*
Caribbean, Central America & Northern Countries of South America	09-11 (1) 11-12 (2) 12-14 (3) 14-16 (4) 16-17 (2) 17-18 (1)	07-08 (1) 08-09 (2) 09-14 (3) 14-19 (4) 19-20 (3) 20-22 (2) 22-00 (1)	06-08 (4) 08-11 (3) 11-15 (2) 15-18 (3) 18-04 (4) 04-06 (3)	19-21 (1) 21-01 (3) 01-03 (2) 03-05 (3) 05-06 (2) 06-07 (1) 20-22 (1)* 22-04 (2)* 04-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	09-11 (1) 11-13 (2) 13-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	06-08 (1) 08-10 (2) 10-13 (1) 13-15 (2) 15-16 (3) 16-22 (4) 22-23 (3) 23-00 (2) 00-01 (1)	09-15 (1) 15-17 (2) 17-18 (3) 18-01 (4) 01-02 (3) 02-06 (2) 06-08 (3) 08-09 (2)	20-21 (1) 21-00 (2) 00-02 (1) 02-04 (3) 04-05 (2) 05-06 (1) 22-01 (1)* 01-03 (2)* 03-05 (1)*
McMurdo Sound, Antarctica	13-15 (1) 15-17 (2) 17-19 (1)	12-16 (1) 16-18 (2) 18-20 (3) 20-22 (2) 22-00 (1)	09-11 (1) 17-19 (1) 19-20 (2) 20-01 (3) 01-03 (2) 03-04 (1) 06-08 (2)	22-23 (1) 23-01 (2) 01-04 (1) 04-06 (2) 06-07)1)

a monthly feature by

FRANK ANZALONE, W1WY

Contest Calendar

News/views of on-the-air competition

Trophy donors continue to pour in for the recent WPX C.W. Contest. Add the following to the last list published in my May Column.

WORLD - Contest Expedition.
(Donor - Northern Ohio DX Assoc.)

WORLD - QRPp Single Operator, All Band.
(Donor - Nevada Amateur Radio Assoc. - Memorial for WB7OOQ)

SO. AMERICA - Single Operator, Single Band.
(Donor - John Kroll, K8LJG)

And to make the SSB section of the contest more interesting we have a new donor for the Europeans.

EUROPE - Single Operator, Single Band.
(Donor - Myron E. Crofoot, WB4VQO)

All the above will be awarded rectroactive to the recent WPX Contests held in March and May.

Many thanks for your generosity fellows. Sorry we could not give you the proper publicity before the contest but you will be given full credit when the results are published.

Anyone wishing to make additional donations should make their wishes known to me and I will advise you of what categories are available.

73 for now, Frank, W1WY

1978 Results
Venezuela and Colombia Contests

Stateside participation and returns were rather slim, only a handful of stations bothered to send in their entries.

However the following did receive attractive awards for their efforts.

In the Venezuelian Contest N4NX was the Continental winner on Phone, and WB0GOB in the c.w. section.

In the Colombian Contest K5UR took continental honors for North America.

SEANET World Wide DX Contest

CW: July 21-22 SSB: Aug. 18-19
0001 GMT Sat. to 2359 GMT Sun.

*14 Sherwood Rd. Stamford, CT 06905

Calendar of Events

	July	21-22	Seanet CW DX Contest
	Aug.	4-5	Illinois QSO Party
+	Aug.	4-5	Romanian Contest
	Aug.	11-12	European CW Contest
	Aug.	11-18	Bancroft "Homecoming"
	Aug.	18-19	Seanet Phone DX Contest
+	Aug.	18-19	SARTG RTTY Contest
*	Aug.	25-26	All Asian CW Contest
	Sept.	1-2	Skokie Avi. QSO Party
	Sept.	8-9	European Phone Conest
	Sept.	8-9	Pennsylvania QSO Party
	Sept.	8-9	CLARA AC/DC Party
	Sept.	15-16	CAN-AM Phone Contest
	Sept.	15-16	Maryland/DC QSO Party
	Sept.	15-17	Wash. State QSO Party
	Sept.	15-16	Scandinavian C.W.
	Sept.	22-23	Scandinavian Phone
	Sept.	29-30	CAN-AM CW Contest
	Sept.	29-30	Delta QSO Party
	Oct.	6-7	VK/ZL/Oceania Phone
	Oct.	13-14	VK/ZL/Oceania C.W.
	Oct.	13-14	RSGB 21/28 MHz Phone
	Oct.	20-21	RSGB 7 MHz Phone
	Oct.	20-21	WADM DX Contest
	Oct.	**27-28**	**CQ WW DX Phone Cont.**
	Nov.	3-4	RSGB 7 MHz CW Contest
	Nov.	17-18	Austrian 160 CW Contest
	Nov.	**24-25**	**CQ WW DX CW Contest**
	Dec.	1-3	Connecticut QSO Party
	Dec.	1-3	North Carolina Party

(Sept. 1 - Nov. 30 RTTY Art Contest)

* See June issue.
\+ Not Official.

The aim of this contest is to call attention to the holding of the 9th annual Seanet Convention to be held Nov. 30th thru Dec. 2nd in Penang, Malaysia. The South East Asia Net meets every day at 1200 Z on 14.320 MHz.

The same station may be worked only once per band, cross-band or cross-mode contacts are not allowed, and only one signal at the same time for multi stations. The usual disqualification rules will be observed and enforced.

Classifications: Single operator, single and all band, and multi-operator, all band.

Exchange: RS(T) plus a 3 figure QSO number.

Scoring: For stations outside the SEANET area. (a) Contacts with stations within the SEANET area with following prefixes: HS, YB, DU, 9V1, 9M2, 9M6, 9M8. 20 points if on 160, 10 points if on 80 and 40, 4 points if on 20, 15 or 10 meters.

(b) Contacts with other stations in the NET area. 10 points on 160, 5 points on 80 and 40, 2 points on 20, 15 or 10 meters.

(c) Contacts between stations outside the SEANET area have no value.

(d) Multiplier is 3 points for each NET country worked.

For stations within the SEANET area.

(a) Contacts with stations outside the NET area. 10 points on 160, 5 points on 80 and 40, 2 points on 20, 15 or 10 meters.

(b) Contacts between stations in the Net area 6 points on 160, 3 points on 80 and 40, 1 point on 20, 15 or 10 meters.

(c) Contacts between stations in own country have no value.

(d) Multiplier of 2 for each Net country worked. And 3 multiplier points if country is outside the SEANET area.

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

Awards: Commemorative certificates to all entries. Trophies to Top scorers will be presented at the SEANET Convention.

All entries must be received by Oct. 31st and go to: "Eshee" - 9M2FK, P.O. Box 725, Penang, Malaysia.

Include a s.a.e. with one IRC if you desire a copy of the results.

SEANET Area Country Prefixes

A4, A51, A6, A7, A9, AC3, AP, BV, BY, CR9, DU, EP, HL/HM, HS, JA/JE/JF/JG/JH/JI/JR, JD1, JY, KA, KC6, KG6, KH6, KX6, P29, S21, S79, VK, VQ9, VS5, VS6, VS9K, VS9M/8Q6, VU2, VU (Andaman, Nicobar, Laccadive Islands), XU, XV5, XW8, YB, YJ8, ZL, 3B6, 3B8, 3D2, 4S7, 4W1, 5Z4, 9K2, 9M2, 9M6, 9M8, 9N1, 9V1, C21.

Ed: Unfortunately above was not received in time to make the July issue.

Illinois QSO Party

Two Periods GMT
1800 Sat. Aug. 4 to 0500 Sun. Aug. 5
1200 Sun. Aug. 5 to 2300 Sun. Aug. 5

This is the 17th annual party sponsored by the Radio Amateur Megacycle Society. The same station may be worked on each band and each mode.

Exchange: QSO no., RS(T) and QTH. County for Ill. stations; state, province or country for others.

Scoring: One point per contact, 2 points if it's with a Novice or Technician.

Ill. stations multiply total QSO points by sum of states, (max. 50) VE/VO call areas, (max. 10) and no more than one DX country worked. (DX maybe worked for QSO points but only one multiplier.)

Out of state stations multiply total QSO points by Ill. counties worked. (max. of 102)

Ill. mobiles or portables operating away from their normal QTH may add 200 points to their final score for each county of operation from which 10 or more contacts were made.

There is a bonus for out of state stations, a multiplier of one for each group of 8 contacts with the same county.

Frequencies: C.W. - About 60 kHz. from low edge of each c.w. band. Phone - 3975, 7275, 14275, 21375, 28675. And 25 kHz. from low end of each Novice band on the half hour.

Awards: Certificates to the top scorers in the following categories: Single operator, multi-operator, mobile, portable, Novice and Technician. In each state, VE/VO province and country from which two or more entries have been received. And to the three top scorers in Ill. There are also Club awards.

A summary sheet is requested showing the scoring and other essential information. Include a large s.a.s.e. for copy of results.

Mailing deadline is Sept. 15th to RAMS - K9CJU, 3620 N. Oleander Ave., Chicago, Ill. 60634

Romanian Contest

Starts: 1800 GMT Sat. August 4
Ends: 1800 GMT Sun. August 5

This one is sponsored each year by the Romanian Amateur Radio Federation.

You may work other European contries as well as the Romanian stations on each band and mode, 3.5 thru 28 MHz. The same station may be worked only once per band, either on c.w. or on phone.

Classes: Both single and multi-operator, single and all band for both divisions.

Exchange: RS(T) and a QSO number starting with 001. YO stations will also include two letters denoting their county. (569001/SJ)

Scoring: For Europeans—Two points for DX contacts, six points if it's with a YO station.

For others: Two points for European QSOs, 10 points if it's with a YO station.

Multiplier: DX countries worked on each band for the Europeans. Others will use European countries and YO countries worked on each band. (There are approximately 40 YO counties)

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

Awards: Certificates to the top scorers in each country in each class. And a Crystal Cup to the overall champion.

Include a summary sheet and a signed declaration with your entry. (Inquire about the several YO awards. No details were given.)

Mailing deadline is September 1st to: Romanian Amateur Radio Federation, P.O. Box 1395, 7000 Bucuresti 5, Romania.

S.A.C. 1978 Contest Results

C.W.

W1YN	13,845	N8II	21,951
K1GQ	13,668	K8BCK	6,273
WB1ANT	4,326	K8LJG	1,100
N1RI	4,270	W8XT	195
W1OPJ	2,849	K9BG	9,990
WA1ORP	2,516	W9HE	4,680
W1CNU	1,071	W9OA	864
WA1FCN	1,020	WB9PIR	714
		K9UQN	480
SM0CCM/W2	17,544		
K2SX	13,926	W0IUB	12,152
N2CM	2,555	WB0GOB	3,952
LA7LG/W2	595		
WA2WSD	42	Check Logs: W4VBW, W5AS, W6MUS, W0YBV.	
WA3DMH	198		

Phone

WA4OML	9,000	K4HGG	1,100
N4BP	1,917	WA4QMQ	396
W4YN	1,353		
		W6BH	682
K5BDX	5,474		
K0JPX/5	3,185	W9SS	1,311
N6ND	15,975	W0WP	1,044
N6AW	12,672		
N6ZZ	11,136	The top scores in each area are certificate winners.	
N6JM	3,700		
N6GL	2,232		
N6OB	714		
AA6EE	56	N8II is a CW Plaque winner for N. America.	

European DX Contest

C.W.: Aug 11-12
Phone: Sept. 8-9
Starts: 0000 GMT Saturday
Ends: 2400 GMT Sunday

This is the 24th annual contest sponsored by the DARC. The activity will be between the European countries and the rest of the world.

Use all bands 3.5 thru 28 MHz. There are two classes, Single operator, All Band, and Multi-operator, Single Transmitter. Only one transmitter and one band permitted during the same time period (defined as 15 minutes). *Exception:* One—and only one—other band may be used during the same time period if —and only if—the station worked is a new multiplier.

Only 36 hours out of the 48 hour contest period may be used by single operator stations. The 12 hour rest period may be taken in one, but not

Results of the European DX-Contest (WAEDC) 1978

CW

Trophy Winners

DT2DUK	Europe
5Z4ZW	Africa
UA9ACN	Asia
K1GQ	North America
LU8DQ	South America

Multi Operator

UK2PCR	Europe
UK6FAA	Asia
CG3BMV	North America

Special

YU3EY	Europe
KH6IJ	Oceania

congrats!

SINGLE OPERATOR

VE-Canada

VE3BR	20512
CG4SW	32062
VE6MP	7098

W/K-USA

K1GQ	682506
K1RX	606480
K1TO	495388
K1ZZ	98612
W1PL	19665
WA1FCN	10672
W1CNU	484
N2LT	630834
K2SS	566932
K2BMI	547200
W2AEE	455760
WB2VYA	226050
WB2SJG	180688
WA2FYA	102120
W2KHT	27027
N2CM	25802
WA2ZWH	18802
DK5AD/W3	334341
W3ARK	58760
W3AP	16566
K4BAI	118992
W4BV	36309
W4OMW	8052
W4KMS	4087
WB4WHE	3268
K5NW	80640
K5RC	31600
W5NR	380
N6AR	90551
N6AA	55120
N6ND	22916
N6ZZ	12660
WA6NEL	2464
K6XT	432
WD6EQI	16
K7NHV	44240
W7JYW	5940
K7UR	2160
N7RO	888
K8CBK	90720
AA8S	7268
KB8CR	896
W9OA	27202
W9QMW	15912
N9UN	1456
W0IUB	19200
WB0GOB	11594
W0BMM	8385
W0ODT	520

MULTI OPERATOR

VE-Canada

CG3BMV	529125

W/K-USA

K3FD	159168
N4OL	120564
W4CUE	46416
N6AW	31348
N9AFU	2412

PHONE

Trophy Winners

G3FXB	Europe
9G1JW	Africa
UL7EAJ	Asia
W1ZM	North America
DL2RL/YV6	South America
VK6CT	Oceania

Multi Operator

YU1BCD	Europe
UK6FAF	Asia
K2SS	North America
YV1TO	South America

SINGLE OPERATOR

VE-Canada

WB2RLK/VE1	33472
CF3GCO	169264
VE3CEF	84152
VE4SW	47700
VE6MP	84150
VE6UM	21252
VE7DTO	9312

W/K-USA

W1ZM	803726
WB1DLA	21780
W2DKM	184116
N2VW	95931
W2FCR	45430
W3MR/2	17548
WA2ZWH	17160
N2CM	7772
WA2YLY	814
WB3FAF	34580
W3CM	16168
N3RL	5408
N4NX	98880
N4BP	13068
WD4MZP	8350
W4KMS	2210
WB4WHE	84
K5TM	49080
K5OOU	16920
WA5IYX	1008
N6AW	26230
N6AR	19578
N6ND	18408
N6AA	16128
N6ZZ	6144
N6JM	2622
AB8K	63406
WA9NPM	133931
W9QWM	6554
N9UN	3196
W0SF	108528

MULT OPERATOR

VE-Canada

VE3BMV	19720

W/K-USA

K2SS	977664
WA4PYF	82278

more than three periods any time in the contest.

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

Scoring: One point per QSO and one point for each QTC reported.

Multiplier: For non-Europeans, number of EU stations worked on each band. Europeans will use the ARRL list and call areas as follows: JA, PY, VE/VO, VK, W/K, ZL, ZS, UA9/UA0. In addition the multiplier on 3.5 may be multiplied by 4, on 7 MHz. by 3, and on 14/21/28 by 2.

Final Score: Total QSO points, plus QTC points, times the sum total multiplier from all bands.

QTC Traffic: Additional QSO points may be realized by reporting a QTC. This is a report of a QSO you have made earlier in the contest and later sent back to a European station.

The general idea being that after a number of EU stations have been worked a list of these can be reported back to another EU station. One point may be earned for each QSO reported. A QTC can only be sent from a non-European to a European station.

A QTC contains the time, call and QSO number of the station being reported. i.e.: 1300/DK2BI/134. This means that at 1300 GMT you worked DK2BI and received his number 134. It may be reported only once and not back to the originating station.

A maximum of 10 QTC's to the same station are permitted, and the same station worked several times to complete this quota. Only the original contact however has QSO point value.

Keep a uniform list of QTC's sent. QTC 3/8 indicates that this is the 3rd series and that 7 QSO's are now being reported.

Awards: Certificates to the highest scoring stations in each country and call areas listed in the multiplier. Continental leaders and stations having at least half the score of the continental leaders will also be awarded.

Disqualification: Violation of the rules of the contest, or unsportsmanlike conduct, or taking credit for excessive duplicate contacts or multipliers will be deemed cause for disqualification. Decision of the Committee is final.

It is suggested that you use the official log and summary forms. A s.a.s.e. with sufficient IRC's to the DARC will get you a supply. (W/K and VE stations can send their request to WA3KWD, Hartwin E. Weiss, 323 North Street, Millersburg, PA 17061. Figure 40 contacts to the page if you make your own, and use a separate sheet for each band.

Mailing deadline for logs is Sept. 15th for C.W. and Oct. 15th for Phone. To the DARC Contest Committee, D-895 Kaufbeuren, P.O. Box 262, West Germany.

European Country List

C31—CT1—CT2—DL,DM—EA—EA6—EI—F—FC—G—GC—GU—Guer—GJ— Jer—GD—GI—GM—GM Shetland—GW—HA—HB9—HB0—HV—I—IS—IT—JW Baer—JW—JX—LA—LX—LZ—M1—OE—OH—

OH0—OJ0—OK—ON—OY—OZ—PA—SM—SV—SV Crete—SV Rhodes—TA1—TF—UA1346—UA2—UB5—UC2—UO5—UN1—UP2—UQ2—UR2—UA Franz Josef Land—YO—YU—ZA—ZB2—3A—4U1—9H1.

Bancroft "Homecoming Week"

In 1979 Bancroft, Ontario celebrates its Centennial and the Bancroft A.R.C. will commemorate the occasion by operating special events station XJ3TBC for the full 24 hours each day during the week of August 11th - 18th.

Operation will be on all h.f. bands except 160, and v.h.f. on 146.52 simplex and repeater on 147.24 - 84.

Certificates will be awarded for working XJ3TBC on 3 different bands (2 bands for DX stations) Include 2 IRC's or one dollar with your log.

Each day an appropriate prize will be given to the lucky Canadian or U.S. station working XJ3TBC closest to a preselected time. (Special QSL card for all contacts)

Amateurs visiting the station are welcome to operate and will receive a commorative memento.

Send your log to: Bancroft A.R.C., Box 631, Bancroft, Ont. Canada K0L 1C0.

S.A.R.T.G. RTTY Contest

Three Periods GMT

0000—0800 & 1600—2400 Sat., Aug 18

0800—1600 Sunday, August 19

This is the 9th annual contest sponsored by the Scandinavian Amateur Radio Teletype Group. Use all bands 3.5 thru 28 MHz. The same station may be worked on each band for QSO and multiplier credit.

Classes: Single operator, Multi-operator Single transmitter and s.w.l.

Exchange: QSO no., and signal report.

Points: QSOs with own country, 5 points. With other countries on same continent, 10 points. With other continents, 15 points. The U.S., Canada and Australia call areas count as separate countries for scoring.

Multiplier: Each DXCC country and each W/K, VE/VO and VK call areas worked. A multiplier will not be considered unless the claimed station appears in at least 5 logs, or a log is received from that station.

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

S.w.l.s use same scoring but based on the sum of stations and messages copied.

Awards: Certificates to the top scoring stations in each class in each country and each call area of the U.S., Canada and Australia.

Use a separate sheet for each band and include a summary sheet showing the scoring, comments and other essential information. And your name and address in Block Letters.

Logs must be received by October 10th and go to: SARTG Contest Mgr., C.J. Jensen, OZ2CJ, Meisnersgade 5, 8900 Randers, Denmark.

All Asian C.W. Contest

Starts: 1000 GMT Saturday, Aug. 25

Ends: 1600 GMT Sunday, Aug. 26

Complete rules appeared in the June Calendar, that's when the phone section took place. Also the Asian Country List.

Your C.W. entries must be received no later than November 30th, and they go to: J.A.R.L. Contest Committee, P.O. Box 277, Tokyo Central, Japan.

1978 All Asian C.W. Contest
North American Results

All Band		3.5 MHz.	
*K6XT	121,979	*N6RO	3,751
*K5RC	93,250	W6BIP	1,380
*N6AW	85,176	N6DM	280
*K1ZZ	44,856	W7DRA	84
*N7AM	34,493	**7. MHz.**	
W1DA	31,132	*N6OP	17,850
W1PL	19,950	K7WA	3,528
W1YW	18,880	**14. MHz.**	
*WB2DPY	16,344	*K7NF	10,619
*N4MM	15,610	W9OA	5,544
K2CL	12,213	W8CNL	5,418
N6AA	11,094	K3TW	5,292
K4JYS	7,296	WB0UCP	920
*K9BG	3,783	K2PF	98
N6GL	3,772	*CG3BMV	8,323
*K3VW	3,321	VE1MX	2,496
W4MGX	2,720	*HI8LC	126
K4RZ	1,788	**21 MHz.**	
W3AP	964	*K6LL/7	19,734
N2CM	935	N6MU	18,270
K6CSL	882	WA6JUD	15,456
W9QWM	861	K6ZM	13,892
W5SOD	735	WA0ZWH	943
W2HL	385	WA1FCN	36
*WB0GOB	260	**Multi-Opr.**	
AA1M	204	*N6TU	176,748
N3RL	48	N6BV	133,736
*HP1AC	480	W6VLD	103,474
*VE7IQ	315	AA6DX/7	67,830
VE4MF	170	W7DG	44,064
VO1KO	90	WB5VAN	280
1.9 MHz.			
*K6SE	56		
KB6CR	36		

*Certificate winners

Skokie Aviation Enthusiast

2000 Z Sept. 1 to 2000 Z Sept. 2

Open to all, members and non-members. SAE members may work both.

Exchange: QSO no., signal report and state, province or country. SAE members will also include their membership number, airport identifier and flight or aircraft number if station is "aeronautical mobile."

Scoring: (1) Two points per contact.
(2)Add total QSO points plus bonus points.
(3) Add total multiplier (states, provinces, countries)
(4) Multiply 2 and 3 for final score.

Bonus: Score 4 points for "airport operations," 5 points if it's with an "inflight station."

Awards: Certificates to the top 3 scorers in each category. Members and Non-members.

Frequencies: CW - 3550, 7050, 14050, 21050, 28050, 50095. SSB-3975, 7275, 14280, 21375, 25550, 50105, Novice - 3725, 7125, 21125, 28125. FM - Simplex frequencies in your area.

Submit logs before Oct. 1st to: Lawrence I. Cotariu, WA9MZS, 8041, N. Hamlin, Skokie, Ill. 60076

Updated "Shoe-Box" Linear

(from page 23)

gradually applied and the plate capacitor checked so that a proper dip in plate current can be obtained and the loading capacitor checked that it varies the loading while working into a dummy load or an antenna with a known, low s.w.r. This procedure should first be done on each band, in the case of a multi-band linear, before the full plate voltage is applied. With full plate voltage applied (900-1100 volts), the amplifier should easily load to one kW d.c. input. In fact, it will load beyond this to a maximum plate current of about 1.5 amperes. Depending upon the plate voltage used and the dynamic characteristics of the power supply, one can, in fact, get up to 2 kW p.e.p. input. However, it is recommended that the amplifier be used more conservatively.

Part II of this article will describe a single tube 8875 amplifier which can achieve 1 kW input or more even when driven by relatively low power exciters.

(To be Continued)

The microtelevision is easily mounted above the dash for mobile testing and TVI search purposes.

perienced TVI in some form or other. And, eventually, when stubborn cases presented themselves, most of us have probably resorted to "probing" the internal and external circuitry of our rigs with a 300 ohm lead attached to the antenna input terminals of a television set in order to spot the exact point of r.f. leakage. This works surprisingly well, but the sheer bulk of most television receivers along with the problems associated with moving them to the site of the transmitter often present problems. Then, too, when using a.c. powered receivers, one never knows how much r.f. may be traveling in on the a.c. line. Using the micro-television, most of these problems are lessened if not eliminated entirely.

This is the closest thing to a shirt-pocket sized television receiver yet to present itself on the market. While it is a bit too large for actual storage in a shirt pocket, it will fit easily into the pockets of a trench coat and its portability and convenience are unexcelled for TVI search purposes. The whip antenna can be easily wound with tape or other types of insulating material for use as an adjustable probe for reaching those hard to get at places within the chassis of a transmitter.

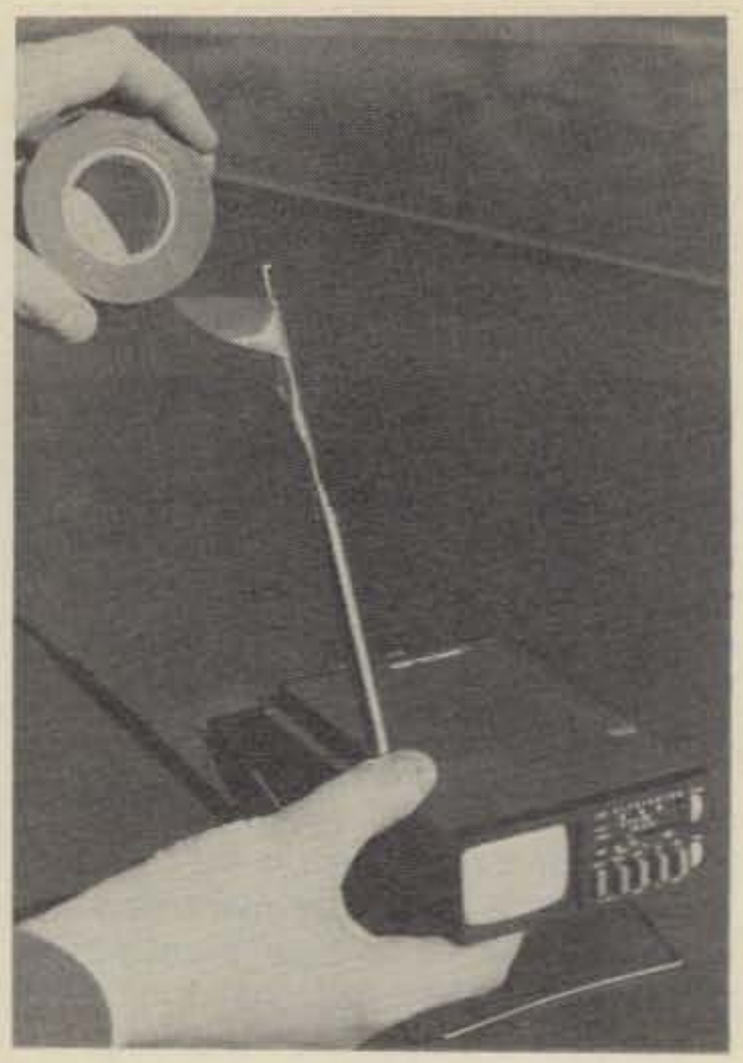
This receiver has been used successfully in probing TVI problems in several homebuilt as well as commerical amateur radio transmitters and transceivers. Even when checking solid-state rigs, the wrapped probe method of leakage detection worked very well. The unit is small enough that it can even be placed on top of the transmitter cabinet at eye level. This eliminates the necessity of constantly looking to one side of the area being probed to get an indication. Homebrewers will undoubtedly build one of these micro-TV's into a rig one day.

From the diplomatic point of view (which is often a necessity when neighbors complain about TVI which you know you're not causing), when you can show a complainant that no TVI is caused when keying the transmitter with the micro-TV silling on top of the chassis, he or she will most certainly find this a more convincing statement of your innocence than if you would use a grid dip meter or some other device most people know very little about.

Mobile interference checking is a snap using this set. Its smallness allows it to be placed right at the rig. You could even mount it in the dashboard if you wanted. Portability is what makes this receiver as attractive a buy as it is. True, when you need to run some TVI checks, it may be necessary to pry it away from the kids who find it irresistible. This would seem to be the only shortcoming I've found so far.

While this article has dealt with the micro-TV purely as a test instrument for tracing r.f. leakage, it could also prove useful in tracking down unknown sources of television interference. It seems to be very immune to alternator, generator, and other types of automotive interference, so the possibility of driving around the neighborhood in search of interference becomes a distinct possibility. With the appropriate converters, this receiver would make an excellent amateur TV receiver, one which could easily be custom installed in an equipment console if you lean that way. Certain frequencies will not even require a converter as it may be possible to make a few minor alterations to the slide rule tuner to shift the frequency coverage.

Certainly, the micro television will find its way into amateur hands and will be used for amateur purposes. Made by Sinclair Radionics Inc. in England, the set was originally marketed for about $400.00 and many were sold. Under present marketing by JS & A, One JS & A Plaza, Northbrook, Illinois 60062, the set sells for $249.95 and includes earphone, charger-A.C. power supply, 6 volt jack, 12 volt automotive jack, and sun screen. All repairs are made here in the states. Even at $249.95, the price is a little steep for this television to be used solely as a TVI test instrument, but the added enjoyment that can be had in television viewing may well be worth the price. Besides, you'll own a device which is guaranteed to strike up a conversation with anyone at anytime... amateur or not.



The whip antenna is wrapped with electrical tape to form a d.c. insulated probe.

Showcase

Radio Shack's TRS-80 Voice Synthesizer (#26-1180)

Now your computer can actually talk back to you in electronically generated speech using the new TRS-80 Voice Synthesizer just introduced by Radio Shack.

The TRS-80 Voice Synthesizer is an accessory for the TRS-80 Microcomputer System. It translates the computers' output into recognizable, intelligible speech. The synthesizer includes a volume control, built-in speaker and cable assembly that permits easy plug-in connection to TRS-80 systems.

Programming the TRS-80 for speech is done in BASIC, the simplified computer language used by the microcomputer. About 60 phonemes (units of speech) can be entered via the computer keyboard. This will even enable the computer to speak in foreign languages or with an accent by integrating the various phonemes to produce the desired sounds.

For more information, get in touch with your local Radio Shack distributorship, or circle number 75 on the reader service card.

RCA's Mini-Mount For Recreational Vehicles

A new RV Mini-Mount for recreational vehicles, vans and other on-the-road vehicles has been introduced by RCA Distributor and Special Products Division, Deptford, NJ.

The RCA Mini-Mount, Model 5MS503, is an anodized aluminum mount designed to support the RCA Mini-State TV antenna at an overall height of 12 inches above the vehicle roof.

It can be mounted over studs on a 16-inch center or through the roof using the backup washers that are provided. Antenna cable lead-in gaskets, plate, and clips; sheet metal screws; and installation instructions are also provided.

For more information, contact A.C. Cominskie, RCA Distributor and Special Products Division, Deptford NJ 08096, or circle number 61 on the reader service card.

Kantronics' Amateur Upgrade™

Kantronics' *Amateur Upgrade*™ is an educational board game that familiarizes players with FCC rules governing amateur radio and elementary radio concepts. The game comes complete with playing surface, playing pieces - coil, grommet, etc.- a die, a deck of exam cards and corresponding answer sheets.

The game surface is 15.4 inches square and is printed in five colors corresponding to beginner, Novice, General, Advanced and Extra Class.

Players roll the die to determine the number of spaces to move. Some spaces players land on have a consequence such as "taught in Novice class - move again," or "exceeded 1000 watts -answer question, if wrong go to start," or "illegal third party traffic - loss one turn."

The first person to progress through all levels to obtain the Extra Class license wins.

The suggested retail price of *Amateur Upgrade*™ is $9.95. The game is available from Kantronics Inc., 1202 E. 23 St., Lawrence KS 66044, or, for more information, circle number 64 on the reader service card.

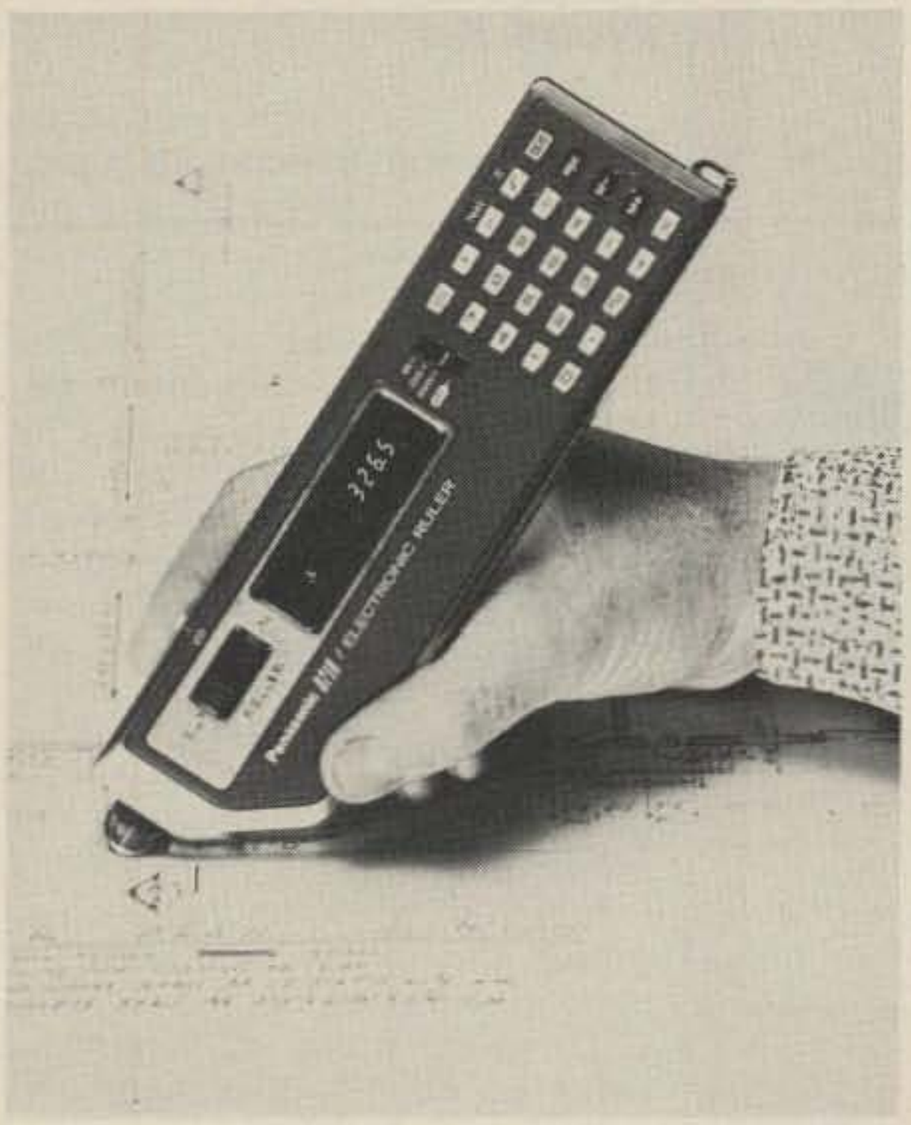
Tempo's K6FZ Miniature Tri-Bander Antenna, Distributed By Henry Radio

Henry Radio announces full availability of a new miniature K6FZ 20/15/10 meter tri-bander antenna; under its Tempo brand name, for amateurs living in apartments, condominiums, mobile homes and other places where full-size beams cannot be erected. Measuring 8-feet square, the new antenna is based upon a full half-wave long constant current loop design using capacitive phase shifters in the outer arms to achieve front-to-back ratios in the order of 15 dB. Gain over a full size dipole is 1 dB.

The bandwidth on 20, 15 and 10 is exceptionally wide. the 20-meter resonant frequency is set by rotating a knob in the boom to any desired spot. On 10 and 15 meters, the user can select operation on either phone or c.w. Power rating is a full kilowatt. One common 50-ohm feed is used for all three loops, and s.w.r. is adjustable to 1:1 on 20.

The price of the complete Tempo 20/15/10 meter tribander is approximately $250. The basic 20 meter antenna is $169.50.

Write to Henry Radio, 11240 W. Olympic Blvd., Los Angeles CA 90064 for more information, or circle number 65 on the reader service card.



Panasonic's Electronic Ruler/Computer

Chafitz, Inc. announces that it will be the exclusive distributor of a ruler/computer developed by the Panasonic Company. The "Ruler That Thinks" uses a small displacement measuring wheel to directly measure lengths, distances, areas, volumes, etc., in linear, square, or cubic units, in any scale, from any document. A multi-function calculator is integrated in the ruler permitting measured data to be used automatically in further computations. Intermediate measurements can be stored in the calculator's memory to yield a total quantity. The computer displays values directly in millimeters, centimeters, or meters and converts to either inches or feet simply by pressing a function key.

The electronic ruler/computor can measure any regular or irregular surface, such as curved walls, floors, containers, etc., making the number of applications limitless.

The unit sells for $99.50 and is available from Chafitz, Inc., 1055 First St., Rockville MD 20850. Or for more information, circle number 63 on the reader service card.

Avanti Research & Development, Inc.'s Moonrotor *Control System And Rotor*

Avanti Research & Development, Inc. has just introduced a rotor and control system. Called the *Moonrotor*, this new system can be used in conjunction with antennas made by Avanti.

Its rugged design strength and durability comes from a tough aluminum housing unit, which holds a double row 98 ball bearing support system that is driven through steel intermediate and ring gears by a stainless steel main drive.

In addition to providing maximum strength and turning ease by this support system, *Moonrotor* also features a four pole high torque electric motor with a safe low voltage control which provides turning power for the big beams - up to 8.5 square feet of wind load area.

For more information, contact Avanti Research & Development, Inc., 340 Stewart Ave., Addison Il 60101, or circle number 71 on the reader service card.

Seton Name Plate Corp.'s New Catalog

Seton Name Plate Corp. has just published its new 1979 catalog offering more than 194 identification products at factory-direct savings.

Each product is illustrated in full color with complete specifications, pricing and simple forms to make ordering sure and easy.

Request Catalog 80-S from Seton Name Plate Corp., 961 Boulevard, New Haven CT 06505, or circle number 76 on the reader service card.

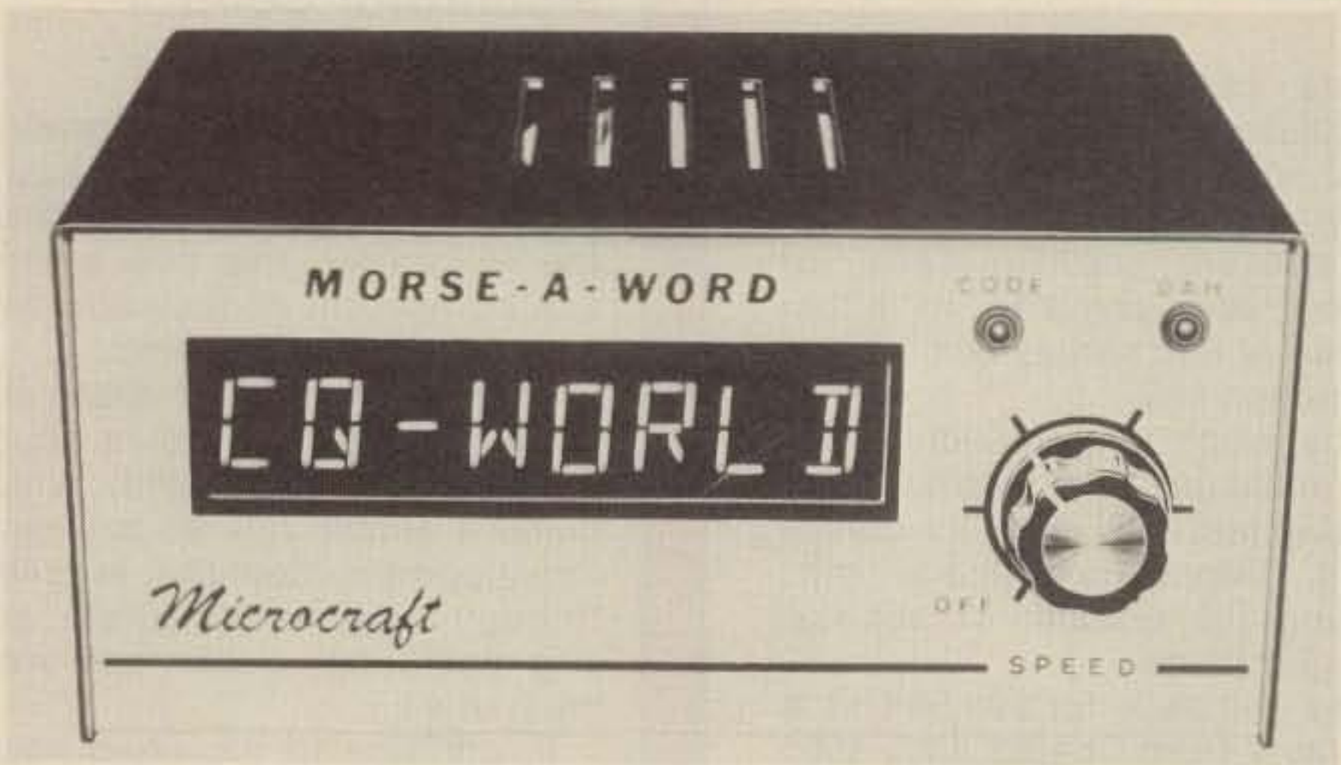
Data Precision's Model 938 Digital Capacitance Meter

A new, portable digital capacitance meter, selling for $149, has been introduced by Data Precision. The 3-1/2 digit Model 938 measures capacitance from 0.1 pF to 1999 microfarads in eight switchable ranges, with a basic accuracy of ±0.1% of input.

Packaged in a rugged plastic case, the 938 features a size small enough to fit in the palm of one's hand. A zero adjust is provided for compensating for the stray capacitance of test leads up to 20 pF.

Measurements are displayed on a 0.5 inch high LCD for easy reading in any light conditions.

For more information, contact Data Precision Corp. on Electronics Ave., Danvers MA 01923, or circle number 60 on the reader service card.



Microcraft Corp.'s Morse-A-Word *Code Reader*

An eight character Morse Code reader has been introduced by Microcraft. It accepts audio signals from a communication receiver's headphone jack or loudspeaker and displays the decoded characters. All text characters - letters, numerals, punctuation marks, special Morse symbols and word spaces - are shown sequentially on the display in moving character fashion. Code speeds of 5 to 35 w.p.m. can be copied depending on the setting of the front panel control. The *Morse-A-Word* also includes a built-in code practice oscillator and monitor speaker for Morse Code practice sessions.

A complete kit is $169.95 and a wired and tested version is $249.95. It measures 7.375 x 5.75 x 3.375 inches and weighs four pounds.

For more information contact Microcraft Corp. at P.O. Box 513, Thiensville WI 53092, or circle numer 77 on the reader service card.

Continental Speacialties Corp.'s Low-Cost Logic Probe Kit

Continental Specialties Corp. has recently marketed a logic probe kit (Model LPK) which sells for $19.95.

The LPK is circuit powered through attached clip leads. HI, PULSE and LO LEDs display logic states and transitions. The HIGH logic state is defined as 70% or more of the supply voltage, the LO state as 30% or less, making the probe compatible with most digital logic technologies, or families. With its high (300 kilohm) input impedance, circuit loading is minimized.

Internal circuitry stretches pulses as short as 300 ns into 0.1 second flashes of the PULSE LED; pulse trains at repetition rates up to 1.5 MHz keep the PULSE LED flashing.

The LPK includes self-protecting circuitry which permits the power leads to be connected in reverse or to as much as 25 v.d.c. without permanent damage.

For more information, contact CSC at 70 Fulton Terrace, New Haven CT 06509 or at 351 California Street, San Francisco Ca 94104, or circle number 62 on the reader service card.

HAM SHOP

FREE TO CQ SUBSCRIBERS

Advertising Rates: Non-commercial ads are 10 cents per word including abbreviations and addresses. Commercial and organization ads are 35 cents per word. Minimum charge $1.00. No ad (non-subscriber) will be printed unless accompanied by full remittance. Free to CQ subscribers (maximum 3 lines per month). Recent CQ mailing label must accompany ad.

Closing Date: The 10th day in the third month preceding date of publication. Because the advertisers and equipment contained in Ham Shop have not been investigated, the Publisher of CQ cannot vouch for the merchandise listed therein. Direct all correspondence and ad copy to: CQ Ham Shop, 14 Vanderventer Ave., Port Washington, New York 11050.

EZ DEALS are hard to beat. Try me and see for new or used ICOM, CushCraft, KLM, Yaesu, Drake, Wilson, VHF Eng., Ten-Tec, Swan, DenTron, CDE, Hustler, Larsen, and more. (800) 247-2476/1793. Iowa call (800) 362-2371. W0EZ, Bob Smith Electronics, RFD 3, Fort Dodge, IA 50501. (515) 576-3886.

QSLs with Class! Unbeatable quality, reasonable price. Samples: 50 cents refundable. QSLs Unlimited, 1472 SW 13th Street, Boca Raton, FL 33432.

ARRL ROANOKE DIVISION CONVENTION AND HAMFEST. Fourth Annual Tidewater Hamfest-Computer Show-Flea Market will be held in the Norfolk, Va. Cultural and Convention Center SCOPE October 20 and 21, 1979. 60,000 sqaure feet of airconditioned exhibit and Flea Market tailgating space are available. Doors open at 9:00AM. ARRL meetings, DX, Traffic forums, plus a CW contest are scheduled. FCC Exams are planned for amateur upgrading Saturday 9-12AM. A special feature will be a dinner cruise and banquet on the Spirit of Norfolk Cruiseship Saturday night. Advance registrations $2.50 (SASE), $3.50 at the door. Flea Market tailgate space $3 day. Cruise and banquet $16 person, $30 couple. Tickets and information-TRC, Box 7101, Portsmouth, VA 23707.

WANTED: Hallicrafters S-1 through S-7, H8PA, 5-T, SX-10, SX-12, and other early Hallicrafter gear, parts, and manuals-any condition-for private collection. Price and condition first letter. C. Dachis, WD5EOG, 4500 Russell Drive, Austin, Texas 78745.

MOBILE IGNITION SHIELDING provides more range with no noise. Available most USA engines, some imports. Free literature. Bonding straps on sale now. Estes Engineering, 930 Marine Drive, Port Angeles, WA 98362.

CALL TOLL FREE for an EZ deal. 800-247-2476/1793. Iowa call 800-362-2371. See ad elsewhere. W0EZ, Bob Smith Electronics, RFD 3, Fort Dodge, Iowa 50501.

QSL CARDS: 500/$10. 400 illustrations. Free Catalogue. Bowman Printing, Dept. CQ, 743 Harvard, St. Louis, MO 63130.

WANTED: Old radio transcription discs; any size, speed. Larry, W7FIZ, Box 724, Redmond, WA 98052.

TRAVEL-PAK QSL KIT - Converts Post Cards, Photos to QSLs. Stamp brings circular. SAMCO, Box 203, Wynantskill, N.Y. 12198.

THE INCREDIBLE SECRET MONEY MACHINE is Don Lancaster's outrageous new "cookbook". Get your autographed copy for $6.95, guaranteed and postpaid. Synergetics, CQ-7, Box 1112, Parker, AZ 85344. VISA accepted.

TRS-80 HAM PROGRAMS Dup search and log contest . . . DXCC, WAS tracking. Antenna Math, much more. $1.00 brings list, refundable. WA4PYF, Box 145-C, Lithonia, GA 30058.

MUSEUM for radio historians and collectors now open. Free admission. Old time amateur (W2AN) and commercial station exhibits, 1925 store and telegraph displays, 15,000 items. Write for details. Antique Wireless Assn., Holcomb, N.Y. 14469.

WANTED: Pre-1925 wireless gear, books, magazines, spark transmitters and tubes. Jim Kreuzer, 1428 Main Rd., Corfu, NY 14036.

VP5 PROVIDENCIALES. Your fam. won't mind your DXing. They will also have the time of their lives with swimming, snorkeling, fishing, beachcombing, etc. Our new home is completely furnished, including transceiver and antenna. Refer to June '77 issue of CQ. Info-Rene Weber, 2600 Douglas Rd., Suite 1100, Coral Gables, FL 33134.

SOFTWARE FOR HAMS with TRS-80 or Digital Group 16k systems. Bearing gives zone, country, bearing from call sign/prefix input or gives prefix, zone, bearing from country input. Dupe, written in machine language, will dupe your contest logs. Send SASE for details or $7.95 each for audio cassette. Specify system and program. J & B Software, SR Box 30564, Fairbanks, Alaska 99701.

FREQUENCY ALLOCATION CHART. See how the entire radio spectrum is used. 2 Khz to 200 Ghz. Send $3.00 to: Collins Chart Co., Box 935, Coronado, CA 92118.

QUCIKLY buy/sell used amateur gear. Nationwide-we match buyers with sellers. Send make, model number, price, name, address, telephone, $1. fee, S.A.S.E. - Write: Amateurs Buy/Sell Exchange, Box 374-C, Visalia, CA 93279.

FREE: FUNDAMENTALS OF LIGHT PROPAGATION, masses with C - plus relative velocities, superior, trajectory relativity & unified field theory, Einstein's eclipse scandal, obsolete, elastic solid aether - based relativity scandals, exposed, reformed! Write W.T. Thomas, Jr., 408 Vermont, Daytona Beach, FL 32018.

TEKTRONIX 549 storage scope w/(4) X10X1 Trektronix probes & cart. 1A4, 1AZ and type O plug in units included. Excellent condition $1200. 545A H.P. logic probe, new, $80. H.P. logic clip, new, $50. HW22A 40m xcvr w/supply, $120. Knight VTVM $30. Bob Budzbanowski, 1442W West River Drive, Stevens Point, WI 54481. (715) 341-7485.

MAKE MONEY for your church, club, or organization. Send $2.00 for plans and info. Danny Lee Ball, Box 624, Uneeda, W. Va. 25205.

KITS FOR SCANNER USERS. Preamplifiers, tone decoders, others. Free catalog. Capri Electronics, Route 1A, Canon, GA 30520.

REPLACE RUSTED ANTENNA Bolts with stainless steel bolts. Small quantities, free catalog. Elwick, Dept. 341, 230 Woods Lane, Somerdale, N.J. 08083.

SILTRONIX Model 90 Super Deluxe VFO. Best offer takes it! Bohdan Czerwinski, Box 527, Iron River, Michigan 49935, (906) 265-3182.

QUAD BUILDERS - blizzard/hurricane proof your antenna. Fiberglass vaulting poles. Incredible strength. SASE for info. K5WSE, Box 1032-C, Cedar Park, TX 78613, (512) 259-2164.

FREE ELECTRONICS SURPLUS Catalog. Bargain Packed. Fascinating items, many never before advertised. ETCO-003, Box 762, Plattsburgh, N.Y. 12901. Surplus Wanted.

WANTED: Collins 51-R receiver (VHF). Bill Orr, W6SAI, 301 Industrial Way, San Carlos, CA 94070.

FOR SALE: Complete set of Time-Life camera books, 17 volumes plus master index and Photographers Handbook, $125. A. Dorhoffer, K2EEK, CQ Magazine, 14 Vanderventer Ave., Port Washington, NY 11050.

QSL—QSL—QSL: Please send QSL Cards to: Philip Steven Kurland, Post Office Box 1686, New Haven, CT 06507.

The book "CQ YL" has been updated again with a new supplement bringing the YLRL Officers section up to date through 1977, plus a report on the 7th International YLRL Convention held in Houston in June 1976. If you have a copy of "CQ YL" and would like to add the new supplement (the pages are "slotted" so they can be inserted directly into the book's spiral backbone), drop a note with your request to author/publisher W5RZJ, Louisa Sando, 9412 Rio Grande Blvd., NW, Albuquerque, NM 87114. Please enclose $1 to cover the cost of printing and mailing. The one and only book about YLs in ham radio, "CQ YL" contains 23 chapters over 600 photographs. Order your autographed copy, or a gift copy from W5RZJ, $3.50 postpaid.

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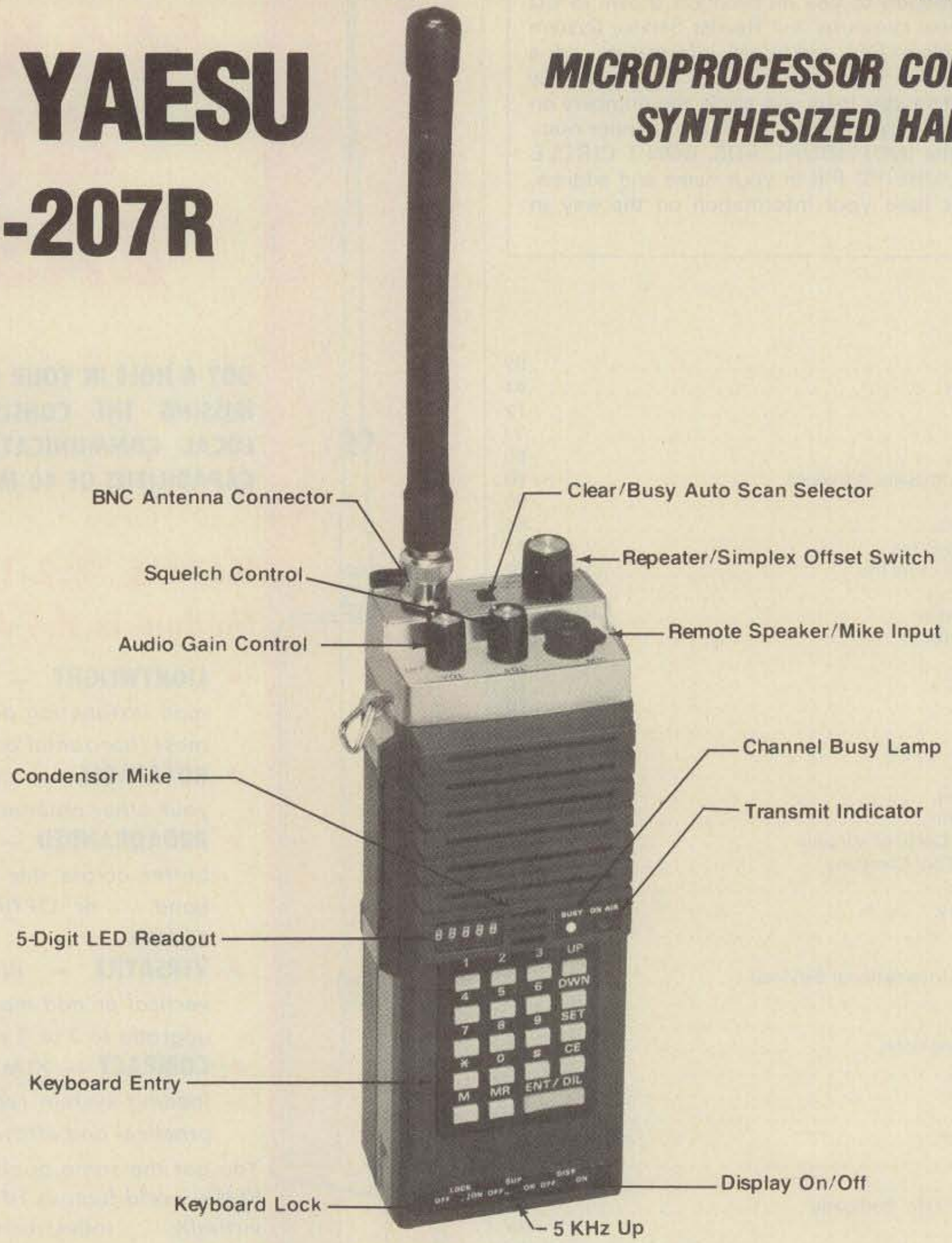

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