May 1967
75¢

ICD CQ

The Radio Amateur's Journal

Collector's Item

It's a mobile transceiver *and* a fixed station. It reaches out — SSB and CW — to collect QSL's. The KWM-2 lets you work all the 80- to 10-meter amateur bands. Like all Collins equipment, the KWM-2 is designed for system use. Put a 62S-1 VHF Converter on the table next to a KWM-2 and you are up on the 6- and 2-meter bands. Add a 30L-1 Linear Amplifier to the system for a full-powered fixed station. That's only part of the KWM-2 story. Ask your Collins distributor about the rest.

For further information, check number 22, on page 110

COLLINS

NEW from International

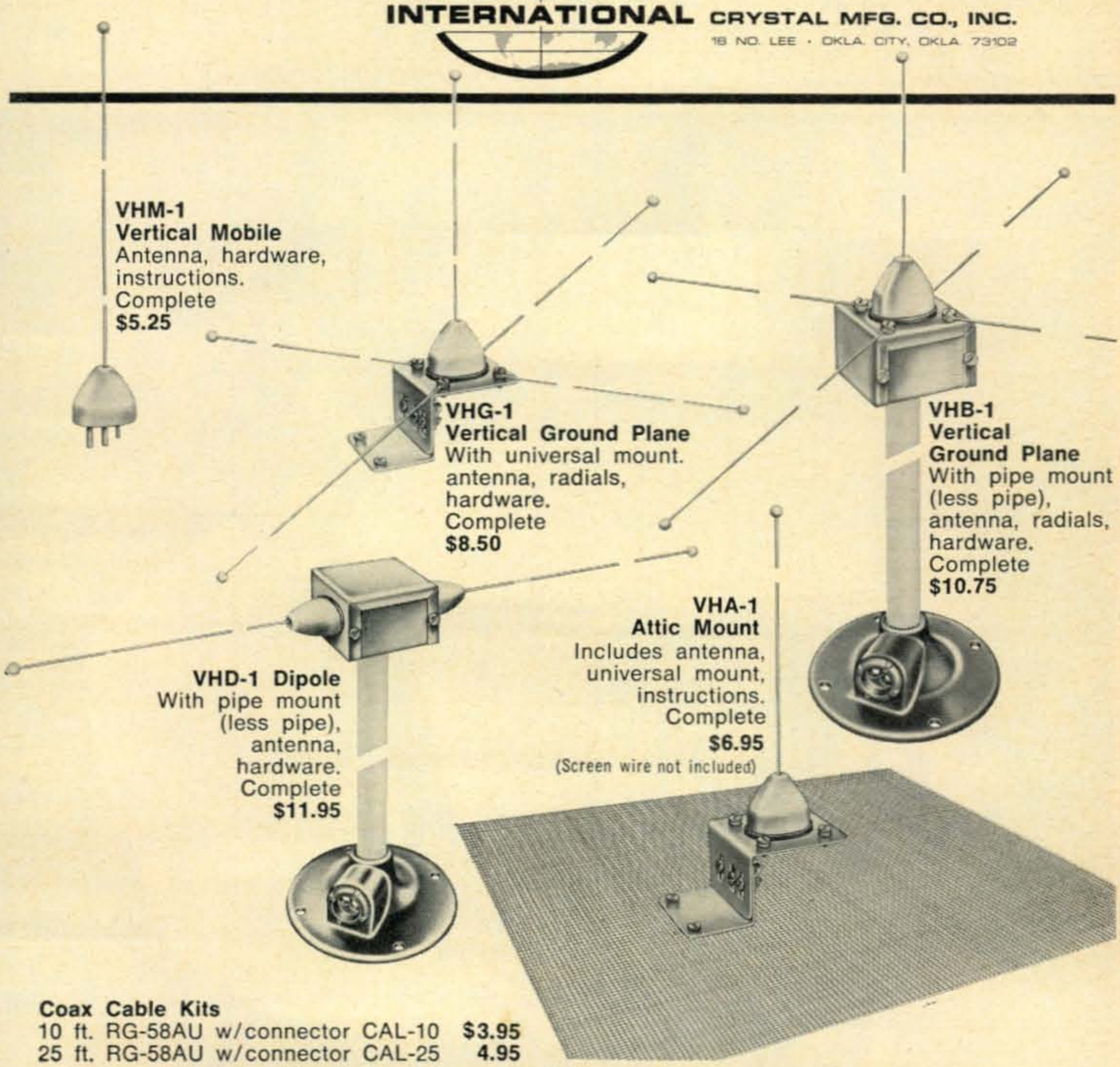
low cost VHF space-saver antennas

144-430 mc **120-480 mc**

- *Designed for full performance*
- *Solid molded bases*
- *Easy mounting*
- *Low cost*
- *Mobile Fixed Base*

If antenna space is a problem, you will find International Space-Saver antennas the answer. The new line of Space-Savers keep antenna display and space requirements to a minimum with full operating performance. Manufactured from the finest material, yet low in cost.

INTERNATIONAL CRYSTAL MFG. CO., INC.
18 NO. LEE • OKLA. CITY, OKLA. 73102



VHM-1
Vertical Mobile
Antenna, hardware, instructions.
Complete
$5.25

VHG-1
Vertical Ground Plane
With universal mount. antenna, radials, hardware.
Complete
$8.50

VHB-1
Vertical Ground Plane
With pipe mount (less pipe), antenna, radials, hardware.
Complete
$10.75

VHD-1 Dipole
With pipe mount (less pipe), antenna, hardware.
Complete
$11.95

VHA-1
Attic Mount
Includes antenna, universal mount, instructions.
Complete
$6.95
(Screen wire not included)

Coax Cable Kits
10 ft. RG-58AU w/connector CAL-10 **$3.95**
25 ft. RG-58AU w/connector CAL-25 **4.95**

For further information, check number 7, on page 110

For further information, check number 6, on page 110

CQ

MAY 1967 VOL. 23, No. 5

The Radio Amateur's Journal

TABLE OF CONTENTS

DEPARTMENTS

Offices: 14 Vanderventer Avenue, Port Washington, L. I., N. Y. 11050. Telephone: 516 883-6200.

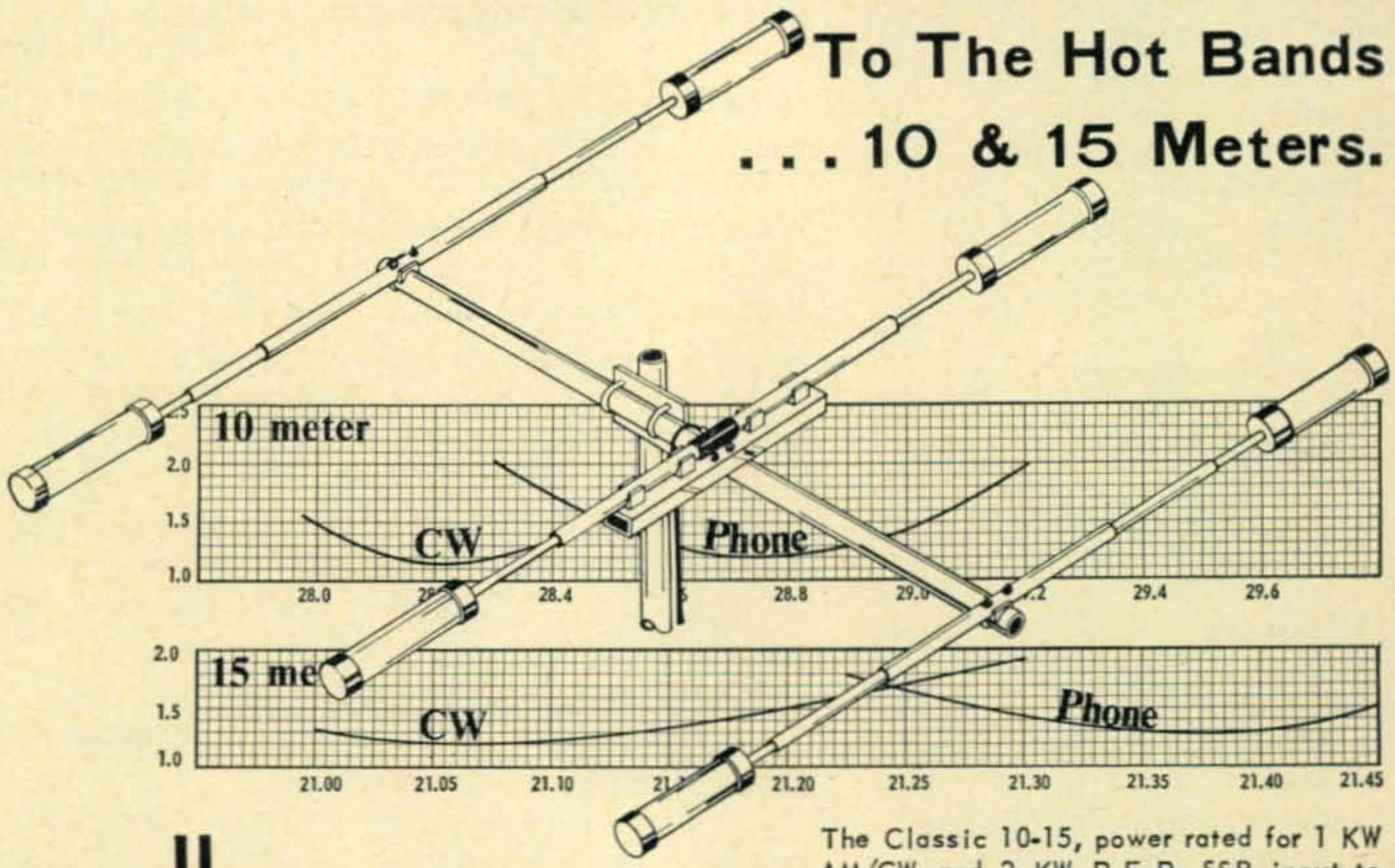
CQ—(Title registered U. S. Post Office) is published monthly by Cowan Publishing Corp. Second class postage paid at Port Washington and Garden City, New York. Subscription Prices: U. S. A., Canada and Mexico, one year, $5.00; two years, $9.00; three years, $13.00. Pan-American and foreign add one dollar per year. CQ does not assume responsibility for unsolicited manuscripts. Please allow six weeks for change of address. Printed in the United States of America.

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

The Classic 10-15

Mosley TRAP MASTER

The New 'CLASSIC' Approach To The Hot Bands ...10 & 15 Meters.



Have you tuned 10 and 15 meter bands recently? They'er quite active again! The 15 meter band is now considered the best daytime DX band and 10 meters is gaining more ground every day. An All New approach to these bands is the Classic 10-15. The newest addition to the Classic Trap-Master beam family. Incorporating the very latest in matching systems, Broad Band Capacitive matching (Pat. Pend.), first introduced last year in the now famous Classic 33.

The Classic 10-15, power rated for 1 KW AM/CW and 2 KW P.E.P. SSB input to the final. Gain, a FULL 8 db. compared to reference dipole or 10.1 db. over isotropic source. Incorporates durable metal encased traps made famous by the Trap-Master TA-33. Maximum front-to-back. And so lightweight (only 27.5 lbs. assembled weight) it may be easily stacked with your present 20 and/or 40 meter beam.

The Classic 10-15 . . . another reason why you select quality when you specify Mosley. Write for more information.

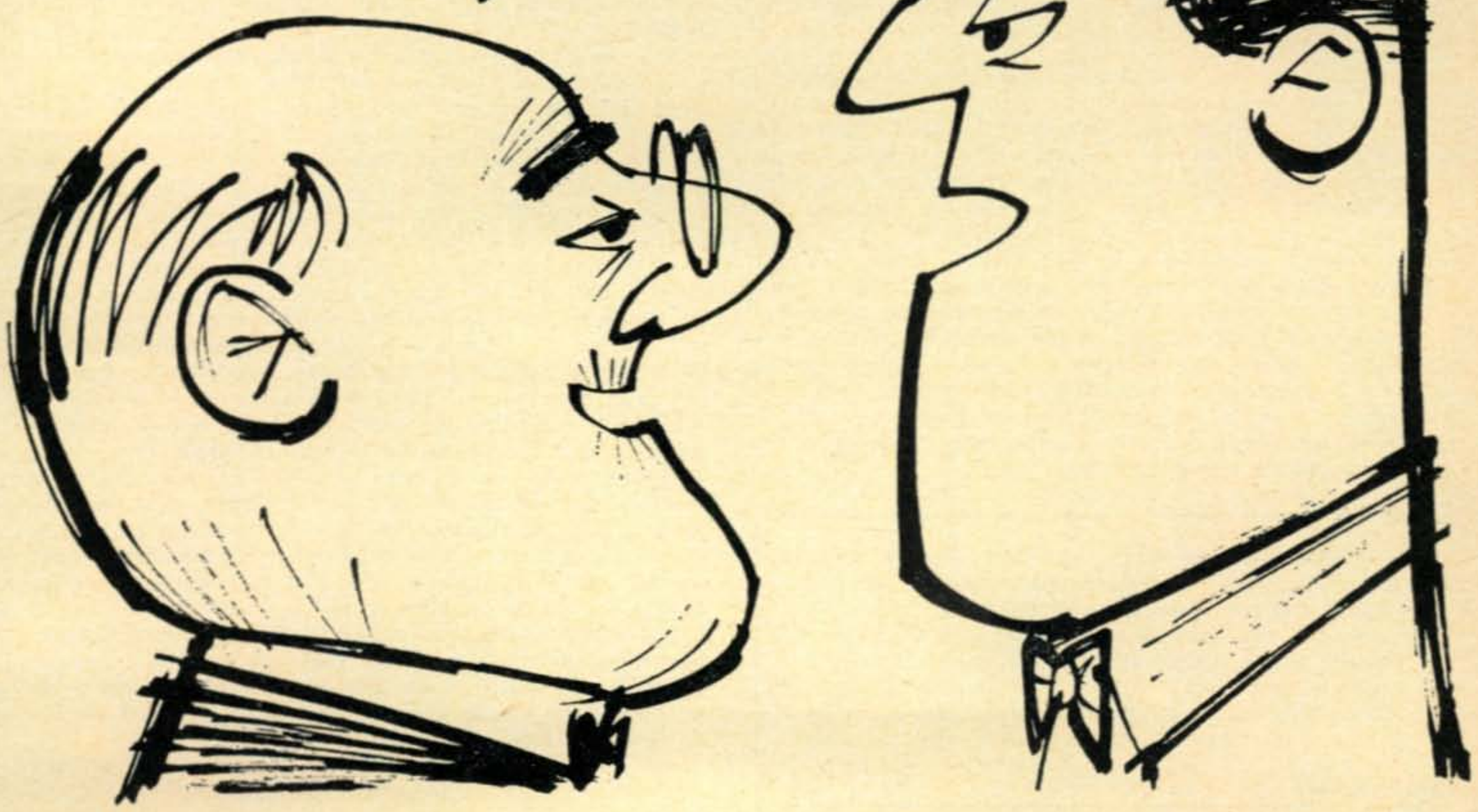
Write Dept. No. 131

Mosley Electronics, Inc. 4610 N. Lindbergh Blvd., Bridgeton Mo. 63042

For further information, check number 1, on page 110

"Do you realize that a CQ subscription for $5.00 is actually worth $39.00? CQ sells on the stands for 75¢ each month, or $9.00 per year! But CQ subscribers get up to 12 free classified ads (each worth $2.50) totalling $30.00 per year. A TOTAL OF $39.00! And besides offering special bonus subscription incentives, CQ is also pulling names from their current mailing list and sending free grab bag prizes to the names pulled. These prizes are beauties; books, tubes, transistors, components, test equipment and various other goodies any ham would be delighted to receive. I not only subscribed for myself, but for quite a few ham friends and relatives. CQ is going all out to become the most popular ham magazine in the business!"

"BIG DEAL!"



OUR READERS SAY

A Radical Proposal

Editor, *CQ*:

It is my opinion that Mr. Soifer's proposal is a very good idea. Although the majority of the Ham population would howl if such a proposal went into effect, one must look into the future. At this time we may not see what is coming to the Ham frequencies but we must face the facts. With the advent of communications satellites and the demand for more commercial frequencies, the amateur frequencies will be in danger in another 10 years or so. If the amateur population is not increased chances are that our frequencies, few as they are, will be taken over for more important things such as international satellite TV networks, etc. Also with a small Ham population the basic reason for the allocation of amateur frequencies will be gone as no new inventions in the field of radio will come from the ranks of ham radio. But, with a program like the "Radical Proposal" we might have a chance of increasing our membership and at the same time help out the FCC in their policing of the Citizen's Band. The restricted class holder would have a chance to do his rag chewing legally and perhaps obtain a Novice license as I have recently done. The CBers may abuse the restricted class license but the harm done would be only to themselves if they were assigned "private" frequencies. In all, I feel that the only way to retain Ham radio for our Junior Ops is to advocate such a proposal by petitions, letters, etc. to the FCC and other related organizations.

Bradford Councilman, WN1GJM
Montague, Massachusetts

Editor, *CQ*:

Re: "A Radical Proposal" by K2QBW.

NO!

Code is an essential part of ham radio. Hams not using code in normal practice are only partly hams. (Hams not honestly interested in theory, building, as well as operating fone, are likewise only partly hams).

I'm not worried about dwindling ham ranks. There are too many to occupy the existing frequencies now. Don't make it any easier.

Can I play bridge in your club without knowing and observing the rules of the game?

C. B. Wolfe, WØLJO
Hastings, Nebraska

Editor, *CQ*:

With regard to your article, "A Radical Proposal", may I add my comments?

First of all, I am not a ham radio operator, but I do have a keen interest in it and that is why I subscribe to your magazine. Many would now ask the question, then, why don't you get a license? Glad you ask, because this brings me to the subject of my letter.

Reason: I would have to take time to learn a code I know I would not use and like most people today I don't have time to waste. I hold a first class Radio telephone License and could easily pass the electrical questions on the test. I would like to have a license to go on the air for the experimental engineering aspects it offers and that, as we know, is the purpose of amateur radio.

Now can someone tell me what learning code has to do with my putting a good signal on the air?

"Our Readers Say" welcomes letters about nearly anything of interest to amateurs, whether about *CQ* itself, the state of the hobby, or whatever else you have on your mind. The most interesting letters will be selected for publication each month; just keep them legible, keep them short, and above all, keep them clean! Something bothering you. We're not mind readers, OM, so drop us a line.

As for the CBers that I have met I can say they have no sense of responsibility to rules and regulations and are using CB for anything but what it is meant for. However, I am sure they are not all guilty so why not make it possible for them to become amateur radio operators.

How? Drop the code requirement and make them learn rules and regulations til they are blue in the face. Then follow up with a good stiff exam on radio theory and good engineering practice. This will then show they have the proper interest in ham radio because they have taken the time to prove it and can use what they learned to put a good signal on the air. Those that can pass such a test will have a different outlook on radio and I believe would conduct themselves in the tradition of ham operators the world over.

Robert M. Johnson
St. Paul, Minnesota

Editor, *CQ*:

I have read with interest K2QBW's article in the February issue and the comments regarding the article in the March issue. The first thing which caught my eye in the March letters column was the letter from Mr. Ferrell of *Popular Electronics*. His comments were typical, I believe, of someone whose salary depends largely on the number of readers of his 90% Citizens Band magazine. I was quite surprised not to see a letter from Kneitel, who burns the candle at both ends. W5EHC's letter, unfortunately, did not provide anything concrete in assuring proper operation should the proposal become law.

Now, if I may, I would like to add my comments regarding K2QBW's proposal. First of all, I believe that the provisions of the license are much too generous. If I were a newcomer to radio and had my choice of taking the Novice or Restricted license, I would choose the latter. Very simply put, a newcomer usually believes that a radio is something to talk over, using a microphone and not a key. Why should the newcomer use a key, when here is a license with which he can actually *talk* to someone using voice transmission? Another point, the present Novice license provides a two-megacycle wide band over which one can use voice transmission. Furthermore, one can also use 75 watts and crystal control as proposed by K2QBW. QRM on the two meter band would still be negligible since it is highly doubtful that skip conditions would prevail causing interference between, for example, W2 and W6. Once again, this is already provided for in the Novice license.

The "hobby-type" CBer for whom this license is proposed would also find another thing unfavorable in the proposed frequencies on which he may operate. He would not be able to work DX! I wonder if K2QBW has listened on CB lately and heard these "hobby-types" working coast-to-coast using self-styled "skip names" and requesting QSL cards? No, these proposed frequencies would be of no value to the "hobby-type" CBer whose only desire is to "shout someone down" 3,000 miles away.

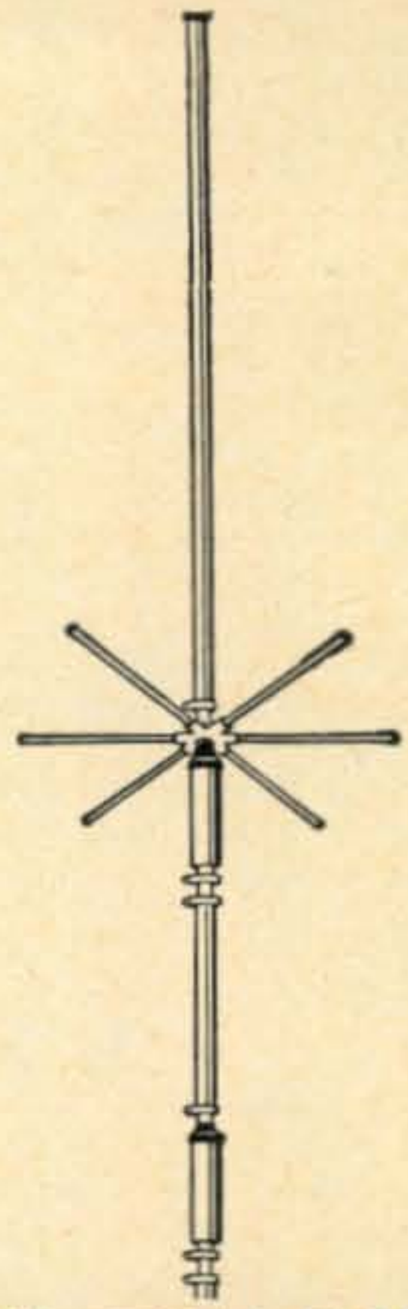
Of course the code test is essential and I will not dwell on it due to space limitations. Suffice to say that, should this proposal be accepted, will the Restricted licensee take the required code test for a higher class license once his two year term has expired? I think not.

Finally, regarding the prohibitive cost of an amateur rig. This is an old saw which has been ground many times. It is fine to say that prices should not be more than two or three hundred dollars for a rig. However, most "hobby-type" CBers usually own between two and ten units costing on the average two hundred dollars *a piece*. Thus, cost should not be too prohibitive and, of course, one can always homebrew the equipment.

Space limitations prevent me from elaborating further. However, these are a few of the reasons why I believe K2QBW's proposal is not feasible. Should anyone wish to discuss the matter further, look for KL7WAH on 10, 15, or 20 meters.

Lt. R. R. Migliorino, KL7WAH
APO Seattle, 98731

WHY SETTLE FOR HALF?



GET THE ENTIRE BAND—BOTH CW AND PHONE WITH ONE TUNING ADJUSTMENT!

Only from HUSTLER will you receive the mechanical and electrical performance you want in a 4 Band Trap Vertical. Make the comparison and see for yourself.

Look what you get with Hustler!

- Individually and precisely tuned traps!
- Lowest SWR and Widest Band width!
- Outstanding mechanical construction!
- Heavy gauge heat treated aluminum!
- Stainless and cadimum plated steel parts!
- Base impedance nominal 52 ohms!
- 5 Band operation with 75 meter mobile resonator on top.
- WHOLE BAND OPERATION WITHOUT READJUSTMENT!
- Performance that defies comparison. Show us where any other is better!

FIXED STATION TRAP VERTICAL HUSTLER ANTENNAS

See your distributor or write for new catalog

NEW-TRONICS. corp. / 3455 Vega Avenue Cleveland, Ohio 44113

For further information, check number 8, on page 110

OUR READERS SAY (Continued)

Editor, *CQ:*

I disagree with Raphael Soifer's "Radical Proposal." Only the frequencies would change, otherwise CB would remain unchanged with the same operators and garbage traffic plus 15 times the power not to speak of wasted spectrum!

Allan B. Tarbell, K1UJB
Windsor, Connecticut

Editor, *CQ:*

Count me in as being against the "restricted class license." Several times in the past, from a few other magazines, I recall reading basically the same thing; a codeless ham ticket. My feelings toward this proposal is the same about the others. I cannot see using a group's lack of initiative to justify a codeless ham license.

The problem from the beginning has been the mis-use of the 27 mc band, not the requirements for an amateur radio license.

Daniel Martin, Jr., W1MKF
Portsmouth, Rhode Island

In Don's Defense

DX Editor, *CQ:*

I read with interest your article on Don Miller, W9WNV, and his DX exploits. I waited until now to gather more information before commenting to anyone. You asked for foreign amateurs to write their views regarding the controversy. First let me say Don and others like him have created, like Mohammed Ali of boxing fame, Bobby Hull of hockey and the Beatles of Rock and Roll, great excitement in DX which otherwise would not have been possible. Now, I have heard Don operate, as well as many other DXers, and came to the conclusion he was extremely fair and gave, as far as I could to tell, everyone an opportunity to work him; not only the stations who were supposedly solicited.

These letters, at least the ones I have seen, were in a general form asking the recipient if he would like to contribute but not that he had to in order to obtain a QSL. I've seen brochures and letters much more demanding from organizations other than this. I have never personally contributed yet. Don has acknowledged my call to him. On several occasions I have listened for 2-4 hours before contact; other times, I was able to work him almost immediately after monitoring the frequency constantly for hours. I used a HX-50 exciter into a homebrew 1 kw linear and a Hy Gain TH-6 90 feet high on a steel guyed tower.

I'm very disappointed in the ARRL for the view they have taken after being hounded into the situation by stations good or bad which Don did or did not want to work. After some of the bad manners used, I would also have avoided such stations. As far as giving QSL's where no contact was made, I find this difficult to believe reading about Don from many articles written about him and hearing him operate. Anyone wanting a QSL that way would have to be sick.

The squawks from Indians who would have liked to have had the signals Don had are, I believe, spite. Many would like the honor but are afraid of the effort and know-how involved. I heard Don with very excellent signals from wherever he worked yet the others who tried to get out from such areas often had little or no r.f. to my location.

I rarely (if ever) hear stations from India or near there, yet Don was able to do it—so why don't the poor sports who critize his style do something constructive on their own initiative. As for the leading phony questionnaire sent out is very misleading. Before I believe that I would have to have better proof than spite.

As for making money this also was hard to swallow judging from reports I heard about contributions. Lastly, I want to point out I'm not a DX hound, don't even bother much about QSL cards or certificates, but enjoying ham radio for the many benefits it has brought humanity and the hams.

Maybe these poor dejected DX hounds should finance an expedition on their own and mail themselves a card, but no one else. They may be great guys, but should show it on the air.

John Heidebrecht, VE3AAQ
St. Catharines, Ontario

Signals From Space

Editor, *CQ:*

The article "Signals from Space" by K2ZSQ and K2UYH which described the experiments conducted by Grote Reber in the '30's made fascinating reading. Reading such an article should provide added stimulus to those amateurs who may still believe that it does not require a Cape Kennedy array of equipment to discover something new under the sun (pardon the pun). Remember, that the 1930's were not exactly a Stone Age era in the world of radio and that the present giants of the radio and telephone industry had well-equipped labs staffed with competent people during Reber's experiments. Despite the lack of NASA-sized funds, Reber carved the first milestone in the field of radio astronomy and great credit is due his remarkable achievement.

Some amateurs may be interested in reading further about radio astronomy, and I would recommend the Pelican book *Radio Astronomy* by F. G. Smith. Dr. Smith is with the Mullard Radio Astronomy Observatory in the University of Cambridge, England. This is a very readable book, with references to Reber's work on pages 12, 21, 122, 215 and 236.

I would like to quote a portion of page 12 of this book: "From 1932, when Jansky discovered cosmic radio waves, until 1946, when wartime research provided a separate stimulus, the only radio astronomer was one lone amateur, Grote Reber. A great opportunity was lost during these years, for since then, radio communications have grown so rapidly that the longer wavelengths

[*Continued on page 98*]

LICENSE EXPIRATION NOTICE SERVICE

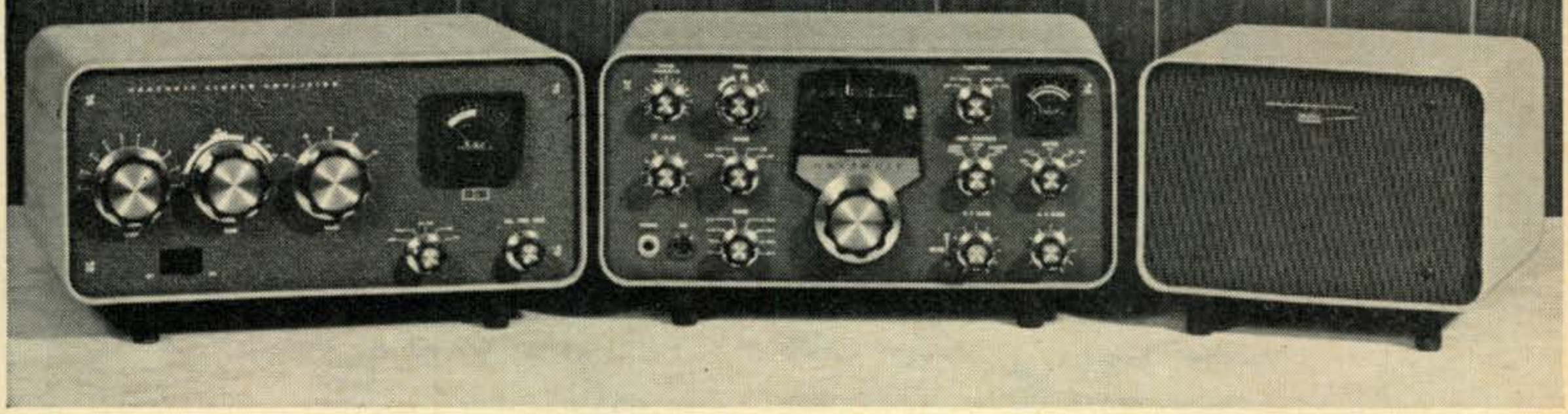
Available To Anyone Anyplace In The World.

1. Address a postal card (no other form accepted) to yourself.
2. Write anything you wish to tell yourself on the card.
3. At the top of the correspondence side (when placed horizontally) write a date (month and year only) when you want the card mailed.
4. When this month arrives, the card will be mailed.

The Foundation for Amateur Radio, sponsor of the service, accepts no responsibility, if, for any reason, the card is not mailed. The Foundation does agree, however, to maintain this service as long as volunteers are available. Mail your card today to:

Joan Machinchick, K3KBI
Lake Drive, Cape St. Clair
R.F.D., Annapolis, Md. 21401

NOW FACTORY ASSEMBLED THE WORLD'S MOST POPULAR RIG



The HEATHKIT® SB-101 Transceiver and SB-200 KW Linear Plus Accessories

In Answer To Your Requests . . . now those of you who just can't spare the time for "do-it-yourself", can purchase the SB-101 Transceiver and SB-200 KW Linear factory assembled and tested ready for operating the moment you unpack them. For those who want to save the most, these units also will continue to be available in kit form. Either way, you get the renowned SSB performance and features that have made the Heath SB line the fastest selling rigs on the air.

The following related accessories also will be available factory assembled or in kit form: HP-13 DC Power Supply (for mobile operation of the SB-101), HP-23 AC Power Supply (for fixed station operation of the SB-101), and SB-600 Communications Speaker (matches appearance of SB line and has space for installing the HP-23 AC power supply).

SB-101 80-10 Meter SSB Transceiver

• 180 watts PEP, 170 watts CW • Switch select Upper or Lower sideband or CW • CW sidetone • PTT or VOX • Linear Master Oscillator with 1 kHz dial calibration (resettable to 200 Hz) • Provision for switch selection of optional SBA-300-2 CW filter • Provision for external LMO • Separate CW offset carrier crystal • 100 kHz calibrator

Assembled SBW-101, 23 lbs., write for terms..... **$540.00**
Kit SB-101, 23 lbs..... **$360.00**

SB-200 80-10 Meter KW Linear Amplifier

• 1200 watts PEP, 1000 watts CW • Drives with 100 watts • Built-in SWR meter, antenna relay, solid-state power supply • ALC • Shielded, fan-cooled amplifier compartment • Pre-tuned cathode input • Circuit breaker • 120/240 v.

Assembled SBW-200, 41 lbs..... **$320.00**
Kit SB-200, 41 lbs..... **$220.00**

SB-600 Communications Speaker

• Styled to match SB series • For fixed station use • 8 ohm speaker with shaped 300-3000 Hz response • Has space for HP-23 power supply

Assembled SBW-600, 5 lbs..... **$24.95**
Kit SB-600, 5 lbs..... **$17.95**

HP-13 Solid-State Mobile Power Supply

• Supplies voltages for SB-101 • Provisions for remote operation (can be located in engine compartment) • Circuit breaker protection • 12 to 14.5 VDC input (neg. ground only)

Assembled HPW-13, 7 lbs..... **$89.95**
Kit HP-13, 7 lbs..... **$64.95**

HP-23 Solid-State Fixed Station Power Supply

• Supplies voltages for SB-101 • Excellent dynamic regulation • Fused primary • Can be installed inside SB-600 speaker cab.

Assembled HPW-23, 19 lbs..... **$64.95**
Kit HP-23, 19 lbs..... **$49.95**

FREE 1967 CATALOG

Describes these and over 250 kits for stereo/hi-fi, color TV, amateur radio, shortwave, test, CB, marine, educational, home and hobby. Save up to 50% by doing the easy assembly yourself. Mail coupon or write Heath Company, Benton Harbor, Michigan 49022.

HEATHKIT®

HEATH COMPANY, Dept. 12-5
Benton Harbor, Michigan 49022

☐ Enclosed is $_____, plus shipping.
Please send model (s)_____
☐ Please send FREE Heathkit Catalog.

Name_____
(Please Print)
Address_____
City_____ State_____ Zip_____

Prices & specifications subject to change without notice. AM-182

For further information, check number 5, on page 110

Announcements

St. Petersburg, Florida

The St. Petersburg Amateur Radio Club, Inc. will hold their annual Hamfest at Phillipi Park, near Safety Harbor, Florida, Sunday, May 14, same location as we have held it for many years. All hams and guests cordially invited. Good time for everyone. This year: No charge for cars to enter the park! This is the old fashioned hamfest, picnic lunch, swap table and prizes.

DeKalb, Illinois

The Kishwaukee Radio Club will hold its annual Ham and Swapfest in the Hopkins Park Shelter House in DeKalb, Illinois, on Sunday, May 7th. Come one, come all and buy, sell or swap for the gear you want, or just eyeball QSO with hams from everywhere.

Bremerton, Washington

The Amateur Radio Association of Bremerton will hold its 33rd annual manfest and banquet on Saturday, May 20, at the West Side Improvement Club Hall. Registration opens at 1000. There will be "Bunny Hunts," QCWA meeting, conducted tours of the Puget Sound Naval Shipyard, Technical talks, c.w. contest, Swap Shop, Rag Chews, etc., furnishing something of interest for everyone. A fine Banquet at 1900 followed by an evening of entertainment and dancing. Registration prior to May 13 is $4.00 per person, $4.50 after that date and at the door. For reservations and further information contact Harold James, K7KWV, 141 South Wycoff, Bremerton, Washington 98310.

Topeka, Kansas

The Kaw Valley Radio Club will hold its annual Hamarama at Lake Shawnee Shelter House No. 1, Topeka, Kansas on Sunday, May 21, 1967, 9 A.M. to 5 P.M. Registration fee $1.50, free drink, bring family, and covered dish. Swap Bench, Auction, good door prizes, Bingo for the ladies, 29.6 Mobile Hunt. Come one and all. For further information write to William R. Powell, KØYHI, 1654 Withdean Road, Topeka, Kansas.

Memphis, Tennessee

The three amateur radio clubs of Memphis; The Delta Radio Club; The Mid-South Amateur Radio Ass'n; Mid-South VHF Radio Club, are combining their efforts to produce for 1967 with the tentative dates of May 20 and 21. For complete details and up to date information write to Richard T. Ely, WA4VHM, at the Memphis Amateur Radio Clubs Hamest, 1100 Home Federal Bldg., Memphis, Tennessee 38101.

Plains, Kansas

Plans are being made for the fourteenth Hamfest of the Hi-Plains Amateur Radio Club to be held Sunday, May 21, 1967, at the Grade School in Plains, Kansas. Bring the family, a basket lunch with your own service. Drinks are to be furnished by the club. There will be entertainment and favors for the XYL's, fun and games for the harmonics and a swaptable for the OM's, and prizes galore.

Rhode Island Amateur Radio Week

The amateur radio clubs of Rhode Island invite all amateurs to participate in the second annual R.I. Amateur Radio Week Achievement Award. Operating times are from 0001 GMT June 4, 1967 to 2400 GMT June 10, 1967. All stations outside R.I., Mass. and Conn. are required to contact 3 different R.I. stations. Mass. and Conn. amateurs must contact 5 different R.I. stations, and R.I. amateurs must contact 10 different R.I. stations. DX stations including KH6 and KL7 are required to contact 1 R.I. station during this period. Any band or mode may be used. All amateurs who submit logs meeting the above requirements will receive a certificate signed by the Governor. Also any station contacting the official station of R.I. Amateur Radio Week, K1RJ, will receive a QSL card commemorating this event. All contestants will exchange a signal report, their county

For further information, check number 20, on page 110

and state. Suggested frequencies are: 3600, 3720, 3850, 7030, 7170, 7250, 14050, 14250, 21150, 21320, 28650, 29000 kc, 50.2, 50.7, and 145-147 mc. Logs should be postmarked no later than June 30, 1967 and sent to: W1YRC, 2 Rocky Crest Road, Cumberland, R.I. A self addressed stamped envelope should be enclosed for the return of your certificate.

Angola, Indiana

The tri-State College ARC is holding its eighth annual picnic and hamfest on Sunday, June 11, 1967, in the Steuben County 4-H Park near Angola, Indiana. The hamfest will include a transmitter hunt, swap-shop and door prizes. For further details write the Picnic Committee, Tri-State College Radio Club, Angola, Indiana 46703.

George Joyce, W9RA

We regret to report the passing of a man very much involved in amateur radio. George Joyce, W9RA, who passed away on March 1st, was founder of one of the countries oldest amateur radio supply houses, Chirad, located in Chicago. He was an active amateur all of his life and did much to contribute to the hobby.

Ottawa, Illinois

The Starved Rock Radio Club will hold their annual SRRC Hamfest, at The La Salle County 4-H Home and Picnic Area Southwest of Ottawa, Ill., on June 4th. This all day affair suggests registration in advance at $1.50 or at the gate at $2.00. Deadline for advance registrations is May 29. Free coffee and doughnuts from 10 to 10:30 a.m., food available and ample parking provided for. For a full day of activities, follow big yellow HAMFEST signs on Route 71 from the South end of Illinois River bridge at Ottawa, Ill. For further details, including incentives and data on available motels and/or camp facilities, write W9MKS, RFD #1, Box 171, Oglesby, Illinois, 61348.

Greenville, S. C.

The Blue Ridge Radio Society wishes to extend a cordial invitation to attend their seventh annual "Hamfest" to be held Sunday, May 7, 1967, at the Cleveland Park, Greenville, S.C. For complete info contact Robert L. King, WA4LVU, Blue Ridge Radio Society, Inc., 101 Griffin Dr., Greenville, S.C., 29607.

Hanson, Mass.

The Massasoit Amateur Radio Association will hold its annual auction on May 2, 1967 at the Hanson Grange Hall on Route 27 in Hanson, Mass. Their auctioneer will be Ed Myerbeck, W1AKY, of Braintree. Address any communications to: W1KGU, 294 Summer St., Brockton, Mass., 02402.

Waterloo, Iowa

The N.E. Iowa Radio Amateur Association is having their Mobile Rally on May 21, 1967 at Black Hawk Park, Cedar Falls, Iowa. A transmitter hunt on 75 meters and mobile judging contest are planned, with trophies for the winners. For more information contact Dave Knittel, KØCQH, 703 Boston Ave., Waterloo, Iowa, 50703.

Lancaster, Pennsylvania

The Lancaster Radio Transmitting Society will hold its 22nd annual banquet on May 13, 1967, at 6:30 P.M. at the Meadow Hills Dining House, New Danville Pike, 1 mile south of Lancaster, Pa. For ticket and other information contact Floyd R. Jury, W3OLV, 2730 Harrisburg Pike, Lancaster, Pa., 17601.

Linthicum Heights, Maryland

The Maryland Two Meter Termite Net is going to sponsor a V.H.F. Contest, strictly two meters on May 20th and 21st. Contest begins at 2000 GMT 20 May 1967 and ends at 2000 GMT 21 May 1967. Contest is limited to two meters operations only, but shall not be limited to type of emmission. Any licensed amateur will be eligible and can participate. Separate awards will be made for Novice and General-Technician classes of license. All stations entering the contest must be single operator.

[*Continued on page 102*]

Feenix, Ariz.
AIR MALE
SPESHUL

Deer Hon. Ed:

Excoosing please my sending this letter to your home address and are sorry if waking you in middle of the nite, but knowing that you wanting to doing l/c public service for your reeders. Not only that, it could be matter of life or death.

(Pardon me for cupple seconds while I making sure that door is locked and my Hon. Shotgun are loaded and ready). Okey, all set. I even pulling shades so lite not showing outside.

Hon. Ed., this hole thing so weird, it taking bit of explaning, so getting comfortable. You see, in past cupple months, I having lotsa reel nice QSO's with amchoor down in Mexico in XE land (or as they saving, down in ole Mayheeco). He are professor fellow working in Hon. University doing research on animals and how they live, among other things.

So, are surprised when getting a phone call about a week ago from Andres (that professor fellows name). He are all excited and wanting to know if I can helping him for day or two and having some fun in the bargain. Well, you knowing Scratchi. Not having any dates with XYL-to-be and are footloose at moment, so I telling Andres 'sta bien, vamanos (speeking Spanish to him natchurally).

Andres telling me he meeting me at airport in Tucson and can I catching next plane. Oh—he also telling me to wearing hunting clothes, bring my camping gear, also two portable two-way radios.

So, cupple hours later I'm in Tucson. (Hon. Ed., pleese telling Hon. Proofreeders to being careful with name of this city. It's pronounced "Too-sahn" but it spelled Tucson, not Tuscon, and I wanting to making sure they getting it rite on acct. I not wanting anybuddies to think Scratchi can't spell).

Old amigo Andres meeting me and loading all my gear in his jeep, and we taking off like sixty. While we driving he telling me his problem.

It seeming that he riting artickle on migrating habits of mounten lions, and cupple weeks ago he catching mounten lion in Mexico and putting portable transmitter on it. This consisting of two watt solid state see-w rig, xtal controlled, along with several pounds of batteries. He also having

timer in rig, so every sixty seconds rig coming on and sending Andres' initials in see-w.

(Pardon me, Hon. Ed., while I changing this bandage on my foot, and taking another pain pill).

There, that feeling mucho better. The problem, as Andres are telling me, is that mounten lion, after spending few days in Mexico, are suddenly heading north to Arizona, and Andres want to catching him before he get too far and put fresh batteries on him.

Evidently a mounten lion moving that far are red-hots news, and maybe Andres can be famous when he finishing artickle, so we both very excited.

Day before, Andres are out with his portable locating reseever, and discovering that lion are in Catalina Mountens north of Tucson. Thats where we were heading to capture the lion.

Of course, to catching him is quite simple. Just shooting him with trankwillizer dart and Old mounten lion being put to sleep long enuf to changing batteries.

We getting up to Mt. Lemmon in Catalinas about dark, taking listen on reseever, not getting any signal, so getting out camping gear and bedding down for nite.

Next morning, after breakfast, we starting off. It seem like no time at all before we getting signal on reseever which telling us that good old mounten lion are somewhere around. At this point we following signal in earnest.

Hon. Ed., have you ever climbed over slippery rocks, high on a mounten, carrying portable radios, reseever with locating antenna, water, food, several pounds of batteries, all the while listening on earfones to week signal? Put it high on your list of things to never doing.

After lunch, signal are finely getting stronger, even though Andres and Scratchi getting weeker. By late afternoon we seeing mounten lion in distance, so we each taking a two-way reechie-screechy and separating.

My job is to make mounten lion go towards Andres so he can getting in shot with trankwillizer gun. We using reechie-screechies to keep in touch with each other.

Scratchi making out pretty well. By making lotsa noise (some of it being my groans from my aching bones) I finely managing to get lion close enuf to Andres that he able to shoot it with dart.

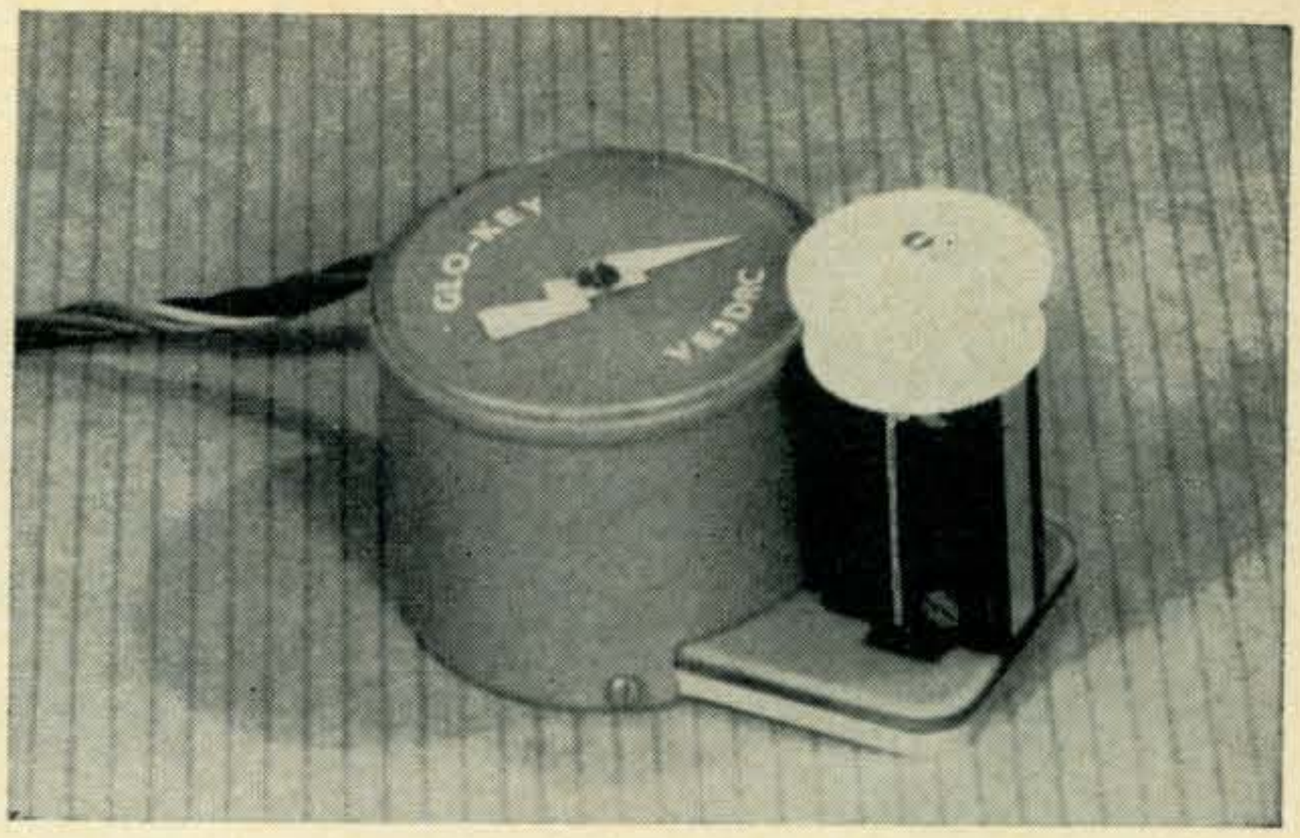
Just as I coming up to where lion and Andres are, he finishing putting two new long-life batteries on lion. As I standing there looking at mounten lion, I noticing that mounten lion are looking at me. With his eyes wide open. Before you can saying Hokendoke Hackensaki, mounten lion are standing up, still looking at me.

Hon. Ed., most of what happening after that are kind of blur. I do remember lion making noise like he asking for another helping of dessert, and then he coming at me. As he do, I kicking him with all my might right in the mouth, then everything blacking out.

[*Continued on page 102*]

The Glo-Key

BY ALBERT H. JACKSON,*
VE3QQ



The Glo-key, as constructed for our club station, VE3DRC.

This paddle key has no moving parts, is light operated and requires little or no finger pressure for accurate control. It is designed to operate with the Touch-a-matic Key described in a previous issue of CQ but may be used with any suitable relay circuits as well.

HERE is another paddle control unit to add to the still growing list of unusual Morse keys. This one is designed to operate with the Touch-a-matic key[1], but there should be little difficulity in getting satisfactory results with any of the circuits previously described for the Touch-key[2]. Like the Touch-key, the Glo-key has no moving parts, but works on the interrupted light-beam principle using a dual light source and two small solar cells. There is no r.f. radiation, and the unit achieves the ultimate in touch sensitivity since triggering occurs about 1/64" from the paddles, just *before* thumb or finger contact is actually made.

*12 Third Ave., Box 453, Arnprior, Ontario, Canada.

[1]Jackson, A. H., "The Touch-a-matic Key," *CQ*, July, p. 56, August 1966, page 16.

[2]Jackson, A. H., "The Touch-key," *CQ*, November 1964, page 28.

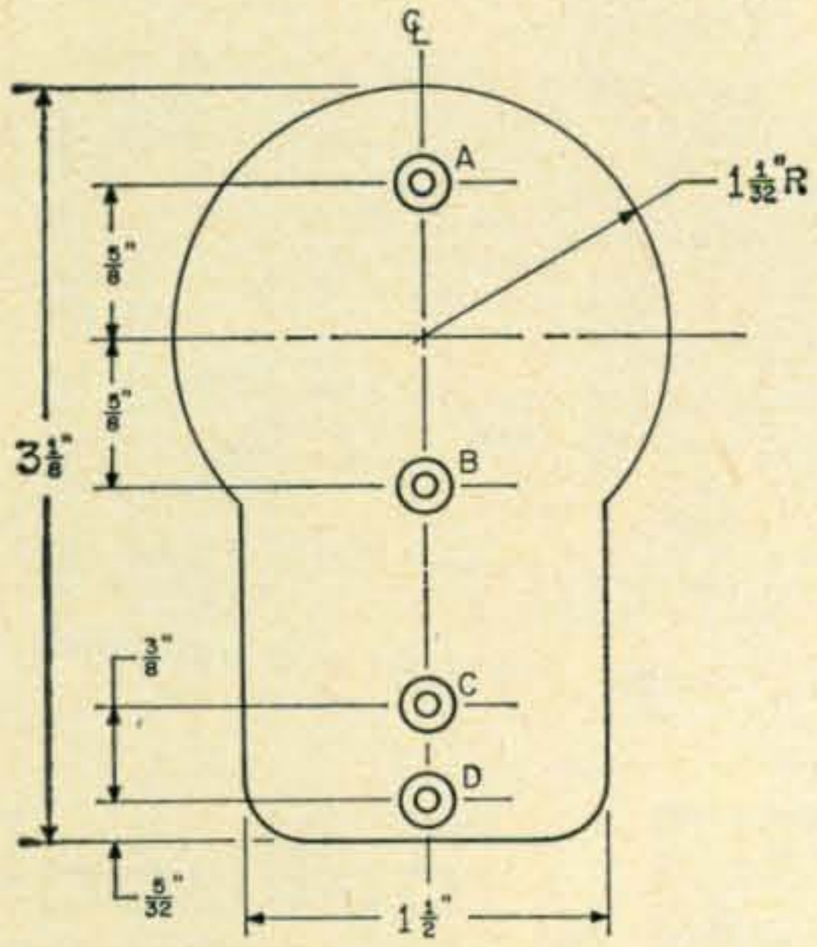


Fig. 1—Bottom view of the base plate fashioned from ⅛" hard aluminum. Holes A, B, C and D, are drilled and countersunk for 4-40 flat head screws.

While the Glo-key is in no way meant as a replacement for the Touch-key, it represents another very practical means of controlling an electronic key. It is relatively small in size, measuring 2⅛" wide, 3¼" long, and 2¼" at its highest point. For a light touch (no pun intended) and nearly effortless c.w., the Glo-key is the lightest. And, though not recommended, you can operate this one with your gloves on if you wish! The key can be built in any convenient form, but the style shown is comparatively simple and uses readily available materials.

Base Plate

Assuming your interest has been sufficiently aroused, begin construction by making the base plate from ⅛" hard aluminum as outlined in fig. 1. Leave the edge-drilled and tapped 2-56 case mounting holes until later, when their positions can be marked through the proper holes in the outer case itself. Cement the non-slip rubber ring to the under side after the rest of the key has been completed. Clean the ring lightly with lacquer thinner from time to time to prevent slippage, but do not allow any of the solvent to touch the painted surfaces.

Paddle Platform

The paddle platform consists of a triple lamination of clear plastic sections mounted over the projecting portion of the base plate, and arranged to provide two insulated pockets for the solar cells, one on each side of the paddle pedestal. Refer to fig. 2 for details.

The (A) section covers the entire base plate and is mounted between it and the base weight. The (B) piece goes in the middle and includes the solar cell pockets and a center duct for the wiring. The (C) layer is the top or outside one, and must be made opaque except for two small

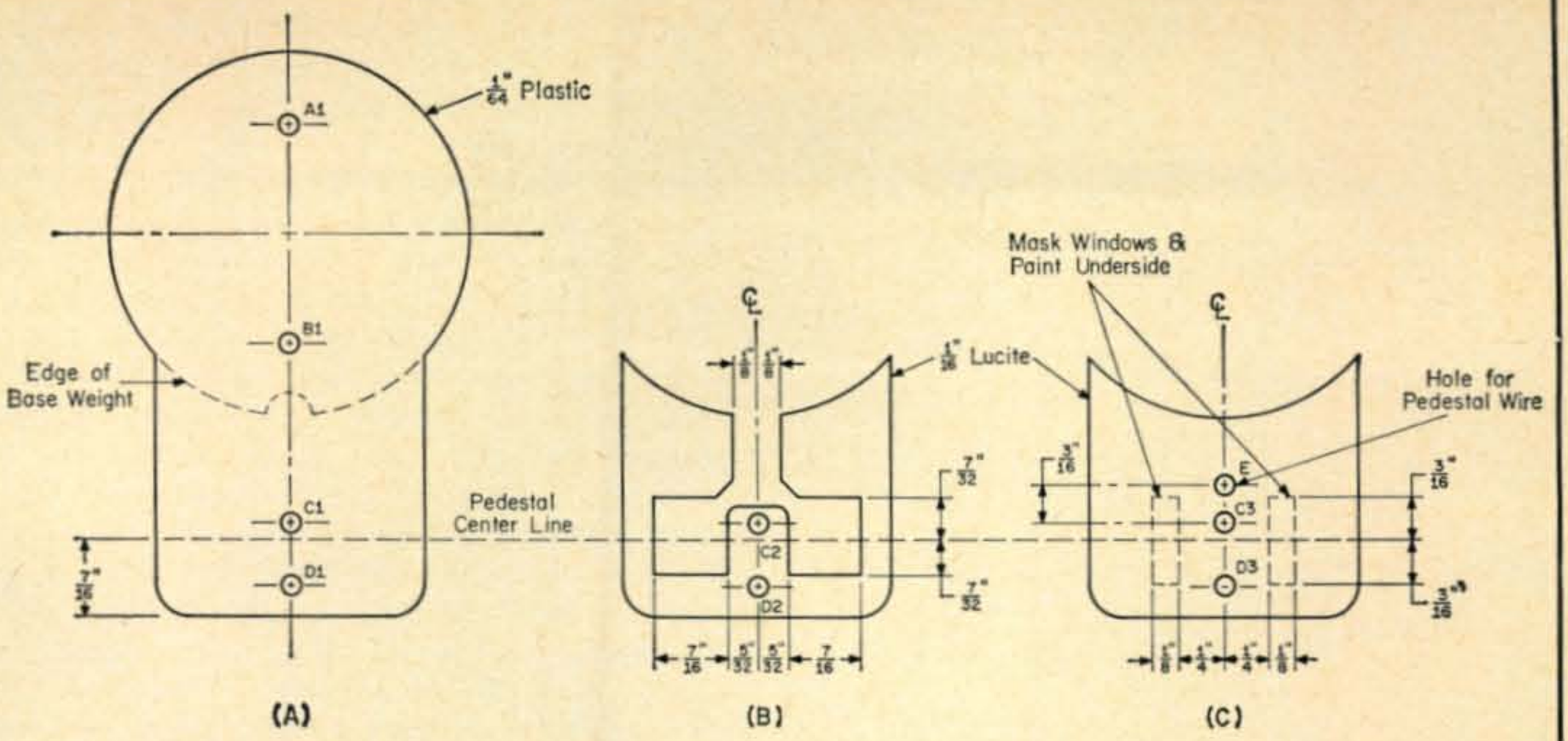


Fig. 2—Paddle platform details. All holes are ⅛" and the other dimensions are as shown in fig. 1.

windows over the solar cells as shown. This is accomplished by placing two pieces of masking tape of the correct size over the window positions on the under side of the lucite. Mask the edges and top surface of the material as well, then paint the exposed portions using the same Aerosol spray as will be used later to finish the outer case. Check the lucite for opacity by sighting against a bright light between coats; four or five sprayings will probably be needed. Remove the masking before the paint becomes thoroughly hard. Brush paint the inside edges of the solar cell pockets in the (B) section to make them light-tight also.

Paddle Pedestal

Make the pedestal from a piece of ¼" hard aluminum and face it with two pieces of ⅛" bakelite sheet, as diagrammed in fig. 3. The translucent light shield, shown at the top in the photo, is the plastic cover-cap from a popular brand of tooth powder and measures about 15/16" inside diameter by ½" deep. An opaque light shield can be cut from the shell of a discarded metal tube of similar size, if you prefer.

The #328 miniature pilot lamps are inserted from opposite sides of the pedestal, and are held in place with a pair of gently tightened 4-40 headless set-screws. Pass the lamp wiring through the holes provided and solder to the tips of the bulbs.

Base Weight and Outer Case

Two food-tins, 2 1/16" in diameter and taken from a widely distributed "pizza" package, were used to cast the base weight and to make the outer case. Some other cans have sides of thinner iron and one end of easily melted aluminum, and are therefore unsuitable for metal casting purposes; if there is any doubt, check the material with a magnet.

Place a little asbestos furnace cement inside one of the tins over the junction tab of the side and end seams to prevent leakage at this point, and melt enough lead into it to form the casting shown in fig. 4. Allow the metal to cool in a level position, remove the can with snips and pliers, file off any roughness and proceed as indicated.

Cut the second tin to the dimensions given in fig. 5, which allow a 1/32" overlap for the rubber ring on the bottom of the base plate. Prepare and paint as described in detail for the Touch-a-matic key. Two 1/16" lucite discs, fitted inside the upper flange of the pizza tin, complete the top of the case. Paint the under

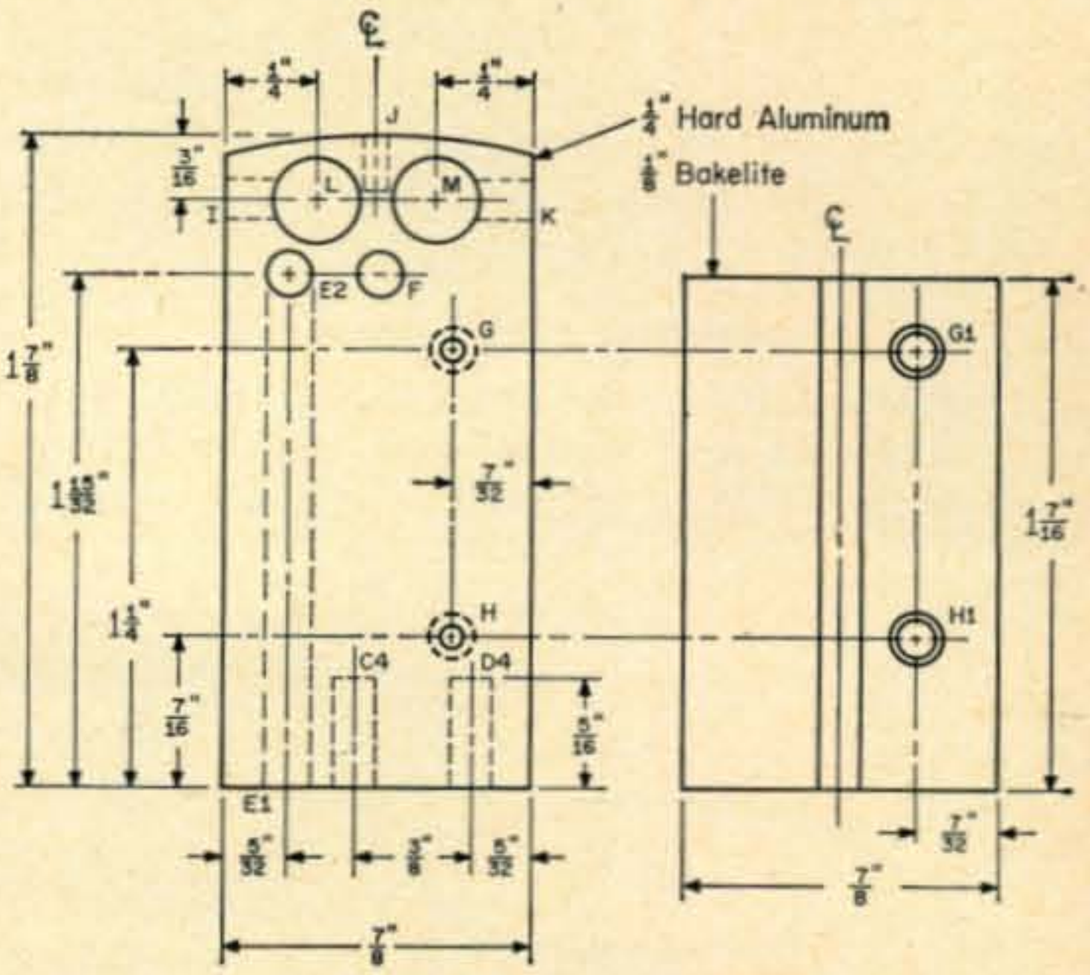


Fig. 3—Construction details for the paddle pedestal. Holes C_4, D_4, G, H, I, K are drilled and tapped for 4-40 screws. Hole J is drilled and tapped for a 2-56 screw. Holes E_1, E_2 and F are ⅛". Incline hole E_2 into E_1. Holes L and M are ¼". Holes G_1 and H_1 are ⅛" countersunk for 4-40 flathead screws. The groove shown in the bakelite pieces should be filed 3/32" wide and 1/32" deep. Two bakelite pieces are needed, one right and one left.

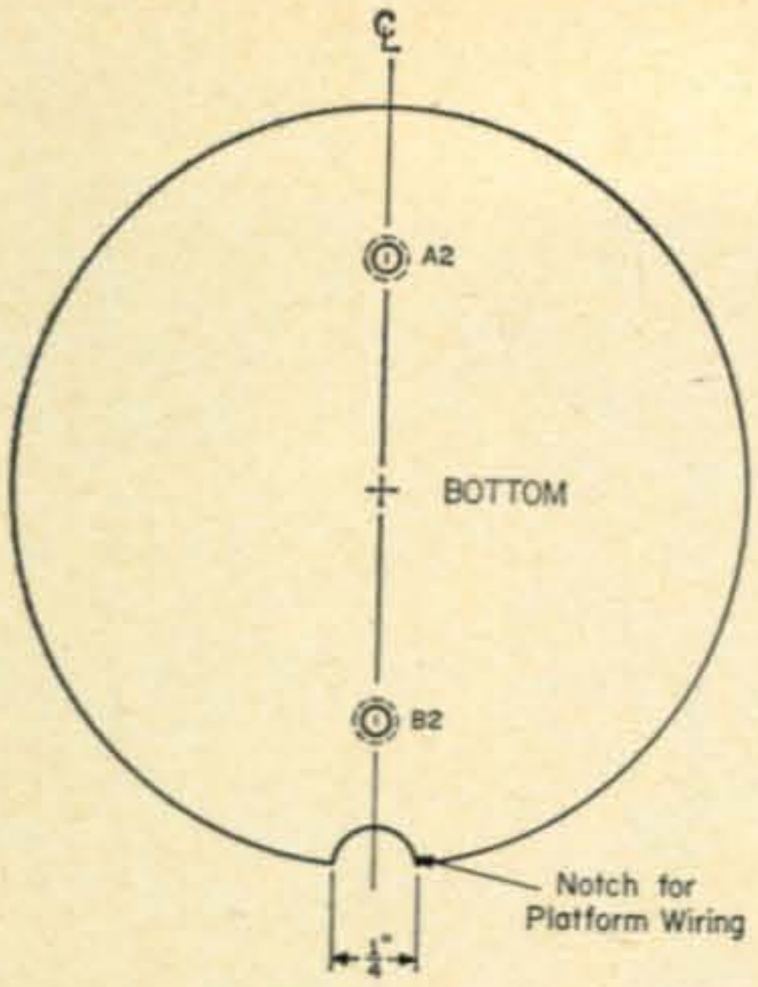


Fig. 4—Base weight is a ⅝" thick lead casting made as described in the text. Holes A2 and B2 are drilled and tapped for 4-40 screws ⅜" deep.

side of the lower disc and attach the lettering and reflecting bumper-tape "lightning," or other design, to its upper surface. Assemble with the second disc on top, placing the markings between the lucite sections.

Parts Board

The circular parts board is a piece of phenolic tubing 1¼" i.d. by ⅝" high. A light metal template, diagrammed in fig. 6 and clamped around the tubing, makes it a simple matter to mark the various positions. Both template and wiring layout drawings are outside views, looking through the parts board. Two #4 soldering lugs, bent at right angles and mounted inside the board at front and back, serve to bolt the assembly to a pair of tapped holes in the top of the base weight. Note that the rear mounting and cable entrance holes lie between the ends of the curved template, and therefore cannot be shown on it.

Transistors and Solar Cells

For best results, transistors Q_1, Q_2 should have high betas of nearly equal value and should be selected from stock if at all practicable, using a simple transistor checker. The silicon solar cells SC_1, SC_2, are self-generating and are several times more sensitive than selenium cells of the same area. These also should preferably be matched, employing a steady light source at a fixed distance and a low range d.c. voltmeter.

If facilities are not available for making these checks, good results should still be obtainable with the Glo-key. It may, however, become necessary to use higher light intensities and to replace diodes CR_1, CR_2 with separate dropping resistors for each pilot lamp, so that the dot and dash sensitivities can be balanced. Reduced light sensitivity from whatever cause means that the key will trigger too soon, before the fingers are anywhere near the paddle pedestal, unless the source level is increased. A close and equal approach should be possible on both sides, before any action takes place. Mount the solar cells with their front terminal electrodes toward the middle of the paddle platform and parallel to its center line.

Assembly and Wiring

Referring to the layout and schematic drawings, figs. 6 and 7, do most of the parts board wiring before installation, and the remainder in any convenient order. Use #32 enamel wire for the low-voltage solar cells, and handle with care as the cells are mechanically fragile. Protect this wire with tape or spaghetti where it passes between the grooved base weight and the case, complete the assembly and attach the control cable.

Pedestal Lamp Supply

In the present transistor age, the lowly pilot lamp has emerged as a current operated device of major proportions, and the days are long gone when such lamps could be added indiscriminately to almost any piece of equipment. The Glo-key pedestal lamps are no exception, though the current drawn in the actual circuit should not exceed 0.3 amp., and it was found necessary to "borrow" their supply voltage from an external source such as the station receiver. The series diodes CR_1, CR_2, are merely a low dissipation means of dropping the lamp voltage by about

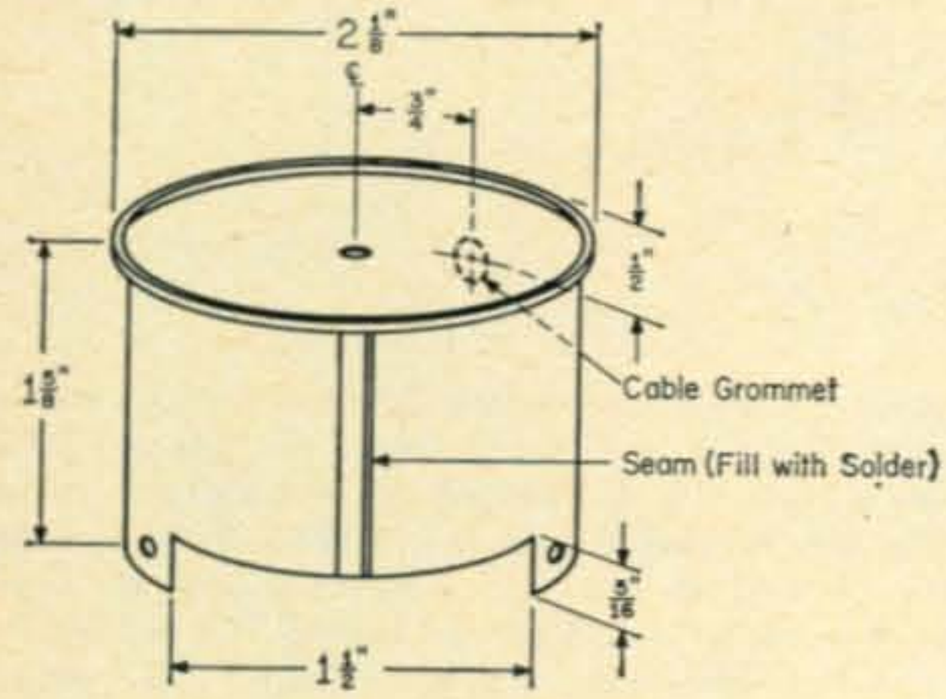
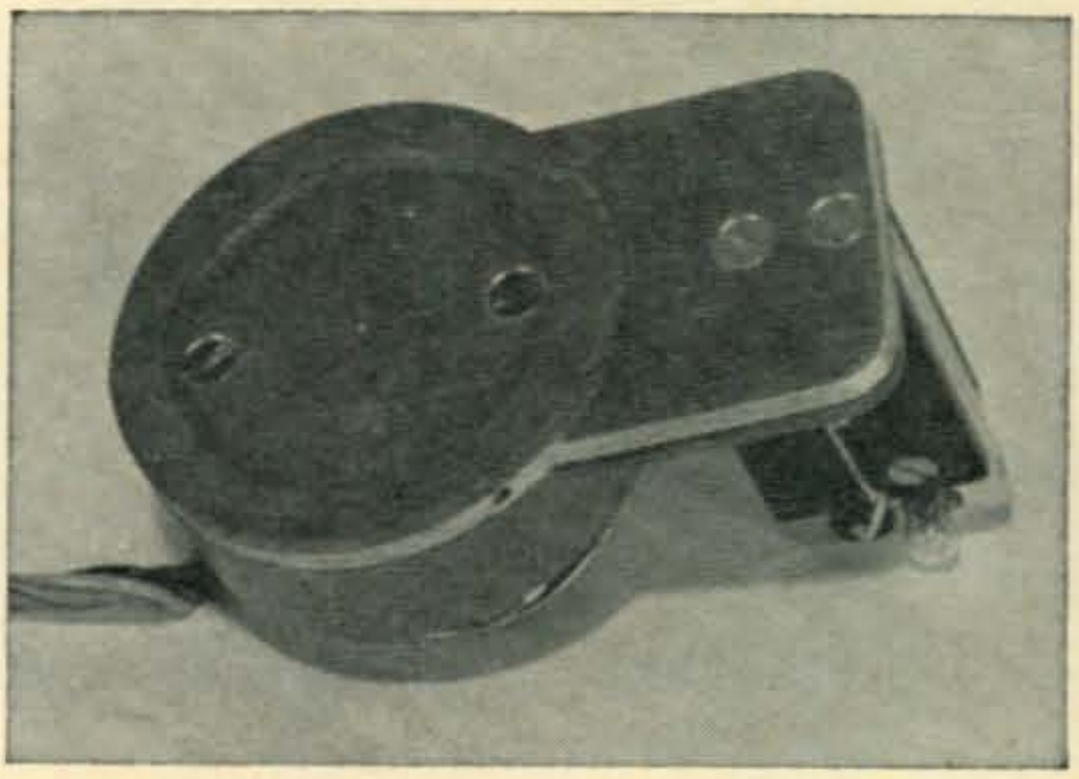


Fig. 5—Outer case dimensions. This cover was fabricated from a pizza tin.



Bottom view of the Glo-Key.

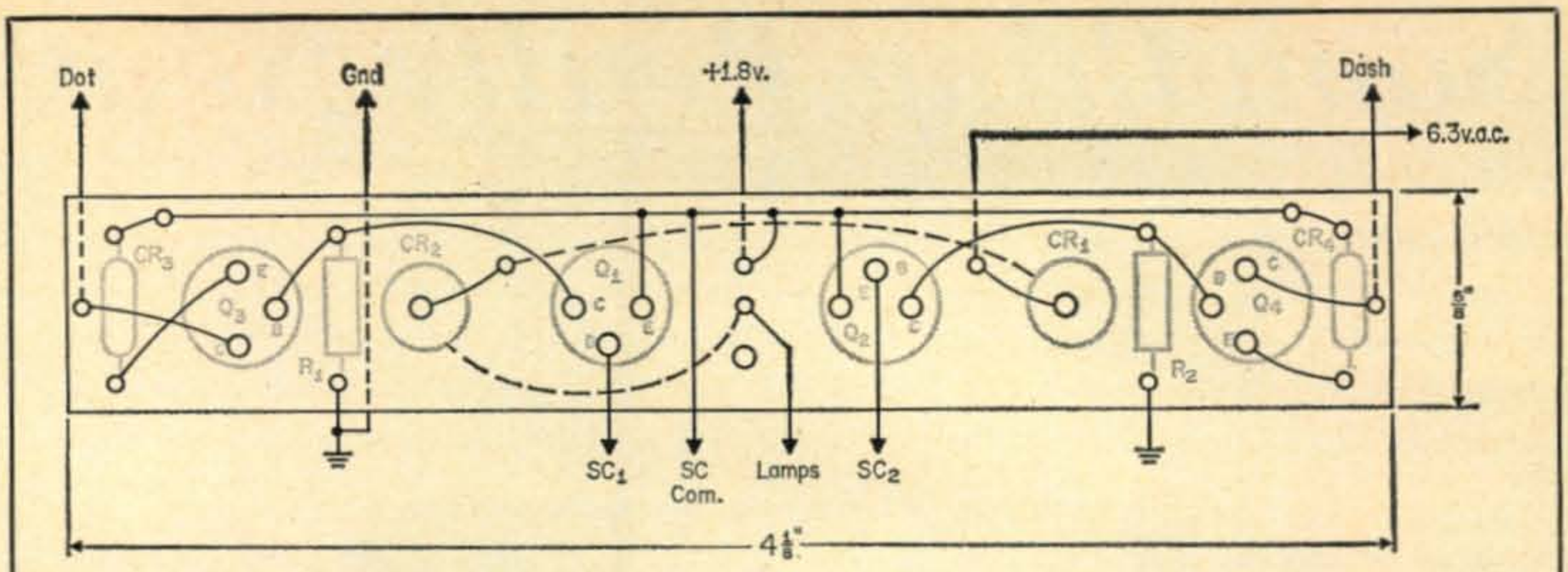


Fig. 6—Circular parts board and wiring guide. Actual wiring is shown in black lines; shaded lines describe components which mount within the bakelite tube.

60%, and could be replaced by a resistor of suitable value. The lowered supply voltage gives sufficient light intensity, reduces the normal current requirement, and increases lamp life by a considerable factor.

Operation

The extra sensitivity of the Glo-key may seem a bit unnerving at first, but this feeling quickly disappears with practice. Correct finger and thumb placement becomes slightly more important than with most other keys, because the triggering areas are not much greater than ½" wide, and fairly complete blockage of the light is necessary. The grooved pedestal faces help in maintaining the optimum hand position, and little or no pressure is required for full control. As long as the pedestal lamps are on, average room lighting will not disturb performance of the Glo-key, but greater intensities may interfere with reliability; in any case, the remedy is obvious. With these lamps off, however, you will find the key quite sensitive to changes in ambient light.

Inside view, showing circular parts board, pedestal and lamp assembly.

Circuit-wise, it is only necessary to describe the operation of the dot portion, since the dash side is exactly similar. Light falling on the solar cell, SC_1, develops a voltage across it which forward biases transistor Q_1 into conduction. This action turns off Q_3 by shunting across its base-emitter circuit; the diode CR_3 assists the cut-off and improves the temperature stability of the transistor. When the light is removed from the solar cell, its voltage drops, cutting off Q_1 and removing the shunt from the input of Q_3. This allows the base of the latter to swing negatively towards ground, turning the transistor on and closing the output circuit.

Plug the Glo-key into the Touch-a-matic, or connect it with a suitable relay arrangement, light the pedestal lamps and fire away. ■

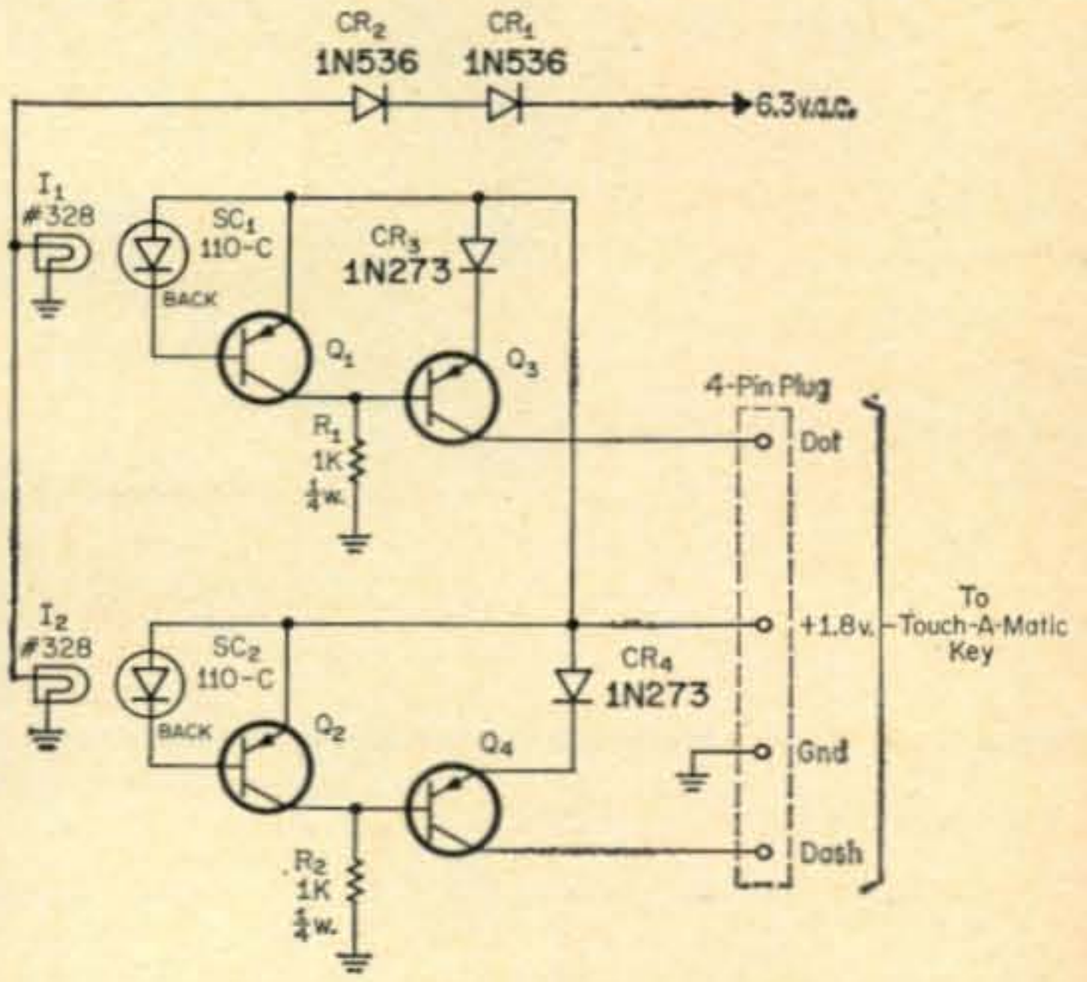


Fig. 7—Glo-Key circuit. The 6.3 volts for the pilot lights can be picked up from the receiver. All transistors are type 2N1303.

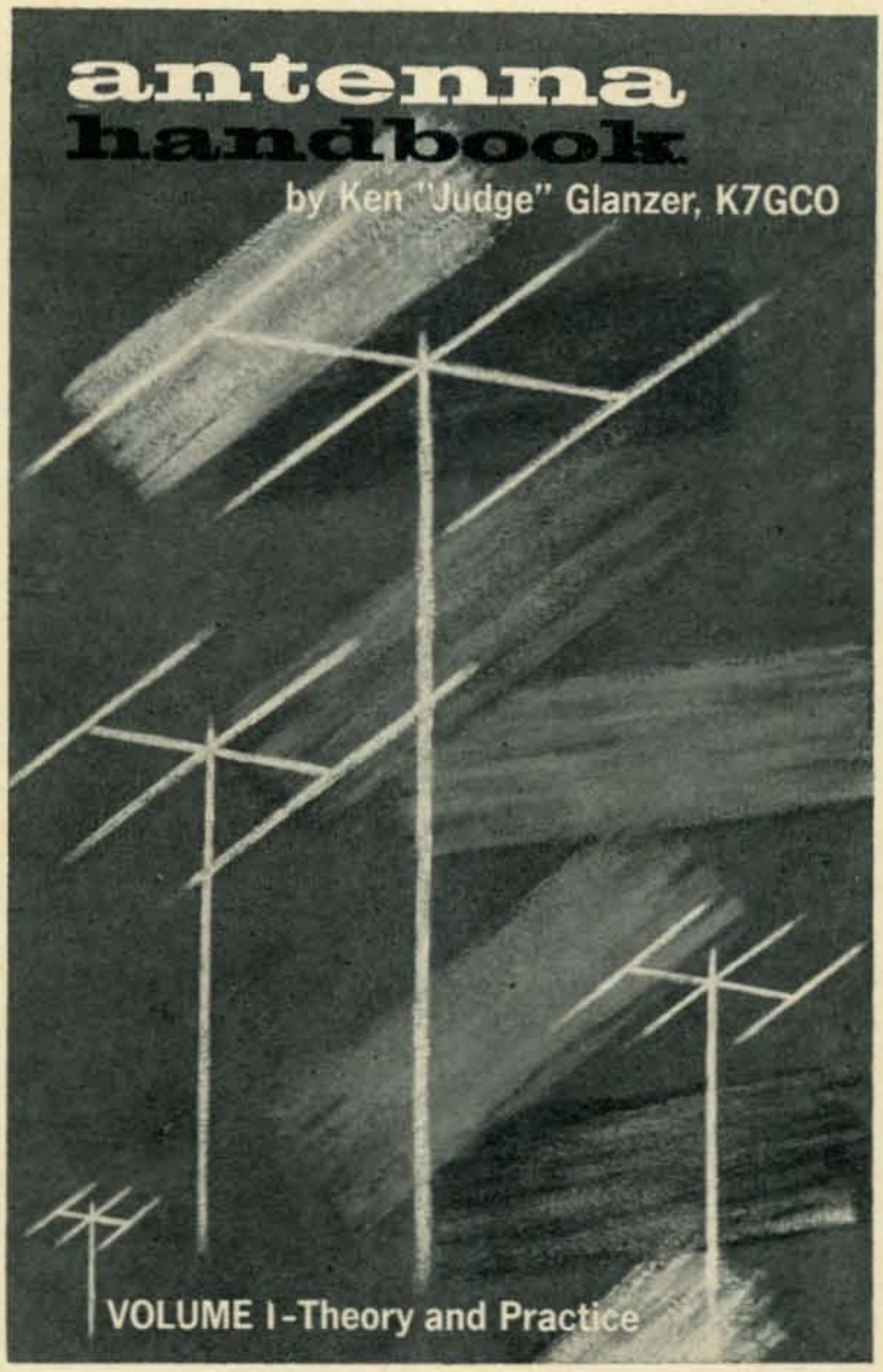
CR_1, CR_2—Diode, 1N536, silicon.
CR_3, CR_4—Diode, 1N273, germanium.
I_1, I_2—6.3 volt miniature lamp, #328.
Q_1, Q_2, Q_3, Q_4—2N1303, transistor.
R_1, R_2—1000 ohms, ¼ watt 10%.
SC_1, SC_2—Silicon solar cell. Hoffman 110-C.

Something Really New!

The result of 15 years of exhaustive research—of trying to find the best antenna for every possible situation. Not a re-hash of old material, but a completely new and exciting book describing techniques and concepts as never before seen in the antenna field.

So big and complete that it takes *three* volumes to tell the whole story. Now, after six years of preparation, the *CQ* Technical library is proud to present Volume I of this soon-to-be-classic trilogy. Volumes II and III will follow in quick succession.

Here's just a sample of what Volume I covers: Transmission line theory, Attenuation, Impedance, Standing waves, resonant and non-resonant lines, stub matching, single and parallel coaxial lines, radiation fundamentals, current distribution, induction field, radiated field, gain, reciprocity, radiation resistance, dipoles, tripoles, depth of electrical ground, relative ground conductivity from s.w.r., reactive variations, free space **3 dimensional** patterns of long wires of all practical lengths, effect of center and end feed on antennas, tilted antennas, terminated long wires and vee beams,



matching, devices, what happens to all that reflected power, which end of feed is more important to match, how to use open wire feed on beams, gamma matches, T-matches, feeding T-match with dual coax, transforming balanced 100 ohm coax lines to 200 or 50 ohms, capacitive match for balanced transmission lines, inductive (hair-pin) match, quarter wave and short bazookas for balanced feed, broad band baluns and effect on feedpoint current, effect of surrounding objects and power lines on feedpoint current, folded dipole matching for beams, feeding stacked beams individually or together.

Watch for the announcement of volumes II and III.

Cowan Publishing Corp., Book Division
14 Vanderventer Ave., Port Washington, L.I., N.Y. 11050

Enclosed is $_____ for _____ copy(ies) of the Antenna Handbook, Volume I, by K7GCO.

Name .....Call .....

Street .....

City .....State .....Zip .....

New York City and State residents add applicable sales tax.

Volume I of three volumes. Price: $4.00

The Eico Model 717 Electronic Keyer. An extruded-aluminum panel is brush-polished and anodized, the knobs are black with polished-aluminum facings and a perforated-steel case is finished in charcoal. Reading from left to right and going upward are: function switch, power-on lamp, vernier-speed control, monitor lamp, speed-range switch, monitor-tone and monitor-level controls. The speaker is behind the vertical grille bars.

CQ Reviews:

The Eico Model 717 Electronic Keyer

BY WILFRED M. SCHERER,* W2AEF

THE Eico Model 717 Electronic Keyer is available as a kit or as a factory-wired unit. It is a console type keyer that has a built-in tone monitor with loudspeaker and it is styled to fit in with most present-day amateur gear. A built-in power supply is also included.

Operation with uniformily-spaced automatic dots and dashes, which have a constant dot-to-dash ratio, may be obtained at any code speed of 3-75 w.p.m., as selected by a panel switch and a vernier speed control. Both the pitch and the signal level of the tone monitor may be varied by separate controls. A phone jack permits optional aural monitoring with headphones; while visual monitoring may be had by observation of a panel lamp that follows the keying.

*Technical Director, *CQ*.

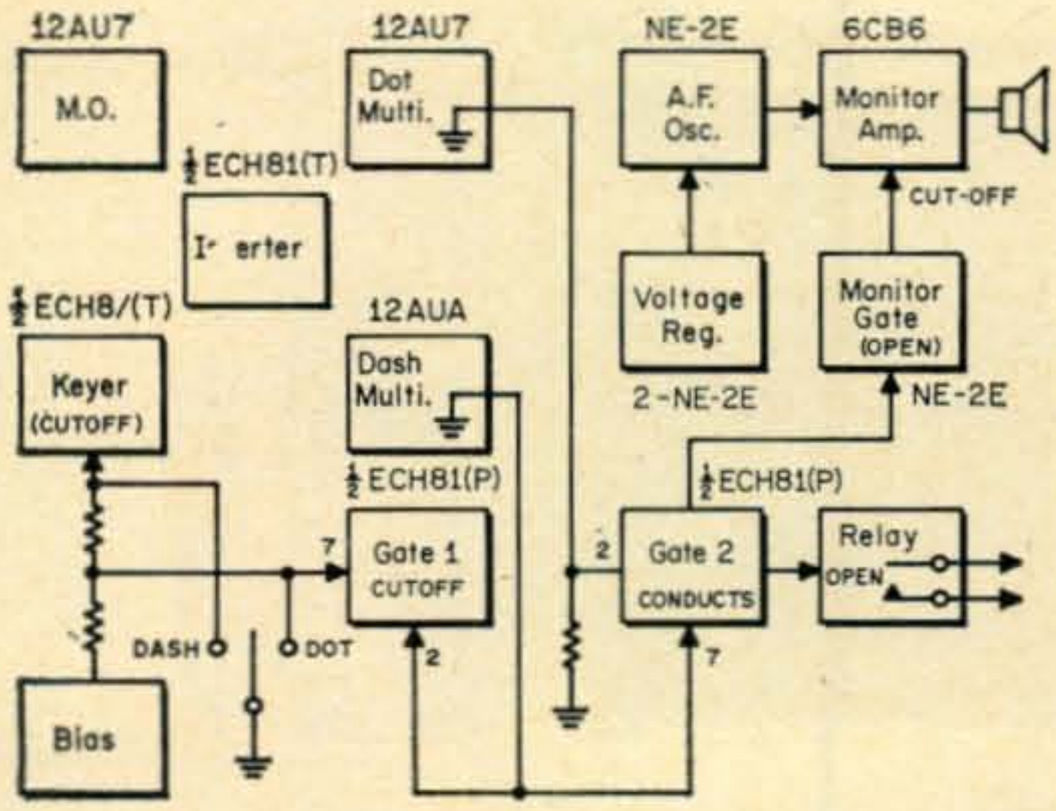


Fig. 1—Block diagram indicating active circuit elements during the initial or "key-up" state of the Eico Keyer, as described in the text. Stages not in use are also shown. The numerals at each gate are related to the tube-pin terminals for each control grid at the ECH81's.

A high-speed dry-reed relay is included for keying the associated transmitter circuits. The relay has 25 v.a. contacts for use with nearly any type of keying circuit and the relay is designed to operate virtually free of contact bounce, even at the highest code speeds. A position is furnished at a function switch to hold the relay closed to enable transmitter tuneup which usually cannot be managed with an automatic keyer. The keyer unit is set up to be operated by an external paddle which is not supplied with the unit.

The Model 717 is a sophisticated affair that employs 5 dual-purpose tubes which provide 10 tube functions to create uniform dots and dashes having a 1:3 ratio with spacing equal to the length of one dot maintained at all code speeds. The dots, dashes and spaces are self-completing and once started, cannot be foreshortened if the paddle is set to another position before completion of the desired mode.

An additional tube and 4 neon bulbs provide monitoring facilities, while 2 silicon rectifiers are used in the power supply.

How the Keyer Works

A description of how an automatic keyer works is not often presented, so for those interested in this aspect, we'll take time out to do so for this particular unit by reference to the operational block diagrams at fig. 1-3. The function and operation of the various stages is as follows:

The *master oscillator* (m.o.) employs a dual triode as an astable multivibrator that produces a non-symmetrical square-wave output to provide narrow trigger pulses as shown at figs. 2 and 3. The pulse frequency can be varied by a range-selector and a vernier-speed control to permit the desired code speed.

The *keyer* stage is an electronic switch in the cathode return of one section of the m.o. It con-

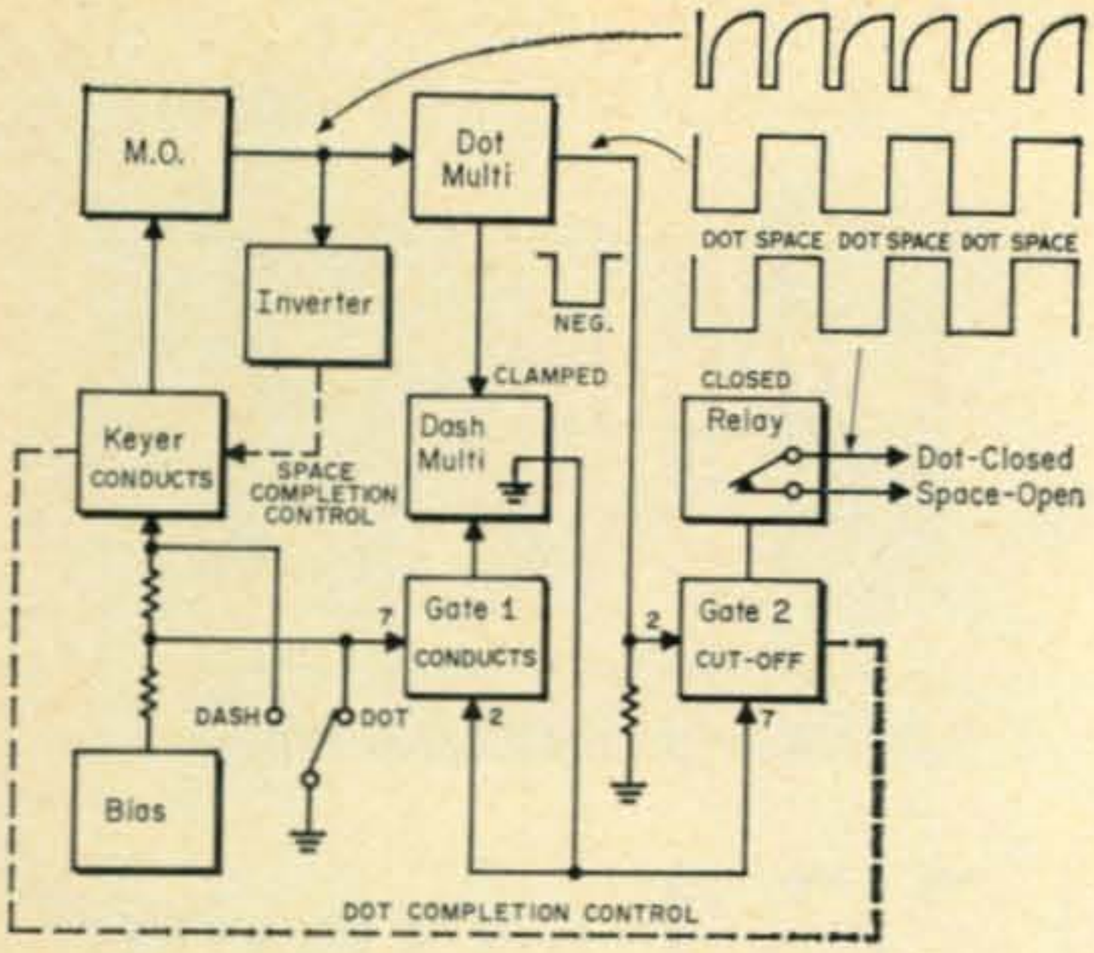


Fig. 2—Block diagram indicating circuit operation during formation of dots, as explained in text. Related waveforms are at upper right.

sists of a triode which is normally biased to cut-off. When the paddle is operated, it removes the bias, the tube conducts and allows the m.o. to function.

The *dot multivibrator* ("dot multi") is a bistable affair using a dual triode. It functions as a flip flop, which is triggered by the m.o. When the first trigger is received, it causes a negative voltage to appear as a pulse at the output takeoff point of the multi. The second trigger removes this voltage until the third trigger sets up a second pulse. Every alternate trigger from the m.o. therefore causes a negative pulse to be produced at a rate equal to half the triggering frequency. The on-off time of each pulse is equal to the duration of one dot.

The *dash multivibrator* (dash multi) also is a flip-flop which is triggered by the dot multi. Since the flip-flop divides the trigger frequency by two as just related, there are only half as many negative output pulses during a given number of complete cycles (wouldn't "hertz" look silly here?) than there are from the dot multi and as a consequence, they are twice as long a duration as shown at fig. 3.

The *logic gates* function as electronic switches and each consists of a tube with dual control grids. The tube conducts only when *both* grids are at zero potential with respect to the cathode. A negative potential applied to either grid will drive the tube to cutoff.

The basic function of *gate 1* is that of clamping or disabling the dash multi when required.

The basic function of *gate 2* is that of operating the *keying relay* which has two coils. Coil #1 is in series with the B-plus supply and thus normally holds the relay contacts closed. Coil #2 is in the plate circuit of gate 2, so when this tube conducts, a current flows through the coil and its magnetic field then cancels that of coil #1 and the relay contacts open. Gate 2 thus acts as a switch to open or close the relay contacts, depending on whether the tube is biased to conduction or non-conduction respectively.

The *inverter stage* is used to preserve the timing of the space duration as will be explained later.

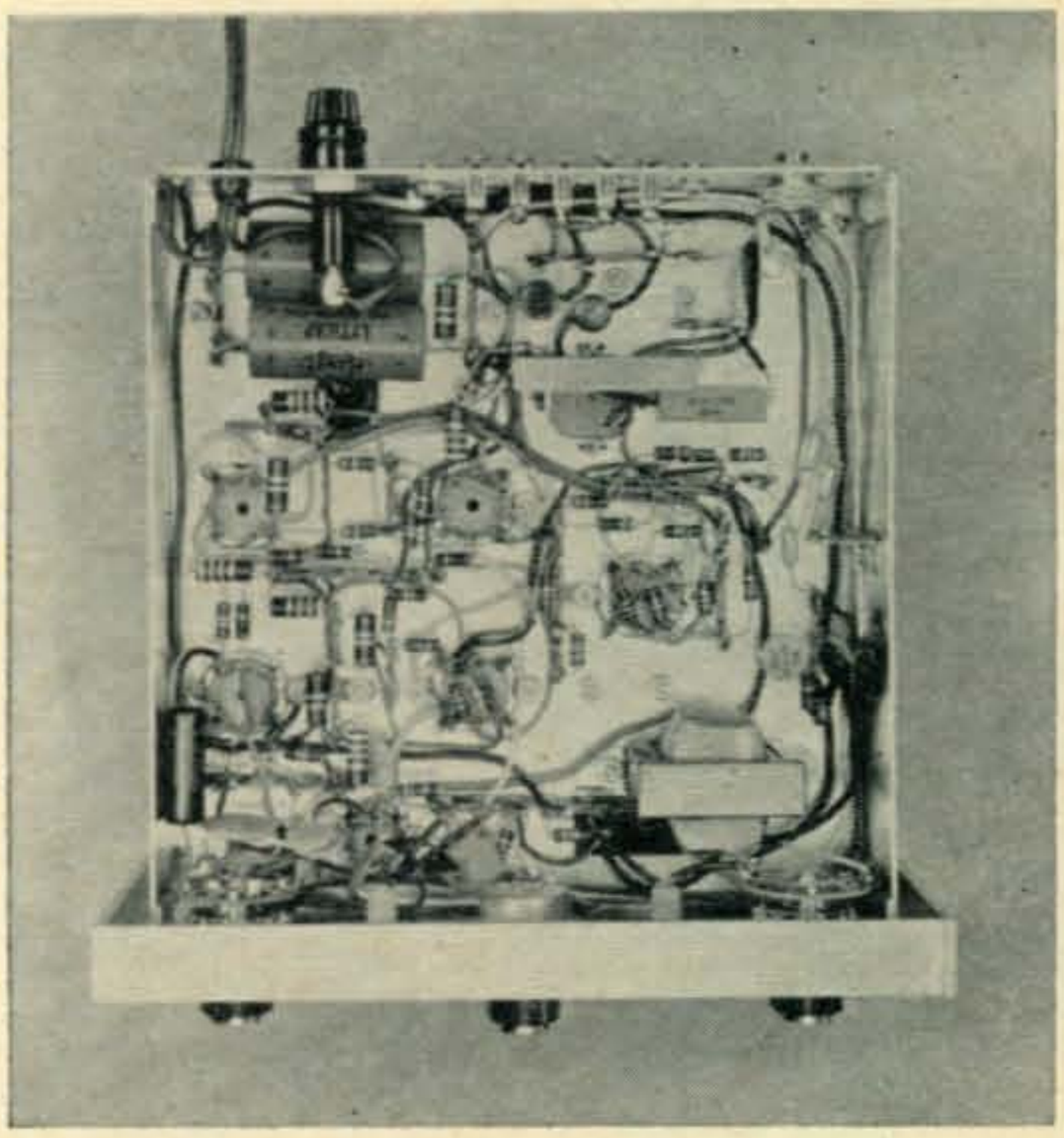
Operating Details

Initial State is when the paddle is at neutral. See fig. 1. The m.o. is then inoperative and thus there are no pulses to trigger the multivibrators. During this time, the sections of each multi, from which negative output voltages are obtained for keying, are conducting. With this condition, the output-takeoff point is at ground potential. This then places both grids of gate 2 at ground potential and thus maintains the gate in a conductive state which in turn holds the keying relay open.

Dot Formation (fig. 2): When the paddle is at the dot position, it removes bias from the keyer to start the m.o. It also grounds grid 7 of gate 1 and since grid 2 has already been placed at ground due to the initial state of the dash multi, the gate conducts. This clamps the dash multi in order to prevent it's changing from the initial state and producing a negative pulse that would otherwise occur due to triggers received from the dot multi. Grids 2 and 7 of gates 1 and 2, respectively, are thus maintained at ground.

As soon as the m.o. starts, it triggers the dot multi to produce a negative pulse at grid 2 of gate 2. The gate is then cut off for the duration of the pulse and the keying relay is closed to form a dot. As soon as the pulse ceases, both grids of gate 2 are again at ground (grid 7 is always at ground when dots are being formed), the gate conducts and the relay contacts open to form a space which is of the same duration as a dot due to the symmetrical triggering by the dot multi.

Dash Formation (fig. 3): When the paddle is at the dash position, it removes bias from the keyer to start the m.o. as before; however, the bias at grid 7 of gate 1 is still maintained high



Under chassis view of the Eico keyer. A neat and uncluttered assembly and wiring job can be made of it.

enough to cut off the gate which then unclamps the dash multi to allow it to flip freely as it obtains triggers from the dot multi which in turn has been triggered by the m.o.

A negative pulse from the dot multi applied to grid 2 of gate 2 and a negative pulse from the dash multi applied to grid 7 of gate 2 cut off the gate and the keying relay then closes; however, the pulse from the dash multi lasts twice as long as that from the dot multi and thus the gate is held at cutoff for the first two-thirds of a dash as shown by the associated waveforms. Exactly as this period ends, a second pulse from the dot multi keeps gate 2 cutoff for the last third of the dash and the relay remains closed to complete the formation of the dash which is therefore three-times as long as a dot.

At the end of the dash there are no more negative pulses (at least for a duration equal to one dot) applied to gate 2 which then conducts and opens the relay for a space, until the gate is again actuated by dot or dash pulses from the multi's.

Self-Completion of Dots and Dashes: When gate 2 is cut off during the formation of a dot or dash, a high positive potential appears at the plate of the gate tube. This voltage is fed back to the grid of the keyer tube and holds the keyer in conduction to keep the m.o. in operation, even though the paddle is released before the character is completed. Since completion occurs when gate 2 again conducts, the positive feedback voltage disappears, leaving the keyer again normally controlled by the bias.

If the paddle is moved to the dot position while a dash is being formed, the dash will not be shortened, because the negative output pulse of the dash multi during the first two-thirds of the dash time is also applied to grid 2 of gate 1. The gate is then cut off and the dash multi will not be clamped or interrupted during this period.

During the last third of the dash, all the related control voltages are the same as when dots are being produced and since a dot is needed anyway to complete the dash, there will not be

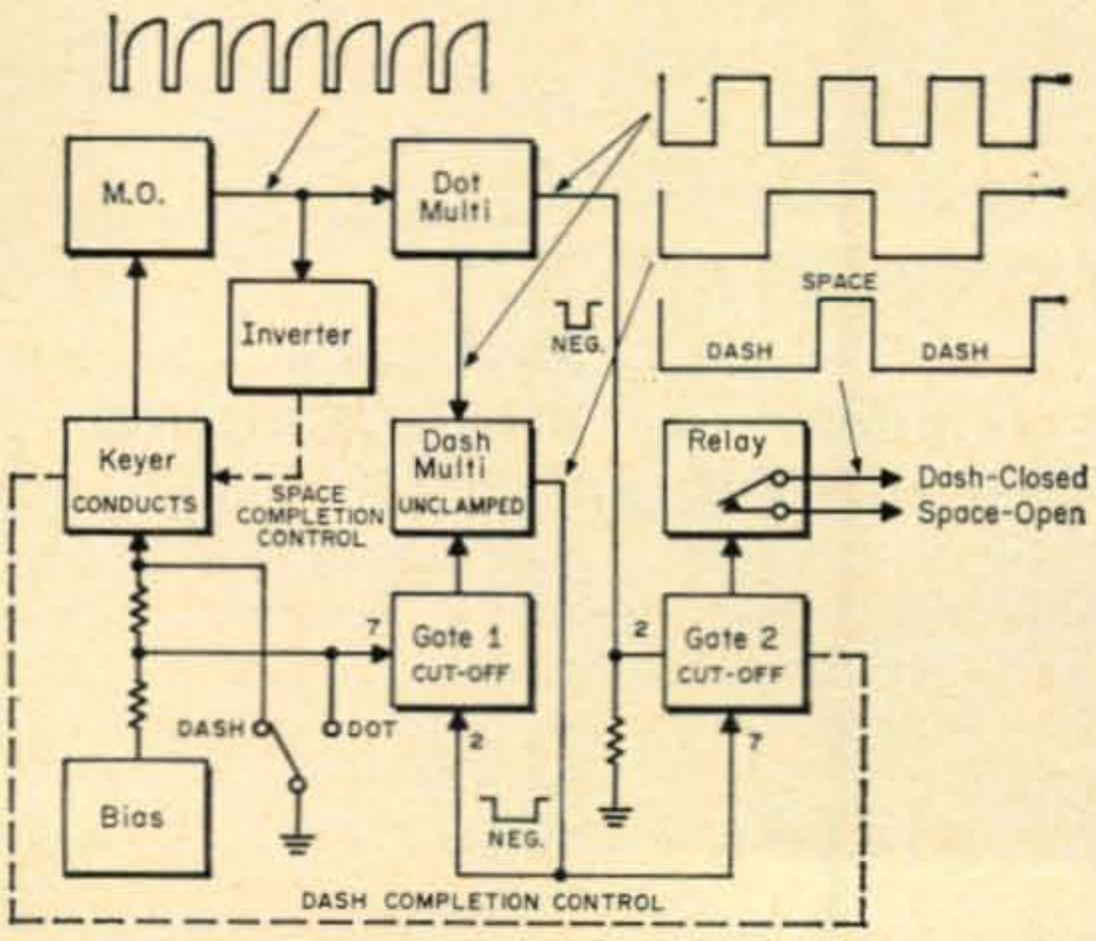
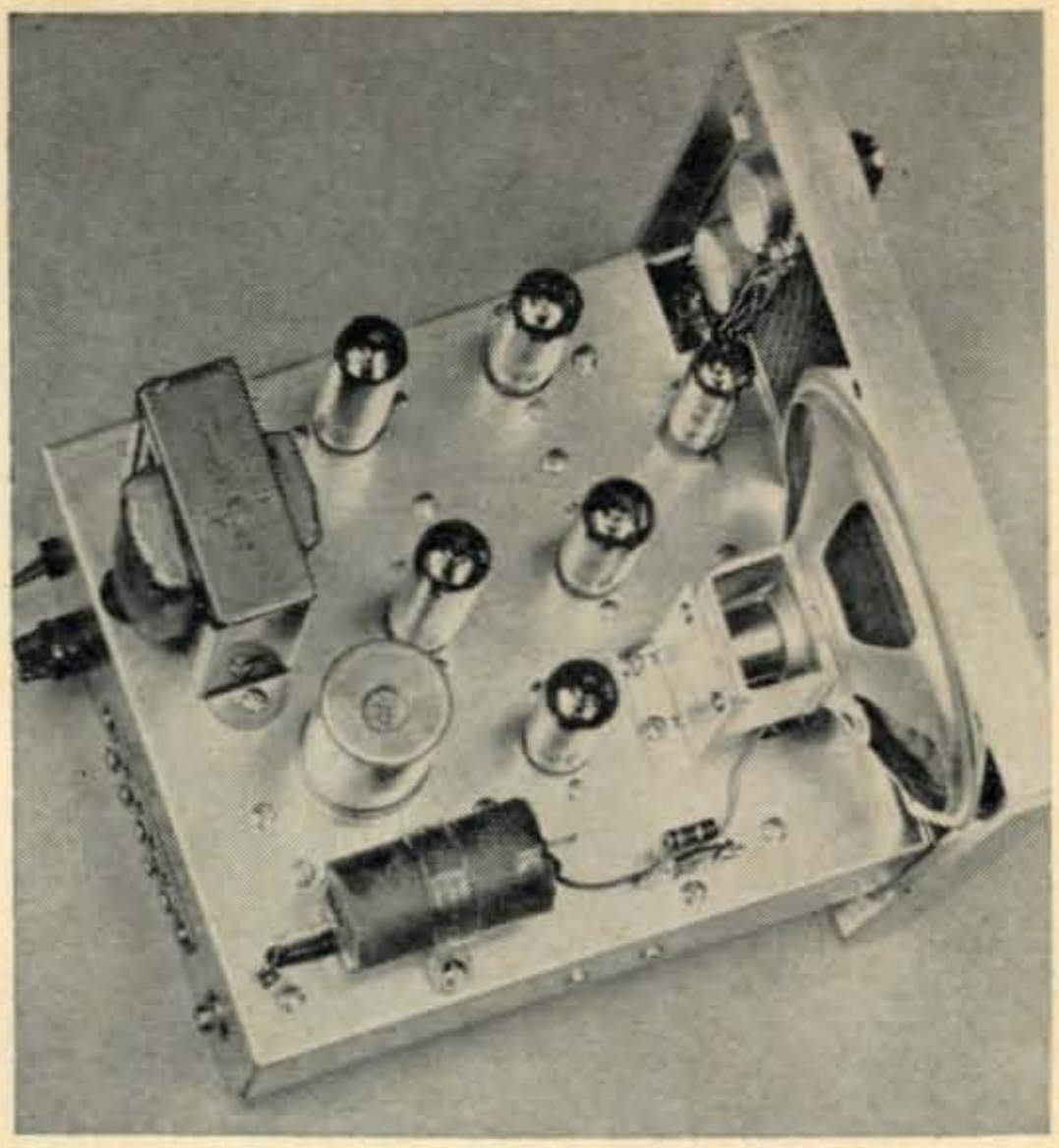


Fig. 3—Block diagram indicating circuit operation during formation of dashes, as explained in text.



Top chassis view of the Model 717 keyer. The oblong-shaped object in the foreground holds the two relay coils through the center of which is a sealed-glass tube in which the relay contacts are supported.

any adverse effect on the dash formation.

If the paddle is moved to the dash position before a dot is completed, a dash will not take over, because once the dot has been started, the dash multi misses the first trigger from the dot multi and thus cannot flip over until the next trigger from the dot multi which will not occur until after the dot and succeeding space have been completed.

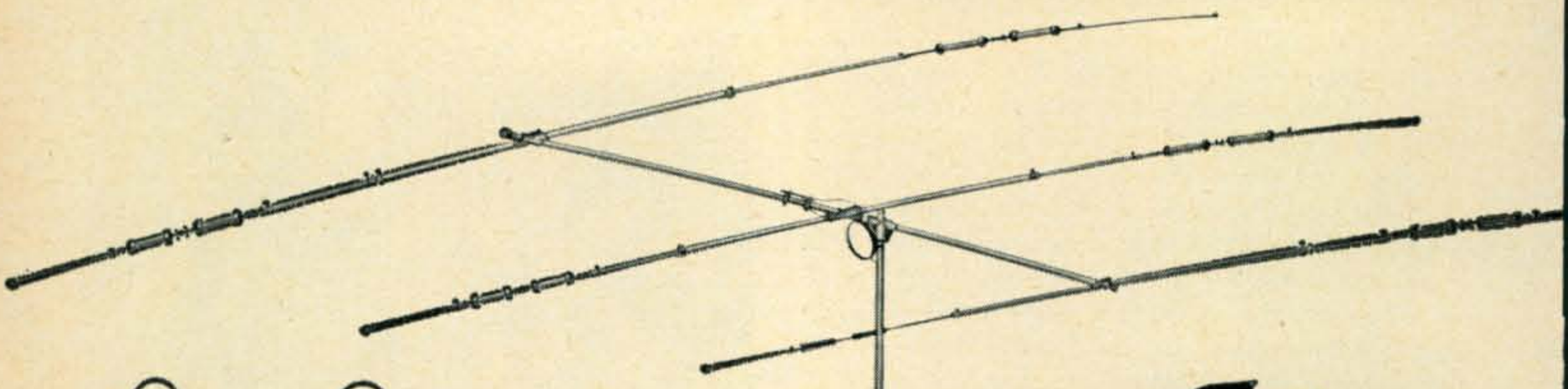
If the paddle is placed at the dot or dash side before a space is completed, a shortened space is prevented with the inverter stage which is biased to cutoff by the master-oscillator during the time a trigger pulse is being applied to the dot multi. This places the inverter-tube plate at a high positive voltage which, like the self-completion voltage-feedback loop from gate 2, is applied to the grid of the keyer stage to hold it in conduction for the required time.

Keying is monitored by an a. f. oscillator which is a relaxation type employing a neon bulb. The signal is amplified by a pentode and fed to the loudspeaker or headphones. In order to minimize the possibility of erratic oscillator operation and keying chirp, only the amplifier is keyed. Two neons also are used as voltage regulators for the oscillator.

A negative voltage is normally applied to the screen of the amplifier, cuts off the tube and prevents the oscillator signal from being heard. Another neon bulb is connected between the dot-dash-completion feedback loop and the amplifier screen. Whenever gate 2 is cut off during the formation of a dot or dash, the resulting positive voltage from this loop ignites the neon bulb, making it conduct and apply this voltage to the amplifier screen. The amplifier tube then con-

[*Continued on page 100*]

So good it defies comparison...



hy-gain's 3-element

THUNDERBIRD

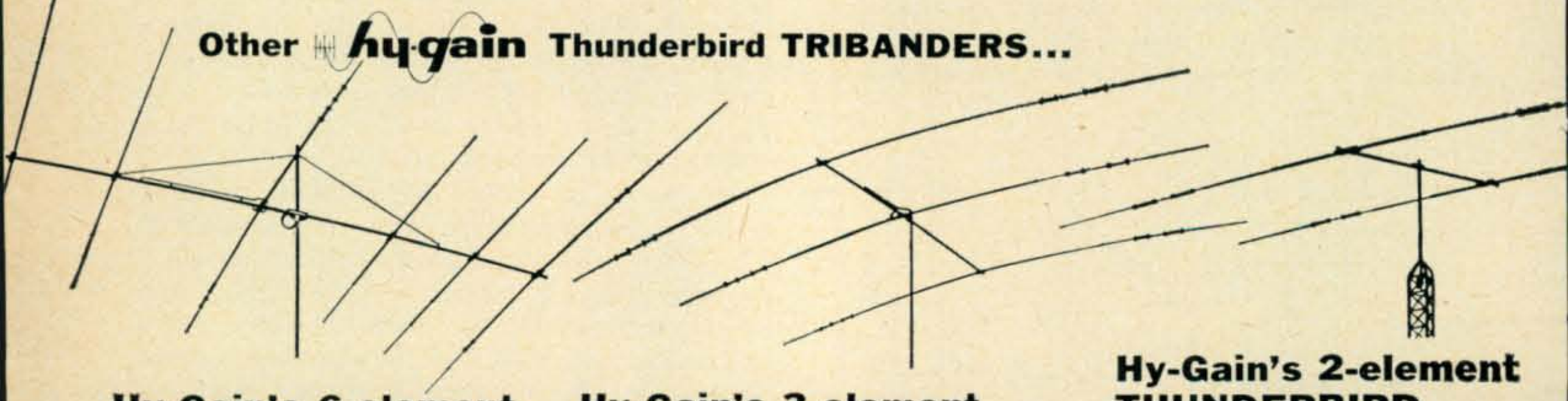
TRIBANDER MODEL TH3Mk2

- **Delivers uncompromised full-sized performance on 10, 15 & 20 meters**
- **Takes maximum legal power**
- **Exclusive time-proven Beta Match**

Try as you may, you just won't find another three-element tribander for 10, 15 and 20 meters that will even begin to compare with Hy-Gain's Model TH3Mk2. Some say it's the individually tuned, large diameter Hy-Q traps that make the difference by providing full-sized performance on each band. Others say it's the spacing of the elements on the 14 foot boom. Still others claim it's the exclusive, time-proven Beta Matching System that provides the optimum gain and maximum F/B ratio you get with the Model TH3Mk2. Actually, it's a combination of all of these factors plus rugged heavy gauge, taper-swaged seamless aluminum construction...solid aluminum trap housings using air dielectric capacitor...weather impervious molded high impact cycolac insulators... and Hy-Gain's over-all engineering excellence, that makes the Model TH3Mk2 so good it defies comparison. Get the best in 3-element tribanders—get a Model TH3Mk2.

Model TH3Mk2..... **$114.95** Net

Other hy-gain Thunderbird TRIBANDERS...



Hy-Gain's 6-element DX THUNDERBIRD

Provides the very ultimate in tribander performance. Takes maximum power. 24' boom. Exclusive Hy-Q traps and time-proven Beta Match.

Model TH6DX **$149.50** Net

Hy-Gain's 3-element THUNDERBIRD JUNIOR

Fantastic performance in limited space. Takes 600 watts P.E.P. 12' boom. Exclusive Hy-Q traps and Beta Match. Rotates with heavy duty TV rotator.

Model TH3Jr. . . . . **$74.50** Net

Hy-Gain's 2-element THUNDERBIRD

Installs most anywhere. Delivers outstanding performance. Takes maximum power. 6' boom. Exclusive Hy-Q traps and time-proven Beta Match.

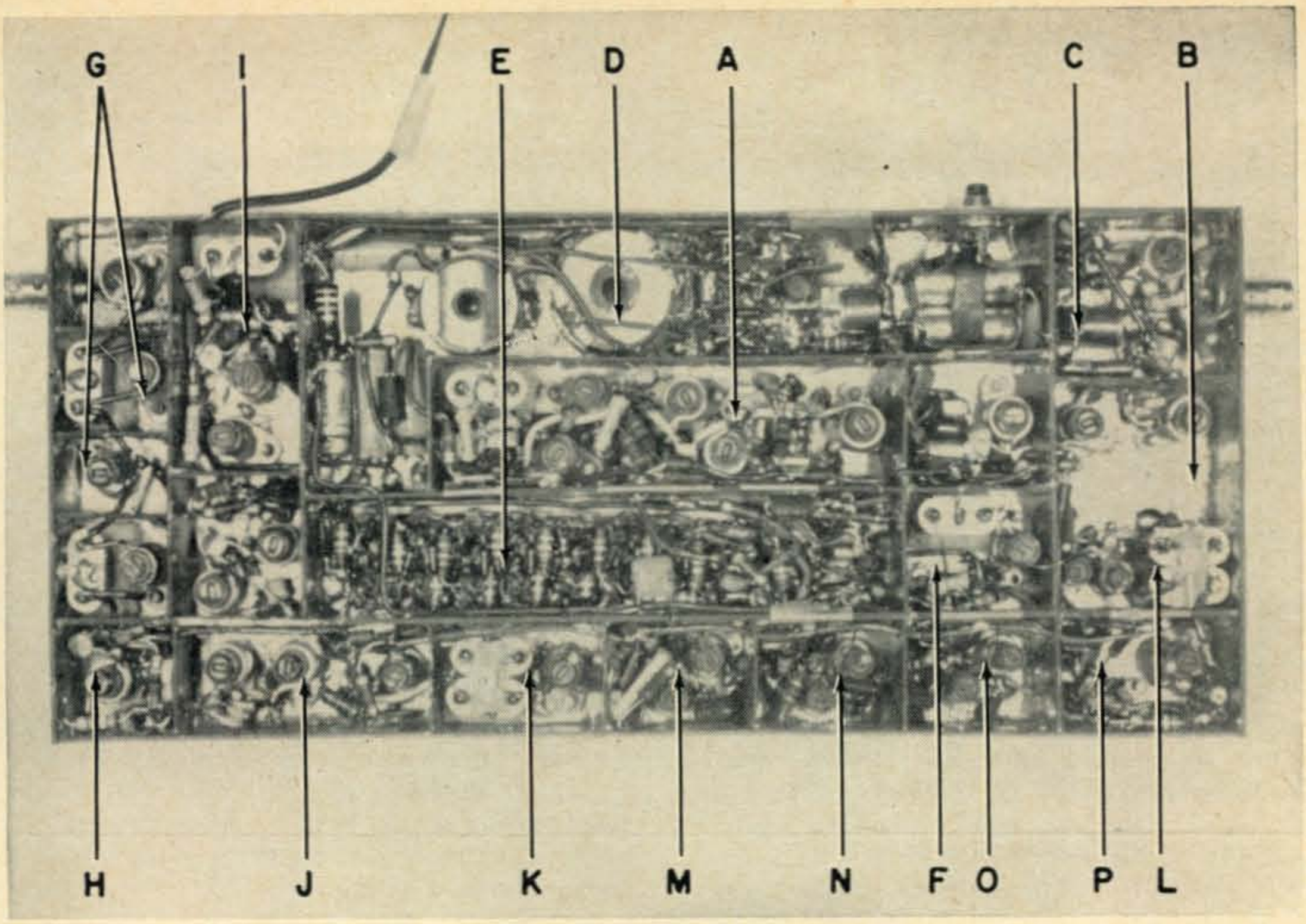
Model TH2Mk2 **$74.50** Net

Available now from your Hy-Gain distributor or write...

hy-gain ELECTRONICS CORPORATION

Dept. AC5, N.E. Highway 6 • Lincoln, Nebraska 68501

For further information, check number 26, on page 110



An inside look at the OSCAR V (EURO-OSCAR) satellite. (A) transmitter osc. chain; (B) transmitter mixer; (C) transmitter power amplifier; (D) primary power conversion; (E) telemetry modulator; (F) beacon oscillator; (G) input filters; (H) receiver r.f. stage; (I) receiver osc. stage.; (J) receiver mixer; (K) 1st i.f. filters; (L) 2nd i.f. filters; (M) 1st i.f.; (N) 2nd i.f.; (O) 3rd i.f.; (P) 4th i.f. The communication package measures approximately 10 x 4 inches.

EURO-OSCAR Satellite Favored To Win OSCAR-5 Race

BY GEORGE JACOBS,* W3ASK

EURO-OSCAR, a satellite financed, designed and built entirely by European radio amateurs, looks as if it will win the race to become the fifth satellite launched in the OSCAR radio amateur satellite series.

The severe weather encountered in Europe this fall and early winter cleared during February, allowing the EURO-OSCAR satellite to be checked-out through a series of weather balloon launches. The beacon-telemetry transmitter and the 2 meter translator checked out A-OK during all tests, and the satellite was readied for shipment to Project OSCAR headquarters in California.

Fog during early March further delayed the shipment of the satellite. However, on March 16, Karl Meinzer, DJ4ZC, project coordinator for the EURO-OSCAR satellite, managed to fly the satellite from northern Germany, where it had been assembled, to Munich, in his own plane. From Munich, the satellite was transported by air to Project OSCAR headquarters in Los Altos, California. The satellite is now going through the final environmental tests required before it can be certified for a launch. Although a launch date has not yet been officially set, it is possible that the EURO-OSCAR satellite may be launched as OSCAR-5 sometime during the early summer months.

*Space Communications Editor, *CQ*, 11307 Clara Street, Silver Spring, Md. 20902

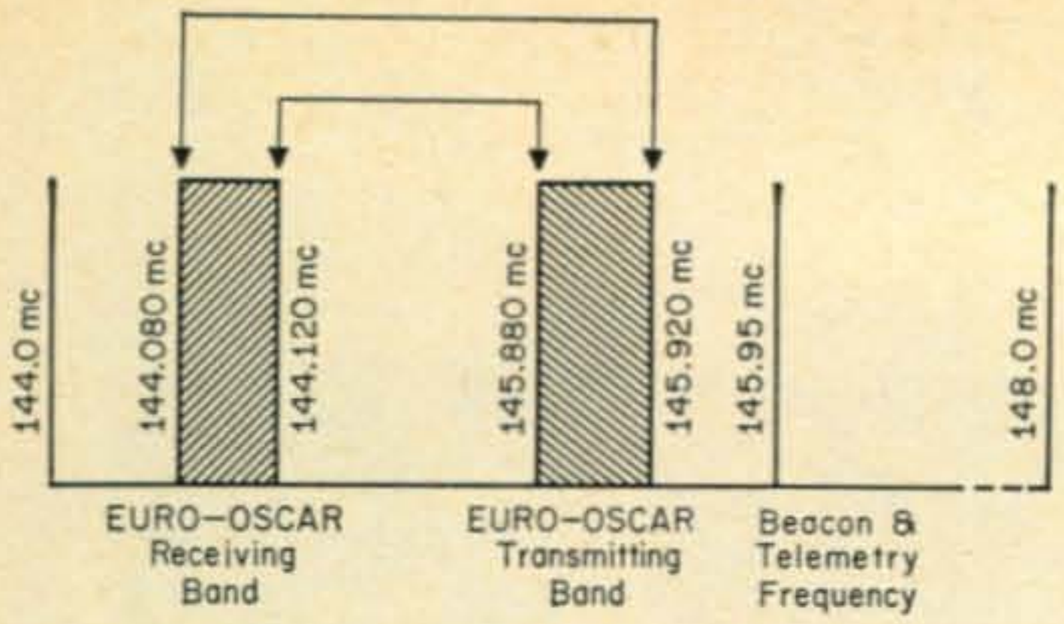


Fig. 2—Frequencies and channels used by the EURO-OSCAR satellite. Note that frequencies in the transmitting band are inverted from those in the receiving band.

EURO-OSCAR Package

The EURO-OSCAR satellite is similar to OSCAR-3. It contains a 2 meter translator and a single 2 meter beacon-telemetry transmitter.

The EURO-OSCAR satellite will receive 2 meter signals from amateur radio stations transmitting from the ground, amplify the signals, and instantaneously retransmit them over distances up to several thousand miles, depending upon the satellite's orbit. The satellite will listen, and accept any signals it hears in a 40 kilocycle wide channel in the 2 meter band, centered on 144.1 mc. It will instantly amplify and translate this portion of the spectrum to a 40 kilocycle segment centered on 145.9 mc, retransmitting the latter band segment back to ground stations.

The satellite is designed to operate continuously, with a life expectancy of about three weeks. As were all previous OSCAR satellites, EURO-OSCAR will be a "free-access" satellite, and will require *no* special code or procedure for working through it. While the EURO-OSCAR satellite's planned orbit has not yet been announced, it is certain that the satellite will fly over almost every corner of the globe, and it will be available for radio amateurs throughout the world to use.

Figure 1 is a photo showing the details of the communication equipment aboard the EURO-OSCAR satellite, while fig. 2 shows the frequencies and channel segments that the satellite will use.

In addition to the translator, the satellite contains a beacon-telemetry transmitter which will operate on 145.95 mc. The transmitter will send a continuous series consisting of 2 HI's in Morse Code (•••• ••), followed by a short c.w. period. The length of the c.w. period, in seconds, will be a measure of the battery voltage within the satellite. Figure 3, a plot of time *vs.* voltage, can be used to determine EURO-OSCAR's battery voltage level from time measurements of the length of the c.w. period.

The satellite's internal temperature will be measured by the time required to send two HI's. Figure 4 is a plot of time *vs.* temperature for the satellite and can be used to determine internal temperature from measurements of the length of time required to send two HI's.

Other OSCAR Satellites

OSCAR-AUSTRALIS, also in the race to become OSCAR V, is reported to have been completed, but has not yet been shipped to Project OSCAR headquarters in California. The satellite, built entirely by Australian radio amateurs, contains a 10

[*Continued on page 98*]

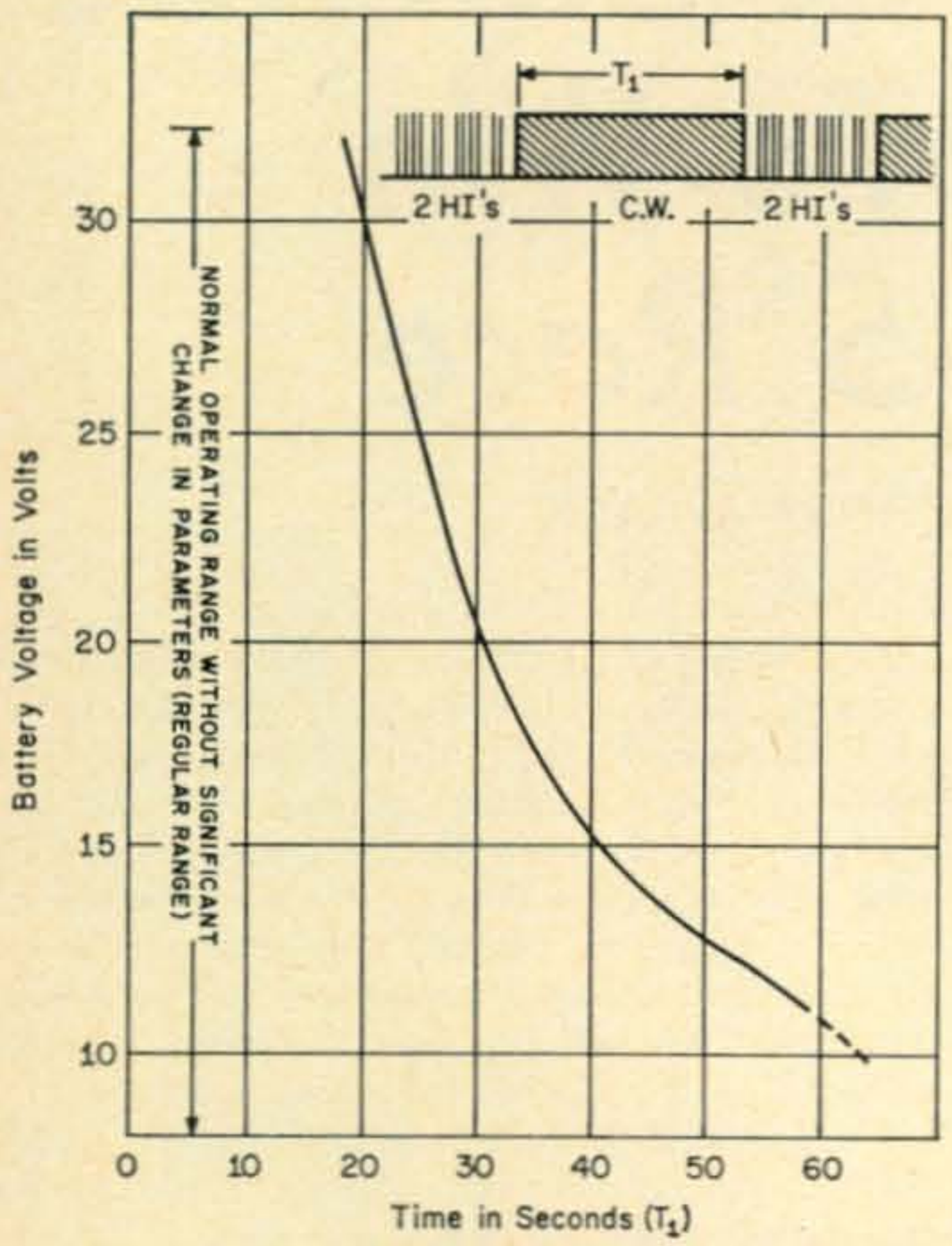


Fig. 3—OSCAR V telemetry Channel A primary power source level. Freq.: 145.95 mc.

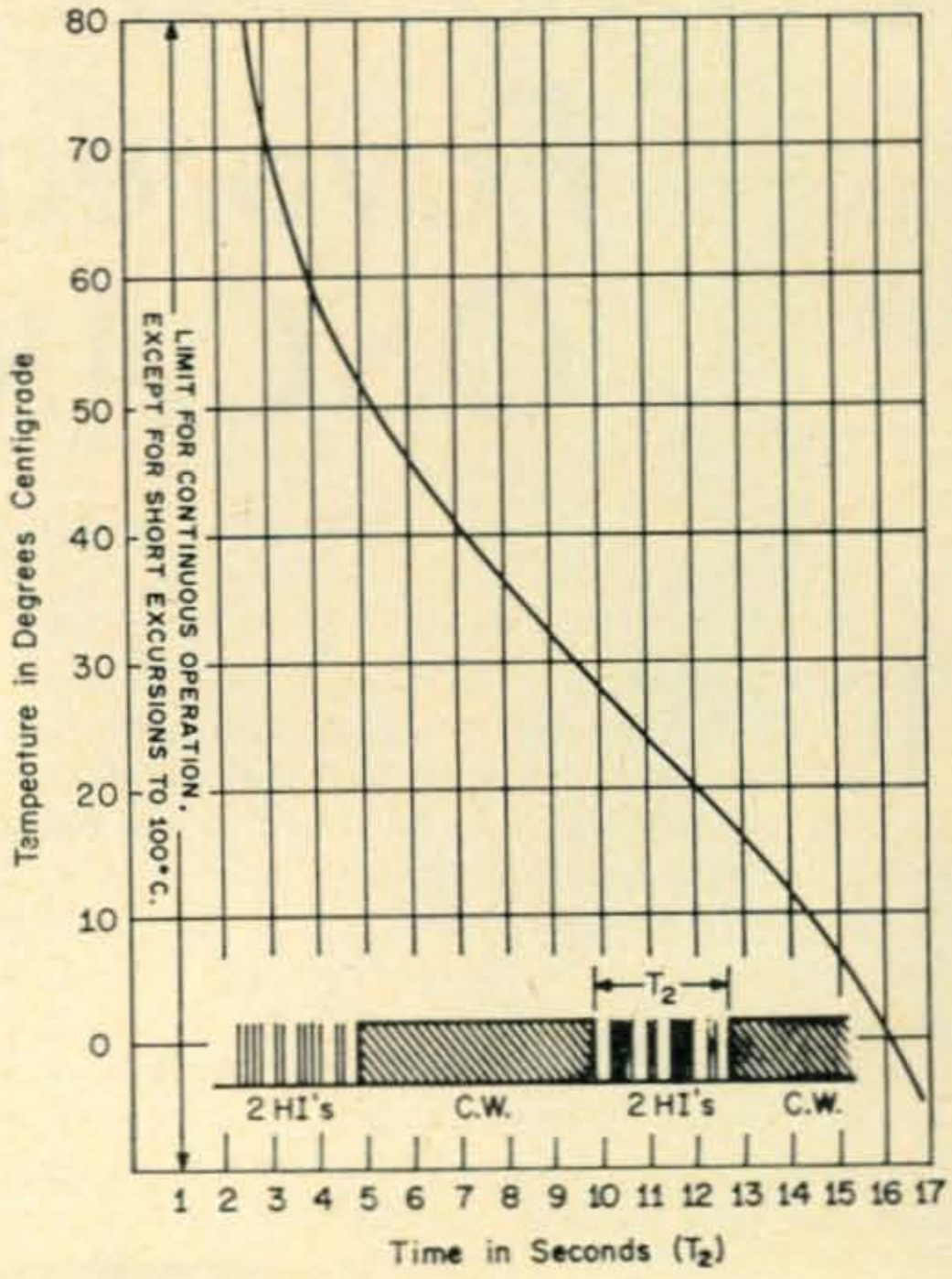


Fig. 4—OSCAR V telemetry Channel B internal temperature level. Freq.: 145.95 mc.

A TEN METER COLINEAR ARRAY

BY ED MARRINER,* W6BLZ

It occurred to me for the first time as I watched my s.w.r. meter that my ten meter beam, my faithful companion and friend for the past six years, had to come down. The devouring master of sea breeze and salt air had corroded the elements until the beam no longer tuned.

No pleasure is so cheap as dreaming about a new beam, and picturing the bird-like span above the house. Eventually the reality of cost, in comparison to the price of raising a beam ten years ago, becomes apparent, and other antennas are thought of for a means of sending a ten meter signal on its way. Thus, through a process of elimination, the virtues of the center fed zepp for a ten meter array became apparent. This long forgotten type of antenna used by many of the old timers before coax made its appearance still has its long list of adherents.

Pattern

The antenna is not only graceful and beautiful to look at with its ladder type feeders, but it is useful on all bands. On ten meters it becomes a collinear array with four waves in phase and changes the broadside bulbous pattern into four long lobes. See fig. 1. On ten meters the antenna has a low angle of radiation on the four lobes with about 4 db of gain over a dipole.

During a year of actual comparison by switching back and forth between a beam, the zepp signal was about equal to the beam except for the backside noise. The disadvantages really are an advantage because you do not have to turn the antenna to catch a DX station; you can work a round table on both sides of your station, and the operator has a chance to hear signals that might be coming in off the back of the beam that would not be heard otherwise.

These arguments might be thin for a real DX'er out for blood, but for the average amateur the choice can't be beaten. During a DX contest, ZL1AH, was contacted on ten meters at 8 A.M.

*528 Colima Street, La Jolla, California

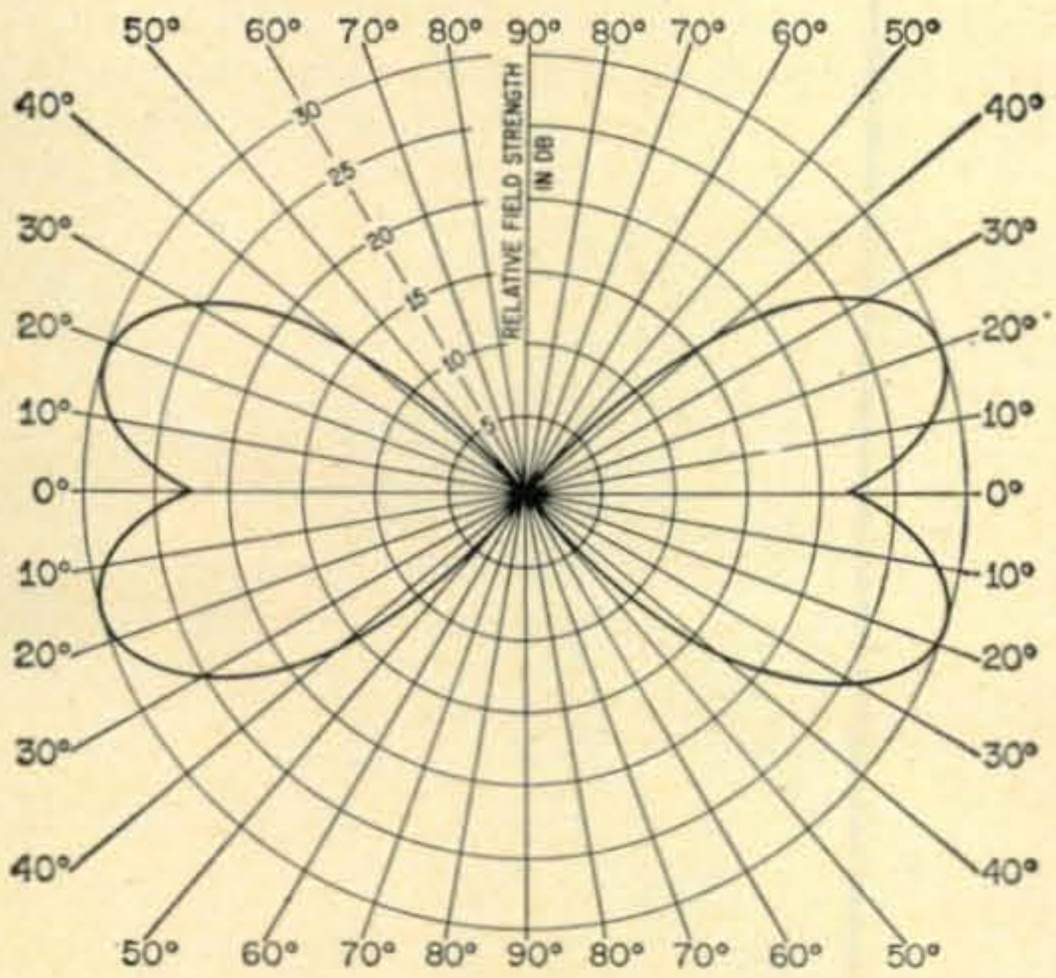


Fig. 1—Pattern of an 80 meter center fed zepp antenna using 600 ohm feeders, operating on ten meters as a co-linear array with four wavelengths in phase.

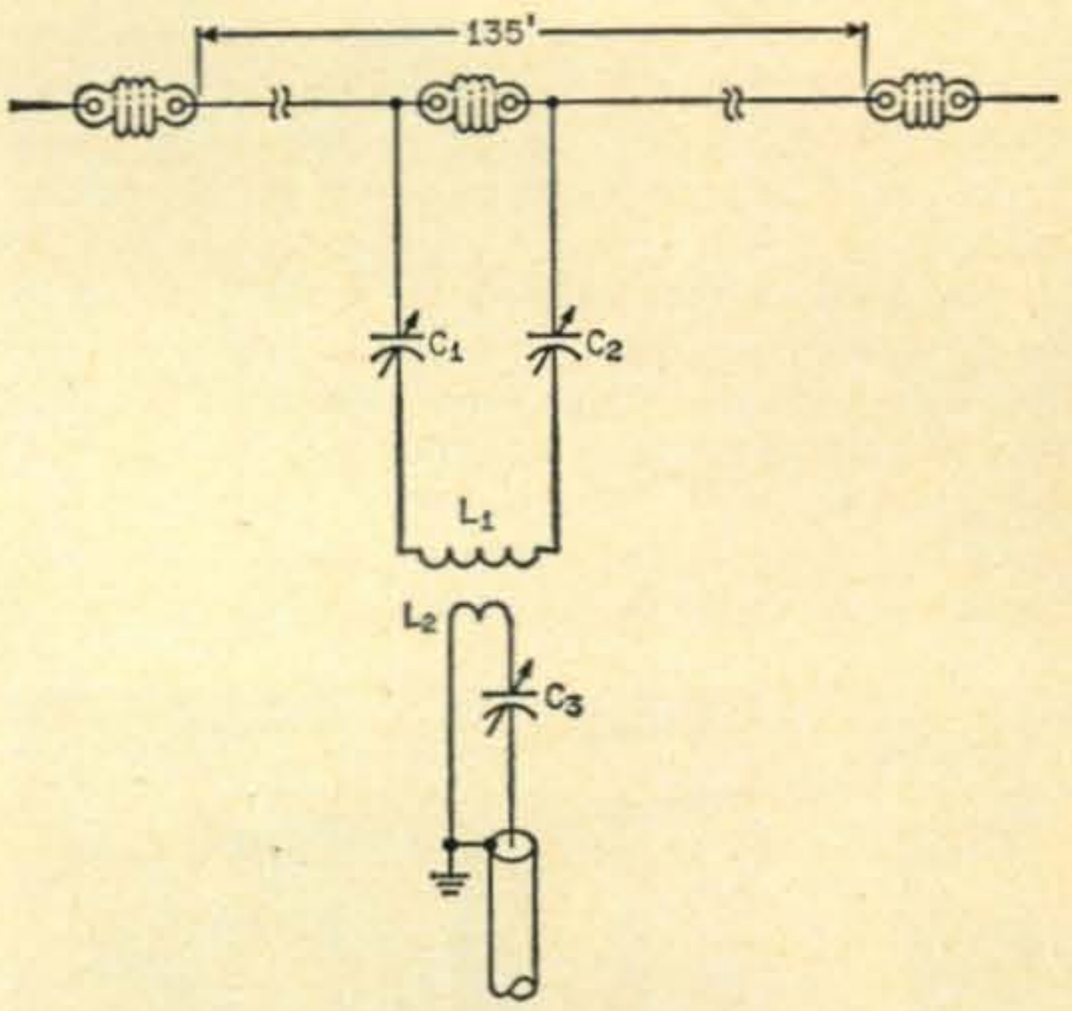
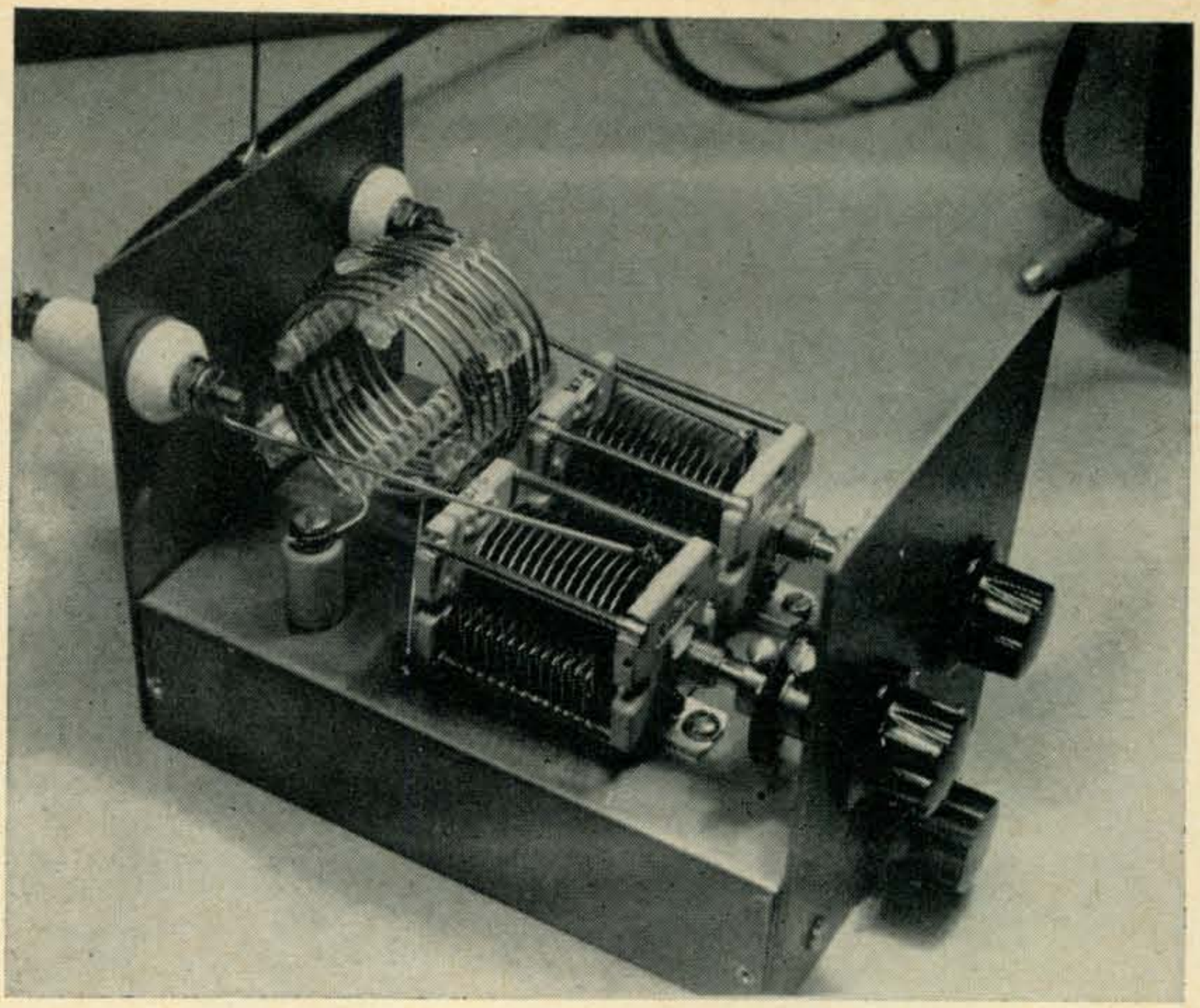


Fig. 2—Collinear array and a series antenna tuner for ten meter operation. The 600 ohm feeder construction is described in the text. The feeder length should be 42 or 71 feet long. The tuner is fed by 52 ohm coax through a low pass filter and s.w.r. bridge.
C_1, C_2—100 mmf. Johnson 167-11 or equiv.
C_3—150 mmf variable capacitor.
L_1—5 turns Air Dux #1406.
L_2—3 turns Air Dux #1610 over the center of L_1.



Interior view of the antenna tuner built on a California chassis #A-137, 4 × 6 × 1½ inches. The 600 ohm feeders connect to L_1 by means of feed-through insulators. The link coil, L_2, can be seen over the center of L_1.

the long way around, and a few minutes later 9J2BC was QSO'd in Zambia. This points out the antenna will do an excellent job even with only 100 watts fed into it.

Feeders

A center fed antenna is illustrated in fig. 2. If the feeder lines are made 71 feet long it may be possible to feed the system with a commercial type Matchbox. Commercial antenna tuners use parallel tuning and the 71 foot feeder length may respond to this type circuit. If not a series feed tuner as shown in fig. 2 must be used.

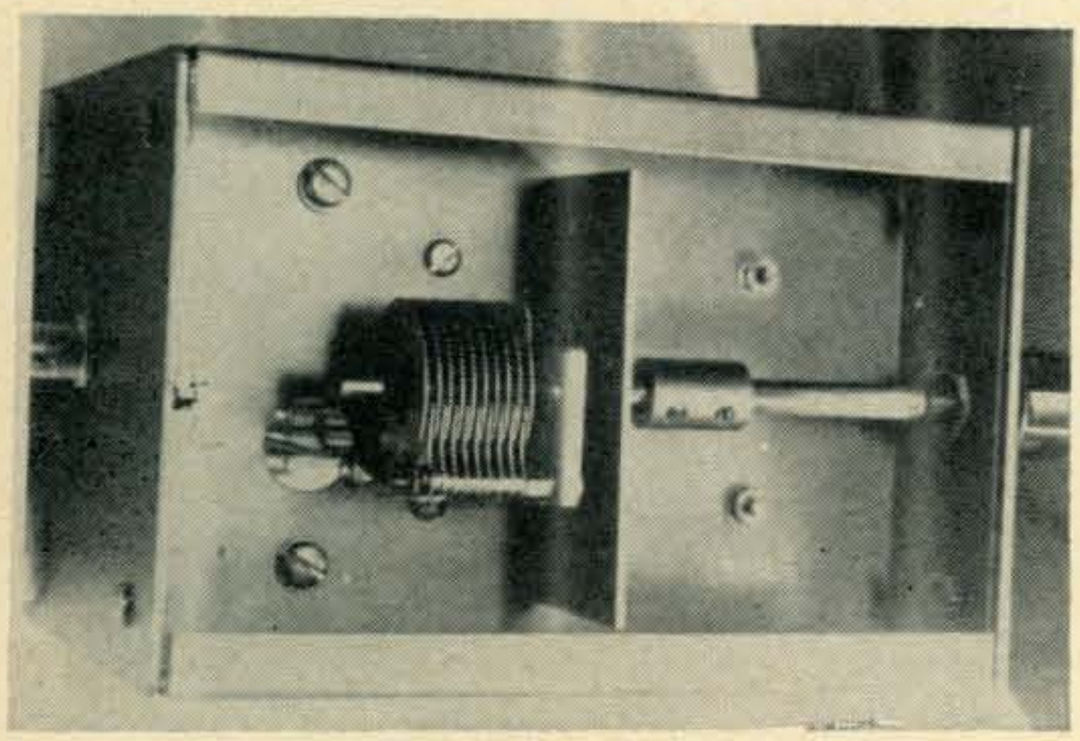
A 42 foot feeder can also be used. It will parallel tune on all bands except ten where series tuning is required. The solution is to make a simple series tuner box, the circuit for which is shown in fig. 2. For rigs up to 300 watts small receiving type tuning capacitors will be satisfactory.

The feeders and antenna are made from #14 solid enameled copper wire. The spacers for the feedline keep the wires separated 6 inches and are located every 2 feet along the line. Lucite, polystyrene, porcelain or other similar r.f. insulators are suitable. Commercial 600 ohm ladder line can be used if desired.

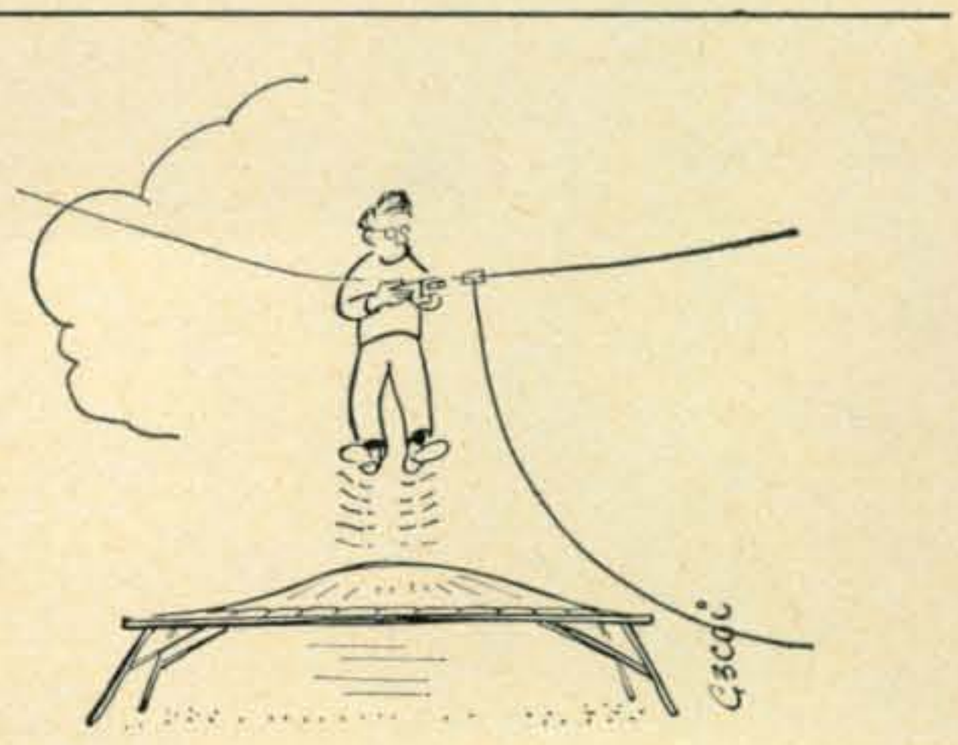
Tuning

If the antenna will not dip to zero s.w.r. with a parallel tuned circuit try the series tuner. The tuning process only requires setting the capacitors about mid scale and tuning each slightly until the s.w.r. goes down to 1:1. If this results in the coax series capacitor being turned to mimimum capacity then try removing a turn from the link coil, L_2.

At least three local amateurs who have watched the antenna work on ten meters have tried it and have now taken down their tower and ten meter beam because of the constant upkeep needed. There is something to say for copper wire antennas with no joints to become corroded and tuned feeders which will zero the s.w.r. at any part of the band. The latter is almost a necessity when using a transceiver that has TV tubes in the linear amplifier stage where any s.w.r. will make the plates glow a cherry red color. It's something to think about; try it. ■

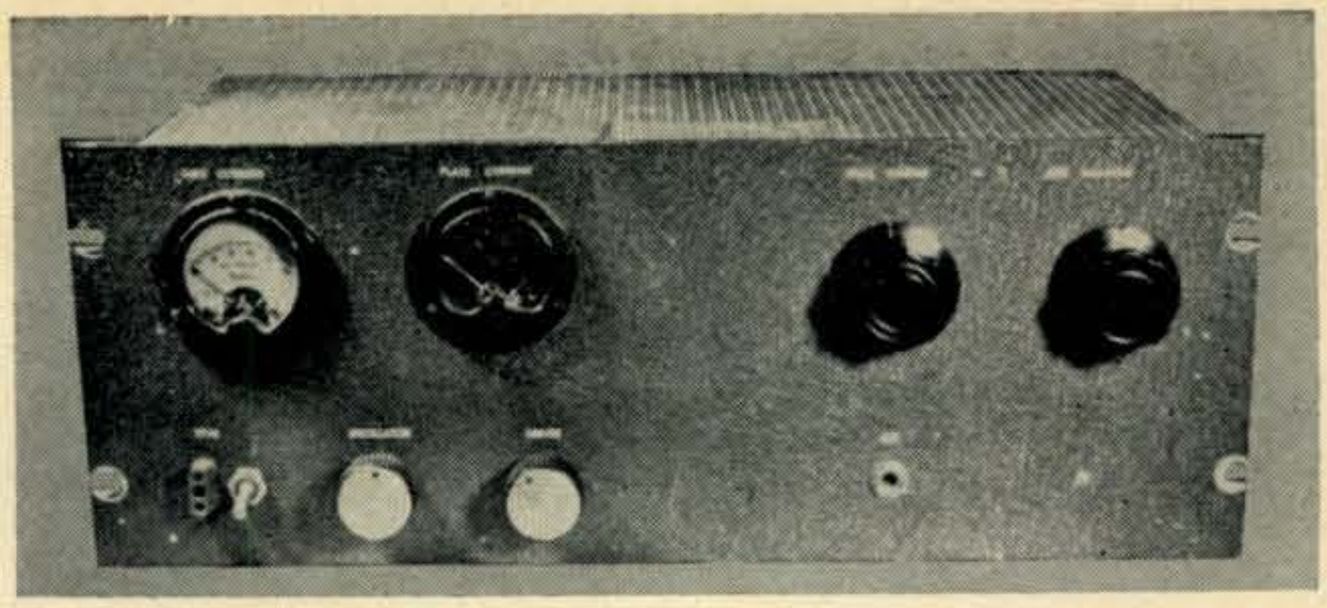


Bottom view of the ten meter antenna tuner shows the mounting of C_3, the link tuning capacitor.



Unusual solutions to difficult problems: Grid-dipping a dipole on site.

The LS-240



One Quarter Gallon On Six Meters

BY DAVID F. PLANT,* K9LAJ/2

The LS-240 offers an inexpensive way to build a medium power 6 meter transmitter suitable for serious v.h.f. work. Ease of construction, optional low power output for local work, and complete TVI suppression are featured.

THE step from the average 50 watt six meter transmitter to a medium power rig is not necessarily a difficult one, and the extra 5 or 6 db advantage (approximately one S unit) is very helpful in v.h.f. work. In extended groundwave work the difference between being heard above the band noise or not being copied can be a matter of a few db and a rig such as the LS-240 is just the ticket for this type of work.

The LS-240 is a 6 meter transmitter that is capable of power inputs over 200 watts and can be built with a minimum investment of time and money. This is accomplished by using available receiving and surplus tubes in a simple yet foolproof circuit.

Provision is also included for modulating the exciter so the rig may be used efficiently at low power levels for local contacts. The use of coaxial link coupling between driver and final aids in the rejection of unwanted signals, and the push-pull output stage cancels even harmonics.

The two push-pull paralled 829B's allow an i.c.a.s. c.w. input of 240 watts with very moderate drive requirements. If the final is built without the exciter, any transmitter with an output of 15 watts will serve as driver.

Circuit Description

In the exciter a 6L6 is used as a Colpitts oscillator with the plate tuned to the third harmonic (25 mc) of an 8.3 mc crystal. Provision is included (by closing S_1) for use of an 8 mc v.f.o. See fig. 1 for circuit details.

The 2E26 driver tube doubles to drive the 829B's straight through at 50 mc. The low height of the 2E26 is in keeping with a low overall profile of the LS-240 and it provides more than enough drive for the final amplifier. The oscillator plate voltage is kept separate from the doubler stage so the latter can be modulated if low power operation with the exciter is desired.

No provision for metering is included for the exciter as the grid current meter of the final amplifier stage gives an excellent indication of proper tuning. The final uses a pair of 829B's in a rather unusual push-pull parallel configuration allowing a quarter of a gallon input on 6 meters with very little financial strain. The circuit of this final is shown in fig. 2.

The 829B found great popularity after the WW II because of its low price tag and good efficiency at very high frequencies. Having several of these bottles around and desiring a rig with more power than one 829B could handle led to the development of the LS-240 circuit. Fears of instability or excessive inter-electrode capacity proved to be unfounded as the rig showed no signs of temperament.

An advantage gained by using these tubes is economy in the power supply section. A pair of TV power transformers will handle the plate load and the filter capacitors can be 400 volt units in series. In fact, lower voltage rated components can be used throughout. See fig. 3.

Mechanical Construction

The transmitter is built on a 15 × 7 × 3 inch aluminum chassis. This size allows plenty of room and fits well behind the 7 × 19 inch aluminum relay rack panel. Use of a relay rack panel proves a convenience for mounting the rig, and the rigidity of the panel results in a very rugged piece of equipment. A slate grey wrinkle finished panel was used and looked very good with the black knobs and white decals.

The photographs show the positioning of the major components. Looking at the rig from the

*Number 5 Weehawken St., N.Y., N.Y., 10014

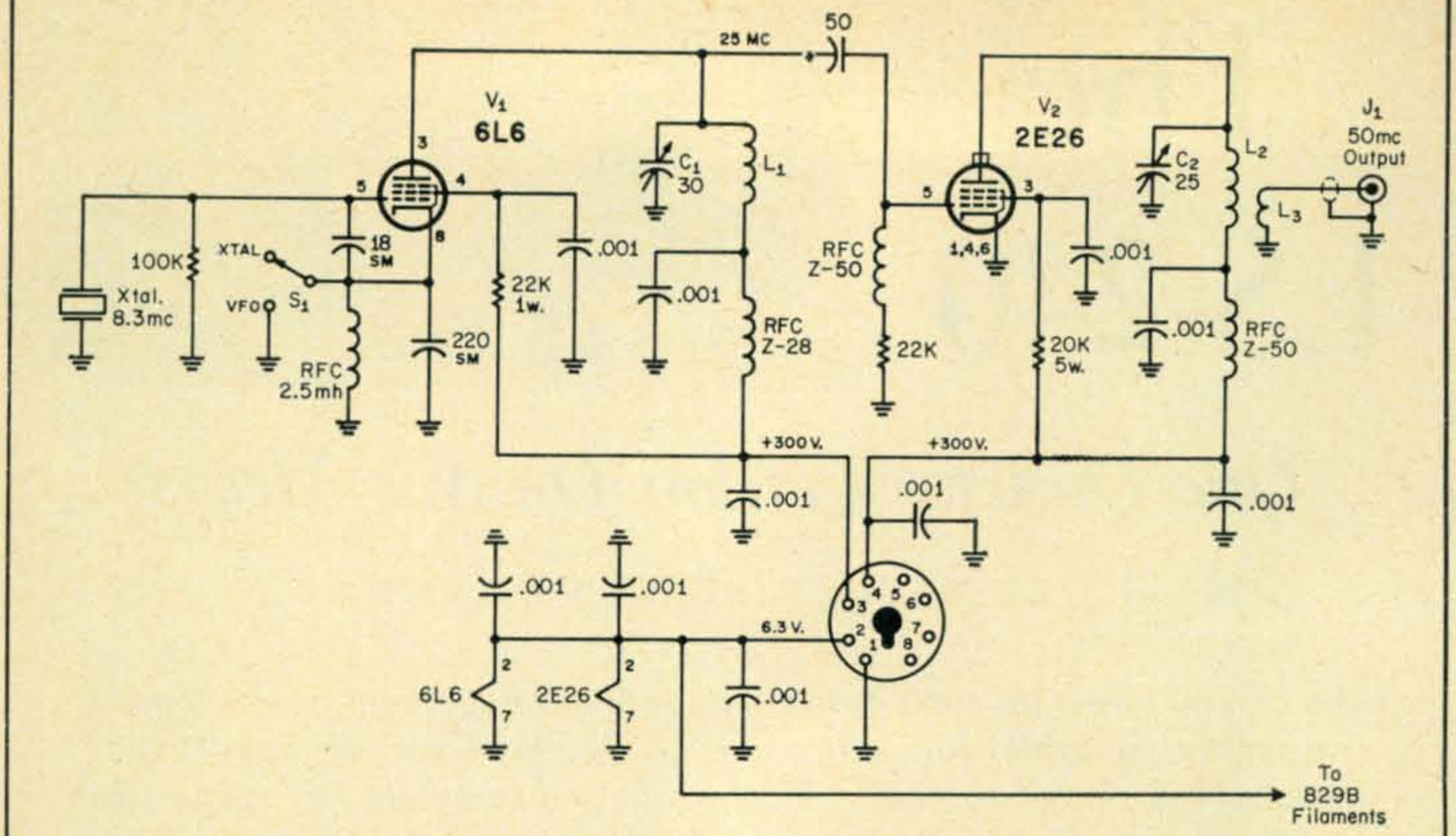


Fig. 1—Circuit of the LS-240 6-meter exciter section. All resistors are ½ watt except where otherwise noted. All capacitors less than one in value are in mf; capacitors greater than one are in mmf. Capacitors marked SM are silver mica.

L_1—8t. #16 e., 1" dia., close spaced.
L_2—4t. #16 e., 1" dia., close spaced.
L_3—2t. #16 e., 1" dia., close wound at cold end of L_2.

rear, the chassis is mounted to the panel with a 1" margin to the left and a 3" margin on the right.

The final amplifier takes up about 9" of chassis space from the left and the remaining 6" is occupied by the exciter components. One of the coax conectors and the high voltage feed-through are mounted on the rear apron of the chassis on the final amplifier side. Two more coax connectors and an octal power plug are fitted on the rear apron behind the exciter section. Also mount a bolt for grounding purposes.

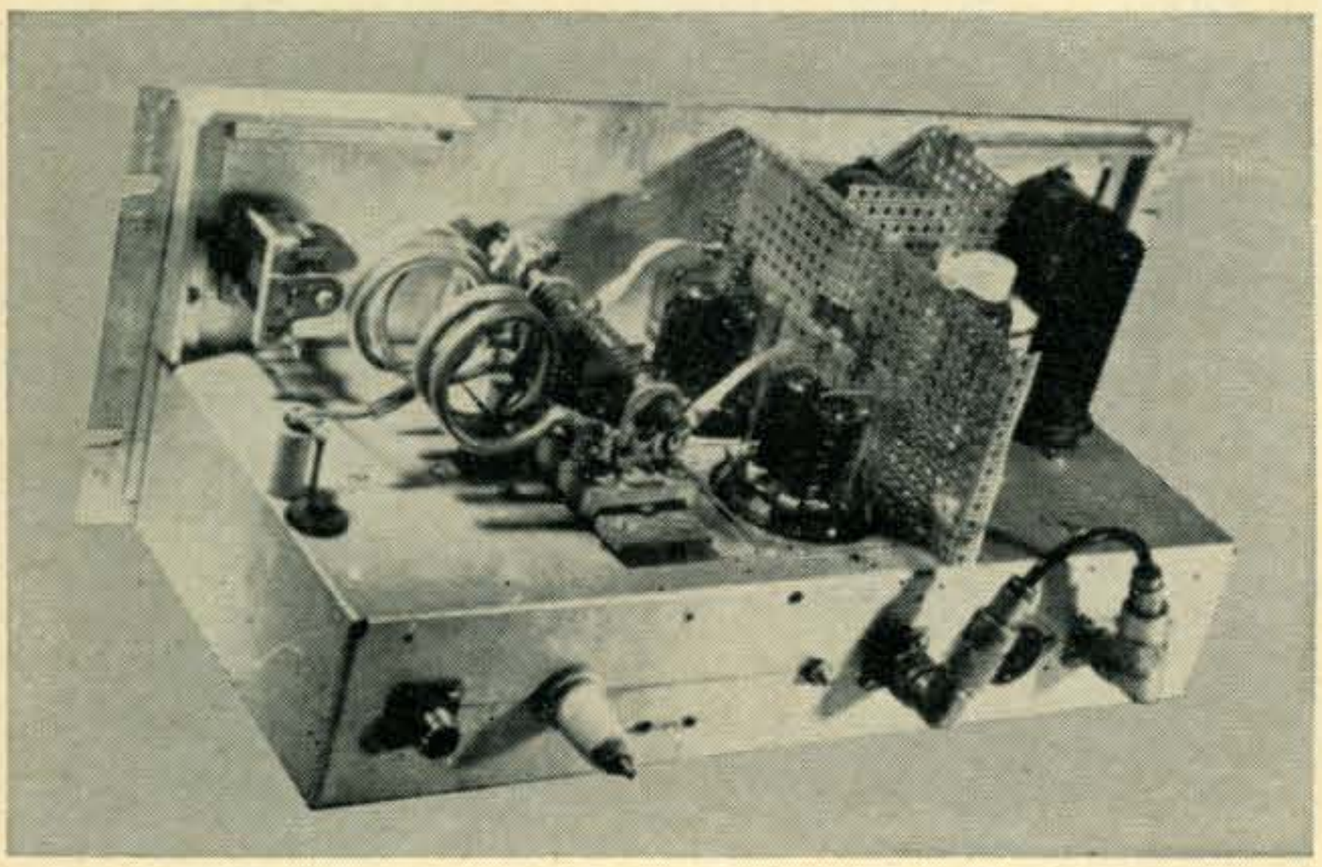
Looking from the front, the crystal socket and the VFO-XTAL switch are mounted on the lower left of the front panel and placed outside of the chassis area. Their leads are fed through a hole in the side of the chassis.

Capacitor C_1 and the closed circuit key jack (J_4) are mounted through the panel and chassis in line with the crystal socket and switch. Also a hole is drilled for the shaft extension of C_2. It may be helpful to fasten the panel to the chassis with screws to insure alignment while drilling the necessary holes for the components.

The two meters and capacitor C_5 are mounted on the panel above the chassis. A hole is drilled in the panel for the insulated shaft extension of C_5.

Octal socket holes are punched for V_1 and V_2 on the exciter portion of the chassis. A bracket for mounting C_2 is placed near the 2E26 socket under the chassis.

The 829B sockets are mounted on 3" centers and positioned so the plate and grid pins are perpendicular to the front panel. The plate tuning capacitor (C_4) is mounted between the final tubes and the tank coil. The rotor of the capacitor is above ground so mount the capacitor on insulating material. Wood was used in the original model with no problems. An insulated shaft extension is necessary for C_4 as the capacitor is centered on the chassis to maintain symmetery



Rear view showing hi-Q plate circuit for the push-pull/parallel 829B amplier. At the far right behind the shield partition is the exciter. Note the coax jumper connecting exciter and final. For independent operation of the exciter, the jumper is removed. High power output is at the far left.

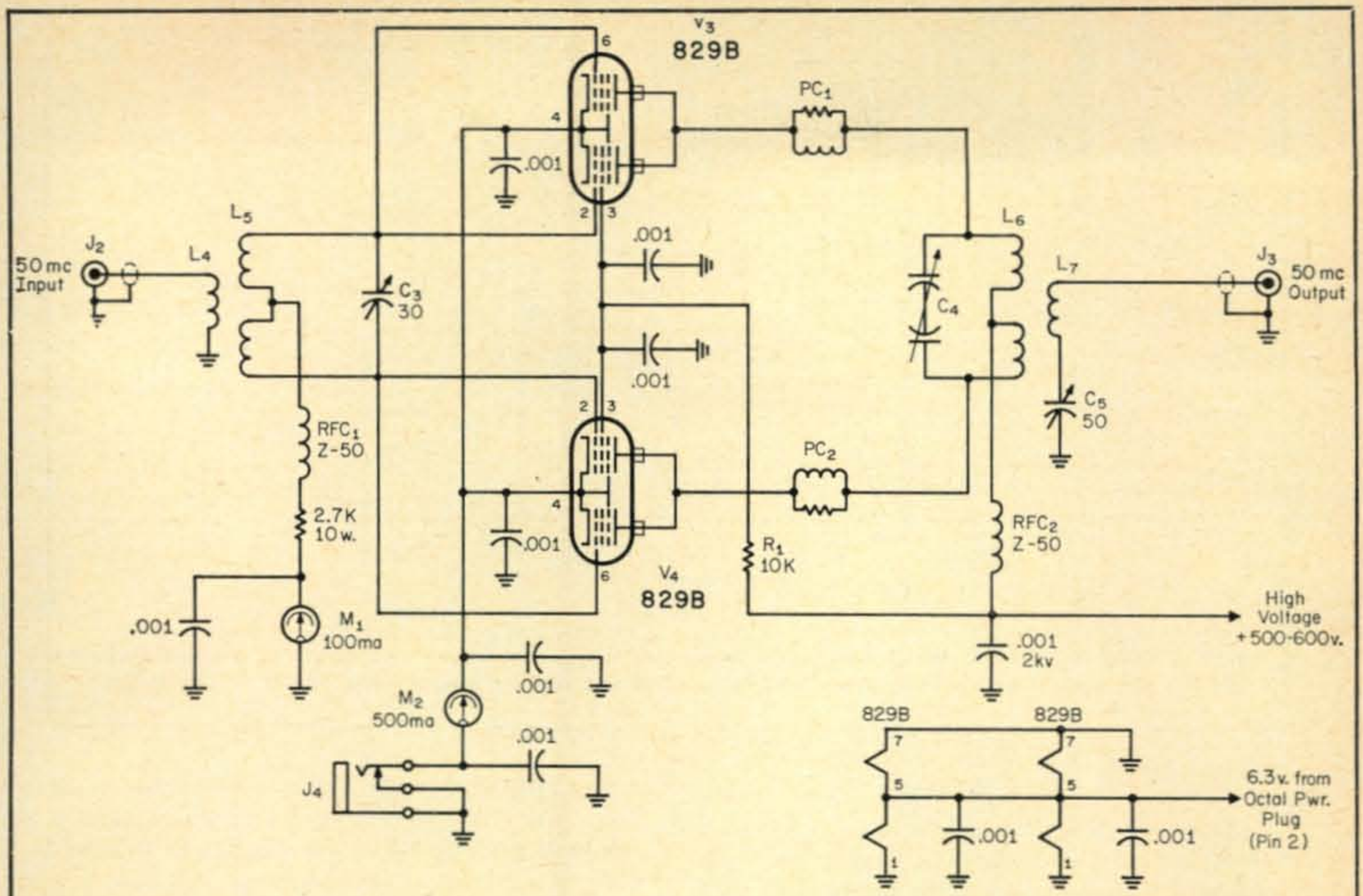


Fig. 2—Circuit of the final amplifier of the LS-240 6-meter medium power rig. All capacitors less than one in value are in mf; capacitors greater than one are in mmf.

C_4—20 mmf rep section, 1500 volt plate spacing.
L_4—2t. #16 e., 1" dia. link at center of L_5.
L_5—4t. #16 e., 1" dia., spaced ¼".
L_6—4t. ¼" copper tubing 2" dia. spaced ¼" and formed to fit across C_4.
L_7—2t. #16 e. at center of L_6.
PC_1, PC_2—47 ohm 1 watt carbon resistor mounted as shown in fig. 4.

in the push-pull circuit. Drill a hole large enough to fit a Z-50 r.f. choke and grommet to the right of the tuning capacitor (looking from the front). This choke will later be connected to the center tap of the plate coil.

The grid tuning capacitor (C_3) is mounted and centered close to the 829B sockets on the driver side. It is very important not to ground the rotor, as both rotor and stator are hot when used in a balanced grid circuit.

L-shaped angle stock is fastened to the top and sides of the panel to support a homemade aluminum encolsure.

Wiring

As with all v.h.f. equipment, it is extremely important to keep leads short, and bypass anything that might cause instability if not at r.f. ground potential. Examples of this would be cathode and screen leads, cold ends of r.f. chokes, meter wiring, and power supply lines. When bypassing, disc ceramic, or ceramic feedthrough capacitors are preferred, as these have the least distributed inductance. The leads of the capacitors should be kept as short as possible and located so the ground end is near a direct grounding point.

The exciter the screen and hot filament pins of the oscillator and driver tubes are bypassed to ground with disk ceramic capacitors. The coils L_1 and L_2 are positioned at right angles to minimize interaction. The wiring of these stages is conventional; however, keep the leads as short as possible.

The crystal socket and XTAL-VFO switch wiring goes through the side of the chassis so use a grommet and make sure that all cathode pins of the 2E26 are grounded.

Exciter Testing

After filament warmup, application of B plus should cause the crystal oscillator to fire immediately. Adjust C_1 for maximum 25 mc output using a grid dip meter, wave meter, or receiver. A neon bulb could be used for r.f. testing but it won't indicate the frequency of output.

Connect a dummy load and relative output indicator to the driver output before testing. A 25 watt bulb is satisfactory too and will also indicate relative output. Capacitor C_2 is peaked for maximum output at 50 mc. Removal of the crystal should cause exciter output to drop to zero.

This portion of the LS-240 can now be used on 6 meters. If the rig is plate modulated, make sure that the 6L6 oscillator is fed from an unmodulated source of plate voltage.

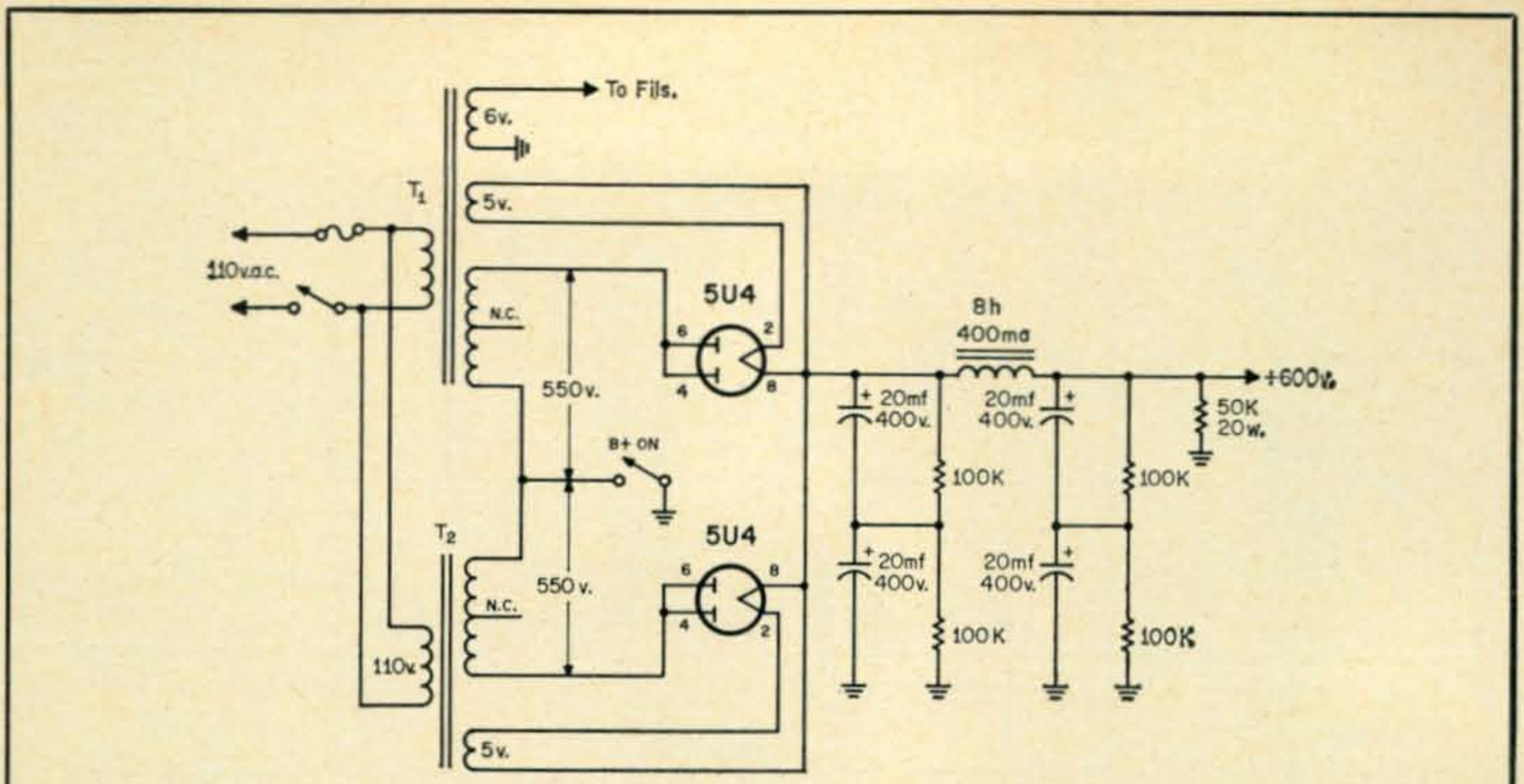


Fig. 3—A possible circuit for the power supply. It does not require that the transformers be identical in both circuits, the transformers should supply 560 volts at 200 ma, and be properly phased for proper output.

Final Wiring

As the two pentode sections in each 829B envelope are paralleled, the control grids are wired together at each socket. The screen and cathode-suppressor connections of each pentode are internally connected. These pins are bypassed by disk ceramics and wired together at each tube socket. The bypass capacitors are grounded by soldering them to the rivet holes in the metal 829B sockets.

The grid coil (L_5) is mounted on the grid pins of the two 829B sockets. An r.f. choke RFC_1 is wired between the coil center tap and a multiple terminal strip and wired as shown in the circuit of fig. 2.

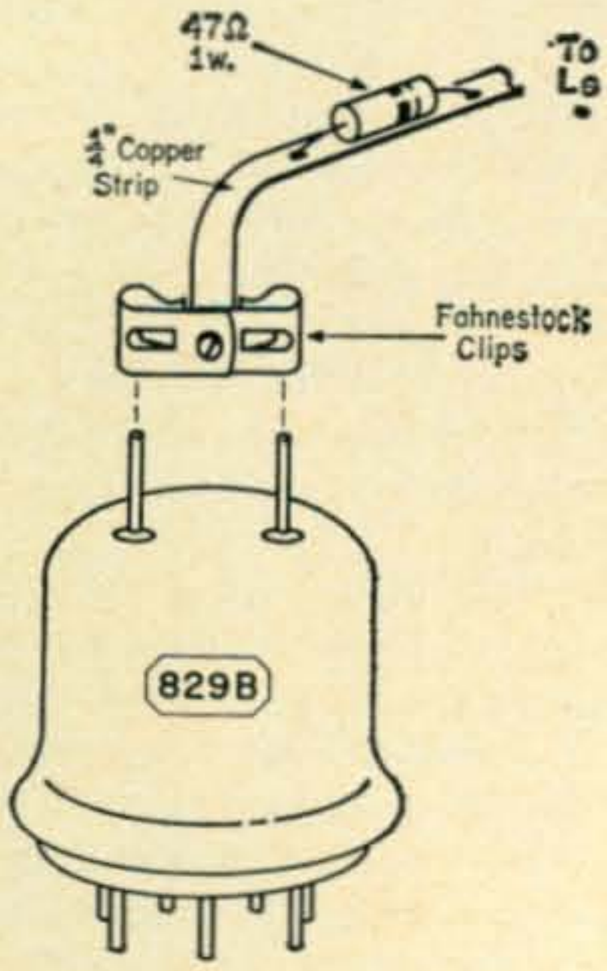


Fig. 4—Plate circuit construction for the 829B final shows how Fahnestock clips are used for plate connectors, and the formation of the suppressors PC_1 and PC_2. The plate circuit wiring is made with ¼" copper strap.

The 10K at 40 watt screen resistor was made from four 10K 10 watt units in series-parallel although a single 40 or 50 watt resistor would work as well.

Topside, the tank coil (L_6) is soldered directly to the plate tuning capacitor. The plate choke is fitted through the chassis and is connected between the center tap of the coil and B plus. The output link (L_7) is then fitted in the center of the plate coil making sure that the turns do not short. One side goes to the stator of C_5 and the other side is fastened to a stand-off insulator. A piece of coax is run from the insulator to the output connector (J_3).

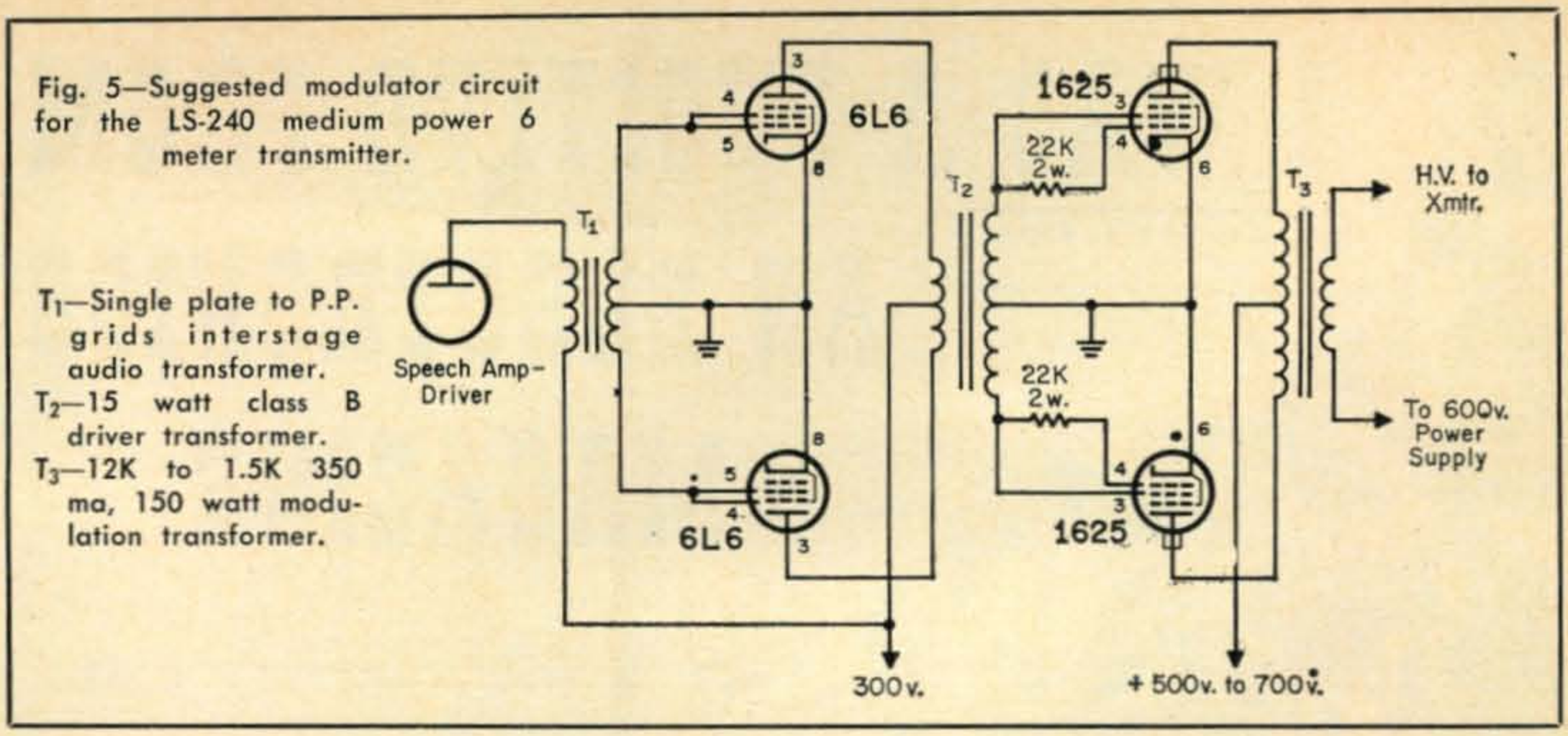
Plate caps are constructed by fastening two Fahnestock clips together at each 829B. The plate leads are pieces of ¼" copper strap with 47 ohm 1 watt resistors soldered in parallel as shown in fig. 4.

The positioning of the shielding can be seen in the photographs and is installed after the wiring is completed. Reynold's hobby aluminum is used (available in many hardware stores) and is located between the exciter and final, both above and below chassis. The cathode current meter is also shielded from the exciter by aluminum.

Final Amplifier Testing

For initial testing of the final, apply filament voltage to the 829B's, but do not connect the B plus line. Connect the output of an exciter to J_2. (If the LS 240 exciter is used merely run a coax jumper between J_1 and J_2.) Install an 8.3 mc crystal and apply the proper voltages to the driver. Adjust C_1, C_2, and the final grid tuning capacitor (C_3) for maximum grid current on the 100 ma meter.

Care must be taken when peaking C_3 as its rotor is not grounded. An insulated alignment tool is best for this work, and once this capacitor



is set it needs no further attention. It is, however, a good idea to peak C_3 for the middle of the operating band. This setting was made at 50.4 mc and found effective from 50 to 51 mc.

Once proper grid drive has been obtained (20 to 30 ma), it is a simple matter to connect B plus to the final and load the transmitter into a suitable load such as resistive dummy load or a 150 watt bulb. Loading will be in the neighborhood of 400 ma at 500 to 600 volts.

For a.m. work, the modulation transformer should handle 300 to 400 ma at an impedance of 1.5K. At K9LAJ a mismatch proved to be no problem, but it takes a bit more audio to modulate a 100 percent.

Provision has been made for cathode keying of the final. A keying relay is recommended because there is 600 volts between the key contacts. For c.w. work a means of removing B plus from the modulator and shorting the modulation transformer secondary should be provided.

Comments And Suggestions

If economy is followed in the modulator section as well, surplus 1625's (or 807's) would do the job nicely. Use either two in a triode connected circuit (see fig. 5), or four in a push-pull parallel class AB_2 configuration.

If the proper modulation transformer cannot be found, shunt modulation can be used. This system will allow a choke to handle the current drawn by the final.

A coax relay should be connected to the output of the exciter if barefoot operation is planned. This way the driver can be switched between the final and the antenna without having to rearrange coax connectors. In operation, however, plenty of feedthrough from the exciter will appear at the antenna with the plate voltage removed from the final.

Although designed for the 6 meter band, the LS-240 could be very easily put on 10. This is mentioned for two reasons: 1) sunspot activity is increasing and 10 meters will yield excellent skip contacts and, 2) the push-pull output circuit greatly reduces channel two TVI by cancelling the second harmonic of 28 mc. For 10 meter work, double in the oscillator to 14 mc and double again in the driver to 28. This could be done by adding inductance to the various tuned circuits.

The LS-240 could be adapted to linear operation by building a separate grid bias supply. The 829B works well in class AB_1 and the stability of the amplifier would lend itself well to this type of service. If s.s.b. work is considered, make sure that the power supply filter capacitors are husky.

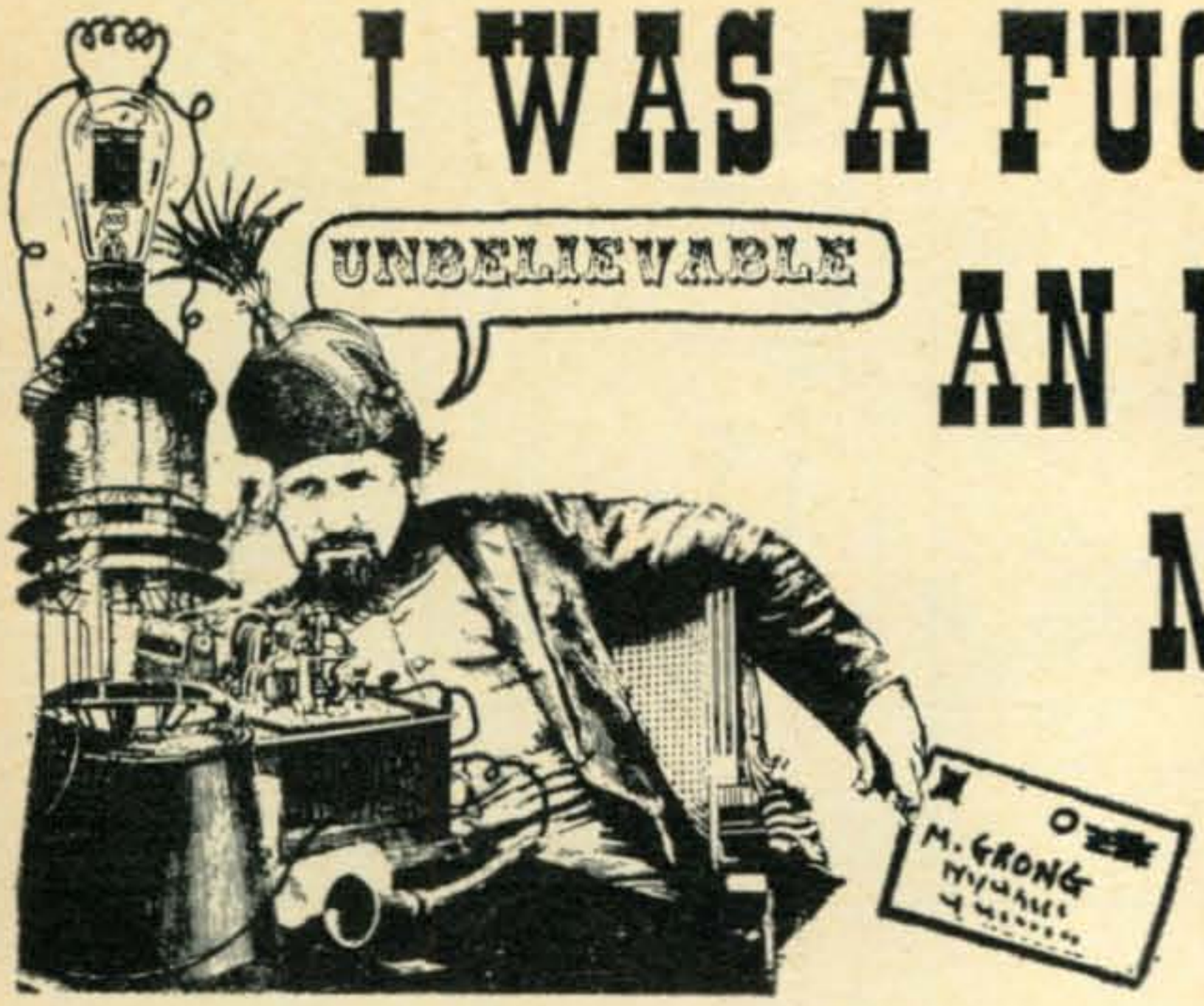
The LS-240 has been in operation for four years with no failures. The 829B's have withstood much abuse without replacing (and they were used surplus to begin with!). The additional power available for extended groundwave and sporadic skip has been most rewarding. ■

New Amateur Product

Millen

James Millen Manufacturing Company is offering a catalog with illustrated descriptions of their major components and line of miniaturized parts. Other product literature available from Millen include *Oscilloscopes, Grid Dip Meter, Magnetic Shields and Shaft Hardware, Inductances,* and *Engineers' Guide to Capacitors.* For either copies of these catalogs or more information write to: James Millen Manufacturing Company, 150 Exchange St., Malden, Mass., or circle 70 on page 110.

I WAS A FUGITIVE FROM AN ELECTRONICS MAGAZINE



BY TOM KNEITEL,* K2AES

ONE day you're hypnotically staring at the smoke curling up from your soldering gun as it slowly melts its way through your treasured FET. Suddenly, in a brilliant flash of inspiration you leap from your workbench, your eyes darting back and forth in some kind of wild St. Vitus rhythm. No time to think of such mundane things as soldering guns and FET's now, you have just realized your mission in life; to be an author. To write for an electronics magazine.

In three fantastic leaps you spring up the seven flights of stairs from your sub-basement converted boiler room and dash to your room. In a wild rage you fiercely fling billows of assorted surplus conversion manuals, QSL cards, five Sundays ago's newspapers, old socks, into the air. At last you find a blank piece of paper, never mind that it happens to be wrapped around yesterday's lunch. Scraping the peanut butter off, you carefully smooth it out, uttering little chuckles and winking at yourself in the mirror.

Now to the typewriter, which emits clouds of grey dust as you gayly dance your fingers over the keys in an effort to work the rust out of the trusty machine. At last you are ready to give yourself to posterity. Particles of rye bread and caraway seeds are still dropping from the paper as your trembling hands ready the machine for its task of glory. Aha! Now you are set. Carefully you center the paper, and deliberately you type the words "BUILD A ONE TUBE VEST POCKET KILOWATT FOR FUN AND PROFIT." Now, quickly, you skip down three spaces and your heart pounds as you type the first words of your great work, "The secret of the vest pocket kilowatt is . . ." You now pause to concentrate your thoughts; several seconds pass, seconds become minutes. You go off into another semi-hypnotic trance, who knows for how long. When you come out of it you find yourself in a cold sweat muttering, "The secret is, the secret is . . ." When you regain your composure you say to yourself, "Come on, Melville old boy, you know the secret of the vest pocket kilowatt!" But gad, when it comes right down to it, you really don't know a vest pocket kilowatt from a hootnanny. Head hung low, you slowly "X" out the title and eight opening words of the would-be masterpiece. Twenty hour-long minutes go by and your hand gradually returns to the keyboard. With one finger you tap out "BUILD A HIGH POWER CODE PRACTICE OSCILLATOR FOR FUN AND PROFIT." Now you have your inspiration, after all didn't you actually build such a devilish contraption one afternoon?

There's no stopping you now; the typewriter groans under the strain, making a noise like a 1912 Essex. So that the stream of thought will not be broken, no margins are used. There is a panicky feeling coming over you as you realize that you are rapidly approaching the bottom of the reverse side of the paper and there is no other paper in sight. In a fit of uninhibited creative artistry you yank Aunt Hattie's picture from the top of the piano, deftly placing it in the typewriter. At about Hattie's left nostril you finish your article. In a flash you fold the priceless manuscript into an envelope, pasting on the only stamps which are handy, taken from your stamp collection. Down to the corner and into the mailbox and now begins the vigil.

Luckily, and by sheer coincidence, the Editor of your chosen magazine has had several inquiries regarding high powered c.w. oscillators (they all came from your neighbors on the day you built yours), and your article is accepted! For some unknown reason it takes you a month to learn the verdict, during which time you have lost 47 pounds and have acquired a nervous habit of calling Aunt Hattie on the telephone at all hours of the day and night and asking her, "What's new?" (To which she invariably replies,

[*Continued on page 98*]

c/o Cowan Publishing Corp., 14 Vanderventer Ave., Port Washington, N.Y. 11050.

A TUNING INDICATOR FOR S. S. B. AMPLIFIERS

BY WILLIAM I. ORR,* W6SAI

An inexpensive and easily built Peak Level Indicator is a useful device and one which is needed by many s.s.b. stations, judging from the quantity of broad, splattery signals heard from time to time on the amateur bands. Some of the more poorly adjusted transmitters, or those badly "flat-topping" occupy 20 kilocycles or more of sorely needed spectrum space. Not only does this cause interference to those stations on adjacent channels, but the "splatter power" is lost and contributes nothing to the intelligibility of the offending signal. On the contrary, the distortion usually makes the signal fuzzy and more difficult to read. Some form of peak level indication for the transmitter would go a long way toward eliminating this unpleasant type of interference. The perfect peak level indicator, it would seem, should be attached to the *receiver,* rather than the transmitter to avoid hurting the psyche of some of the more enthusiastic operators. However, until that wonderful device is at hand, a peak level indicator for the transmitter will have to suffice. Its use can be justified by the fact that it makes proper amplifier adjustment easy, and it insures that all the transmitter power is useable *talk power* and not wasted sideband "splatter."

Linear Amplifier Adjustment

Unless test equipment is at hand, or a complex tuning procedure followed, the simplest and most direct method of properly tuning a linear amplifier is to adjust it for proper plate load impedance and correct grid, screen and plate currents under *peak envelope power (p.e.p.) condition.* This adjustment entails a nice balance between grid drive and antenna loading to be achieved under the state of maximum power input. The accepted technique in this case is to load the linear amplifier to the maximum power input condition using carrier or single audio tone injection, while monitoring the various amplifier currents and the power output. This is all very well and good, but the problem remains that when carrier (or tone) is removed, the operator has no real idea of "how high to talk-up the plate current" to achieve the maximum value of p.e.p. input that he tuned up for so painstakingly. The "old wive's tale" that the voice plate current should be about one-half the p.e.p. (steady state) plate current is only an approximation of the proper condition. The operator could, with the aid of an oscilloscope, observe the p.e.p. voice waveform and compare its maximum amplitude with the amplitude of the p.e.p. (steady state) condition used for tune-up. However, a less expensive solution is to construct and use a peak level indicator, such as the one described in this article. This device will indicate when voice peaks reach the maximum p.e.p. level and, in addition, will also show when the maximum p.e.p. level is exceeded.

*Eimac Division of Varian, San Carlos, California

The Peak Level Indicator

The Peak Level Indicator provides a continual display of voice amplitude of the s.s.b. signal and allows the operator to compare the voice peaks to a p.e.p. level determined at the time of amplifier tune-up. Once the simple, preliminary p.e.p. level adjustment is made, the Peak Level

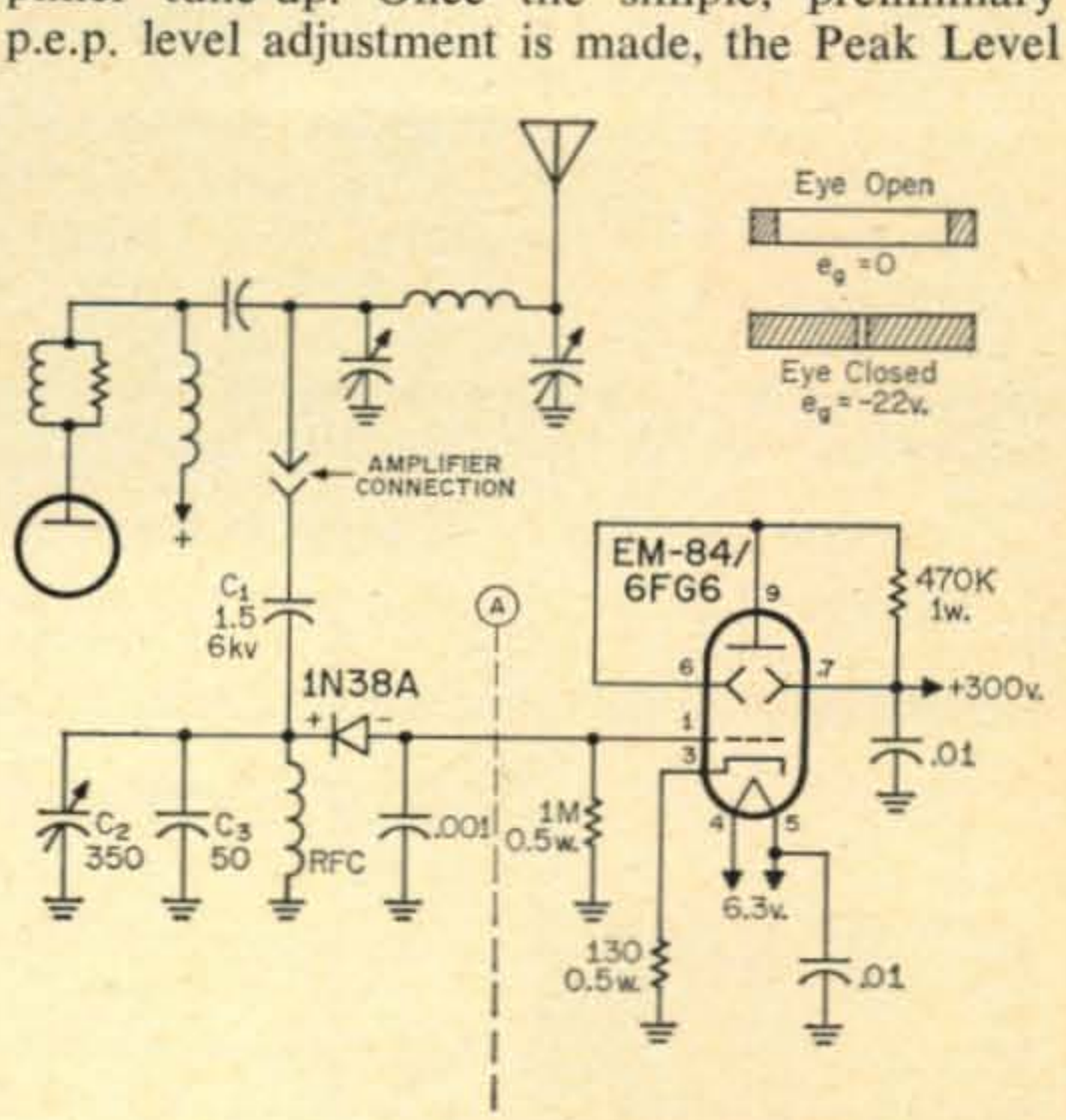


Fig. 1—Circuit of the Peak Level Indicator suitable for s.s.b. amplifiers. If desired, the circuit may be split at A with the rectifier section remaining in the linear and the indicator placed outboard somewhere. All capacitors greater than one are in mmf, less than one in mf.

C_1—1.5 mmf, 6 kv, Spraque 60GA-V15 or equiv.
C_2—350 mmf air variable. Miller 211 or equiv.
C_3—50 mmf, silver mica. See text.
RFC—2.5 mh, National R100 or equiv.

Indicator will provide an instantaneous indication of relative voice peak power and, moreover, will indicate when overloading and "flat-topping" occur. That's a lot of information to retrieve from a simple indicator that costs less than five dollars to build.

The circuit of the Peak Level Indicator is shown in fig. 1. It makes use of an inexpensive EM-84/6FG6 tuning indicator tube, commonly used as a tuning "eye" in many modern f.m. receivers. The display is a bright green horizontal bar, which completely closes under maximum signal condition, as shown in the illustration. A portion of the linear amplifier r.f. voltage is derived from a capacitive divider and applied to a germanium diode to produce a small negative voltage that is a close reproduction of the amplitude of the r.f. envelope of the amplifier.

The EM-84/6FG6 display is "open" when the grid is near zero potential with respect to the cathode and is "closed" when the grid is biased to approximately —22 volts. The negative bias voltage is derived from the plate circuit of the linear amplifier via the aforementioned capacitive divider and diode. The EM-84/6FG6 requires a plate and target potential of about 300 volts at a few milliamperes. This power may be "stolen" from the low voltage circuits of the amplifier or else a small solid state supply may be built to energize the tube.

The capacitive voltage divider is made up of a variable, low voltage air capacitor and a small value ceramic high voltage capacitor. The voltage across each capacitor is inversely proportional to the capacitance, so most of the r.f. output voltage appears across the ceramic capacitor. The values shown will work for amplifier plate potentials in the range of 600 to 3000 volts or so, as the amplitude of the rectified negative voltage is easily adjusted to properly close the "eye" by changing the setting of the variable capacitor. If the rectified voltage is too high, the "eye" will close before the maximum p.e.p. power level is reached and the padding capacitor across the variable unit should be larger.

Constructing the Peak Level Indicator

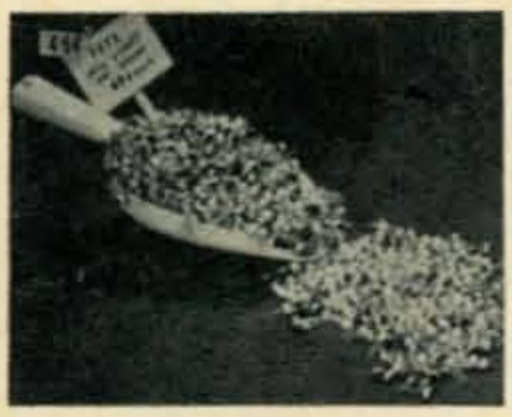
The Peak Level Indicator used by the author is built directly into the linear amplifier, but there is no reason why the device cannot be built as a separate desk unit. The circuit may be broken in half at point *A* and the divider, diode and other components to the left of *A* mounted in the linear amplifier in proximity to the plate circuit. It is a good idea to shield the diode from the full field of the tank circuit by mounting it below the chassis or in a small compartment. The indicator tube and accessory components are then mounted in a small metal box, or cabinet, placed atop the station receiver. Connections between the units are made via a short length of shielded cable: the grid wire and a ground return being required. A small 6.3 volt filament transformer can be mounted to the rear of the box, and wired to energize the "eye" when the amplifier filaments are turned on.

Adjustment of the Peak Level Indicator

Adjustment of the Peak Level Indicator takes less time than that required to write about it. The linear amplifier is tuned for maximum p.e.p. input condition (using a dummy load—don't jam up the band!) and the variable capacitor then set to just close the "eye" display. When the amplifier driving signal is reduced to zero, the display will return to the "open" position. If voice modulation is gradually applied to the amplifier, the display will respond to the envelope amplitude of the signal. When voice peaks are greater than the pre-set p.e.p. level, a bright green flash will be visible at the center of the "eye" where the patterns overlap. This condition indicates that the capability of the amplifier is being exceeded and that the operator should reduce the peak modulation level.

Use of voice compression follows the same procedure, and the "eye" responds in the same manner, even though the average voice level and "eye" closure is enhanced by this technique. All in all, this simple indicator is an extremely handy instrument which will provide a continuous check of linear amplifier operation. It is, however, no more intelligent than the operator who watches it, adjusts the equipment and modulates the transmitter. In short, it is no substitute for common sense and courtesy. ■

New Amateur Products



Siliconix

SILICONIX is now offering their E100 line of epoxy encapsulated n-channel junction FETs which will be priced under a dollar. They will be in a T0-18 case. For complete specs write to Siliconix at: 1140 W. Evelyn Ave., Sunnyvale, Calif., or circle 65 on page 110.

Waber

A new motor speed controller, Model 201, has been introduced by Waber Electronics. The solid state device features stepless change from zero to maximum and may be used to vary the speed of a.c./d.c. motors or loads up to 12 amps. For full details write them direct at: 2000 N. 2nd St., Phila., Pa., 19122 or circle 66 on page 110.

The late Karl Jansky, in the early thirties, indicating position on the Milky Way from where emanated the radio noise he discovered while conducting research at Bell Laboratories' Holmdel, New Jersey site.

Jansky or Reber Father of Radio Astronomy?

THE following letter and accompanying photos, from W2CGX, reflect the difference of opinion between many amateur radio historians and Bell Laboratories over the man responsible for the science of radio astronomy.

It is our feeling that full honor for the discovery of galactic radio noise belongs to Karl Jansky, one of the greatest electronic engineers in recent history. But it is also our feeling that Jansky *did not* father radio astronomy, though he might well have done so. For whatever reason, Jansky's radio astronomy work *was* cut short, and radio astronomy as a discrete branch of science, with its tabulation and compilation of specific, exact information *was* founded by Grote Reber, W9GFZ. Your comments would be appreciated.—*ed.*

Dear Sir:

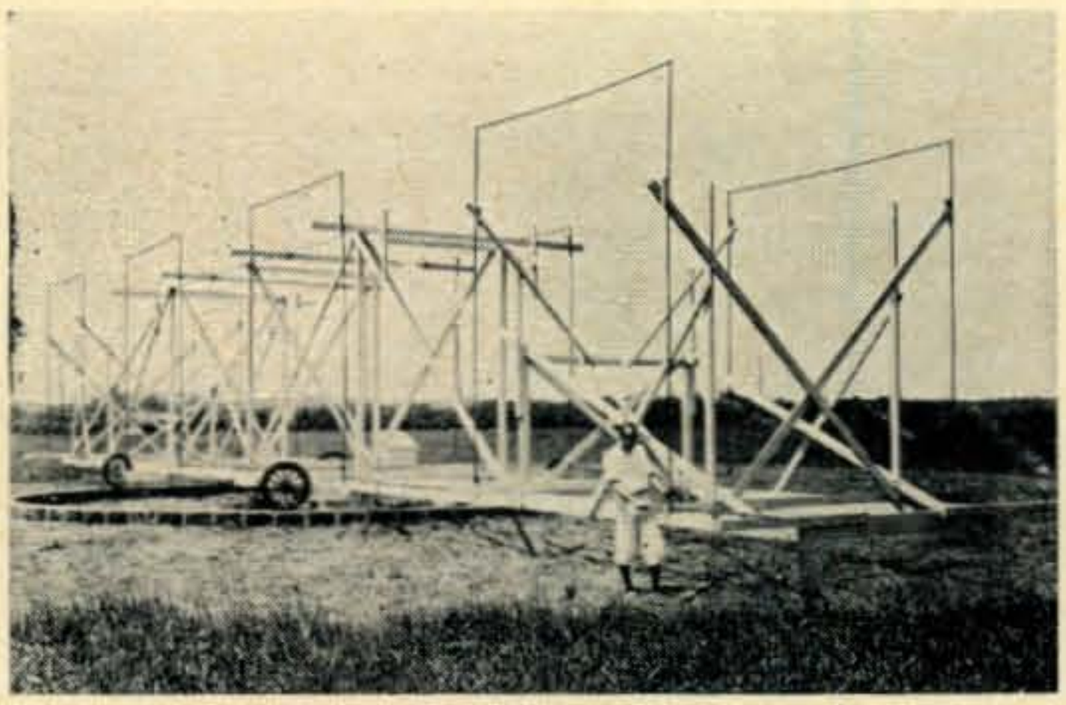
My ears perked up when I saw the cover of the March issue of *CQ*. It said: "The story of W9GFZ, Father of Radio Astronomy!" Then I looked inside, and discovered a story about Grote Reber, and he was being called the Father of Radio Astronomy.

Because I work for Bell Telephone Laboratories, in Murray Hill, N.J., I had become familiar with the fact that indeed the late Karl Guthe Jansky was the father of Radio astronomy.

Armed with that fact in my mind, I immediately set out to gather whatever information and pictures I could to back up anything I might write to you. I am enclosing some pictures which you might find interesting.

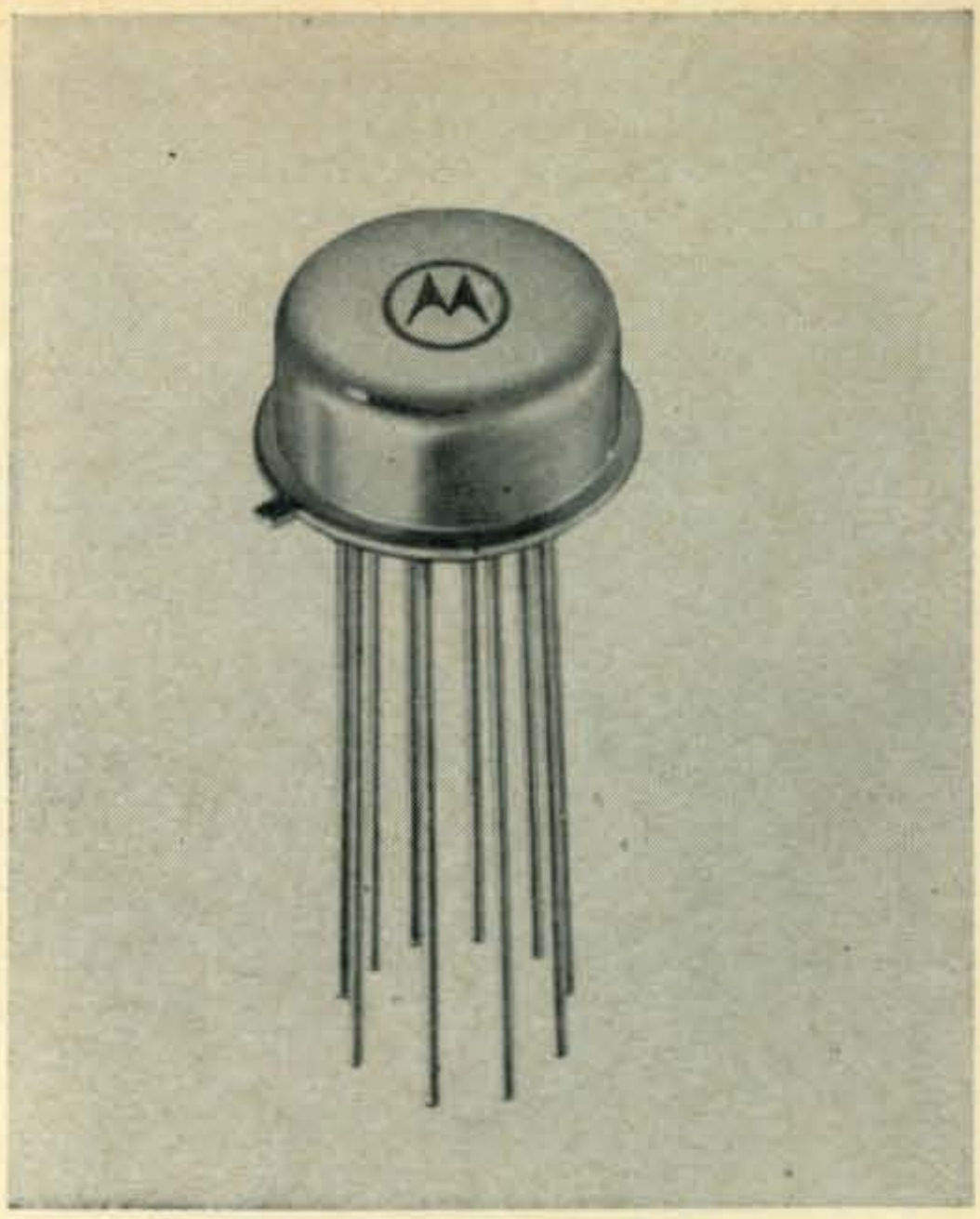
Jansky's original antenna was a 100 foot long "Bruce" antenna, mounted on a rotating platform which turned on rubber-tired wheels.

[*Continued on page 99*]



A historic photo of the late Karl G. Jansky of Bell Telephone Laboratories with the rotating antenna he used to discover radio waves coming from space. Mr. Jansky's investigations during the 1930's into the causes of strange noise in telephone equipment resulted in the discovery of radiation noise from the center of the Milky Way and gave the world a new science—radio astronomy.

The new laboratory named for the late Karl G. Jansky of Bell Laboratories at the National Radio Astronomy Observatory in West Virginia. A plaque in the building's lobby commemorates Jansky with these words: "Karl Guthe Jansky (1905-1950) Father of the Science of Radio Astronomy First to Discover Radio Emissions From Outer Space at Bell Telephone Laboratories Holmdel, New Jersey, in 1932"



A typical IC as it appears placed in a standard transistor TO-5 type enclosure.

THE USE OF INTEGRATED CIRCUITS IN RECEIVERS & TRANSMITTERS

BY JOHN J. SCHULTZ, W2EEY/1

Integrated circuits are becoming commonly available at ever decreasing prices. The author discusses some of the basics of integrated circuits and their application to various typical receiver and transmitter circuits. Such circuits offer a very compact, reliable and inexpensive means to replace a variety of discrete circuit components.

CIRCUITS can be classified a number of ways. One way is by access to individual components—either discrete or integrated. For instance, one could build a transistorized audio amplifier on a printed circuit board, soldering on all the individual components—transistors, capacitors, resistor, etc. This would be regarded as discrete component construction. If, however, the entire audio amplifier were encased in a hard potting compound so that access to individual components were no longer possible without destroying the entire unit, the unit could be considered an integrated circuit.

*40 Rossie Street, Mystic, Connecticut 06355.

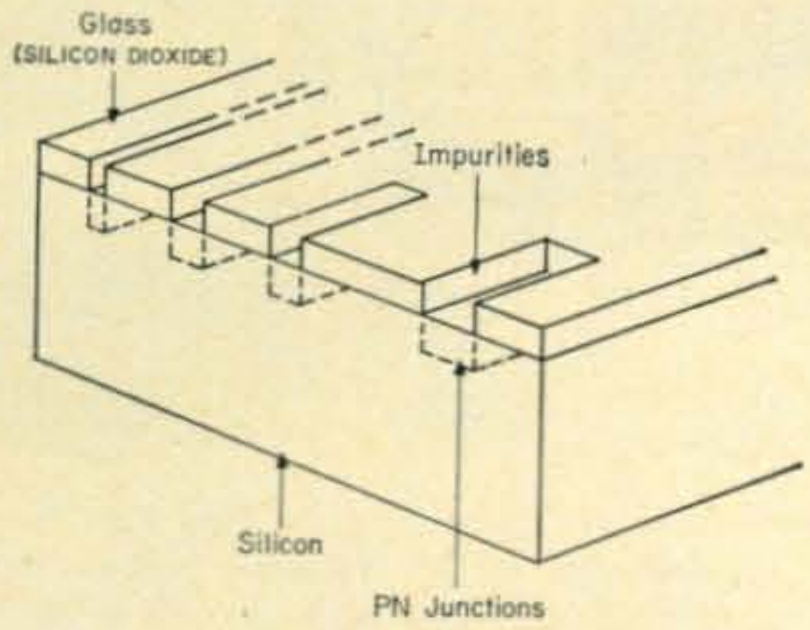


Fig. 1—A basic integrated circuit is built up by injecting various impurities to form different circuit elements on a base of silicon.

The above description may not be wholly correct technically but it does provide a way to visualize the important point about integrated circuits—that is, they must be considered as units which provide certain terminal characteristics (input/output) which cannot be altered internally. In this sense they are like many other circuit components—capacitors, transformers, etc.

Except to provide physical protection, there would not be much sense to potting the audio amplifier made from discrete components. Integrated circuits are largely an extension of transistor technology and other microcircuit technology which has allowed the combination of both multiple active and passive devices together in one integrated unit. The nature of the manufacturing process is such that the relative cost of various devices is contrary to what one is used to with discrete components. For instance, active devices—transistors and diodes—can be produced cheaper than resistors and capacitors. In large production quantities of an integrated circuit, for instance, the transistors might cost 1 to 2 cents each, resistors about 3 cents and capacitors up to 6 cents each. Inductances cannot be manufactured as part of an integrated circuit as yet. These considerations greatly affect the design of stages using IC's as probably anyone who has seen the schematics for the AM radios, phonographs or television receivers on the market which use IC's will attest.

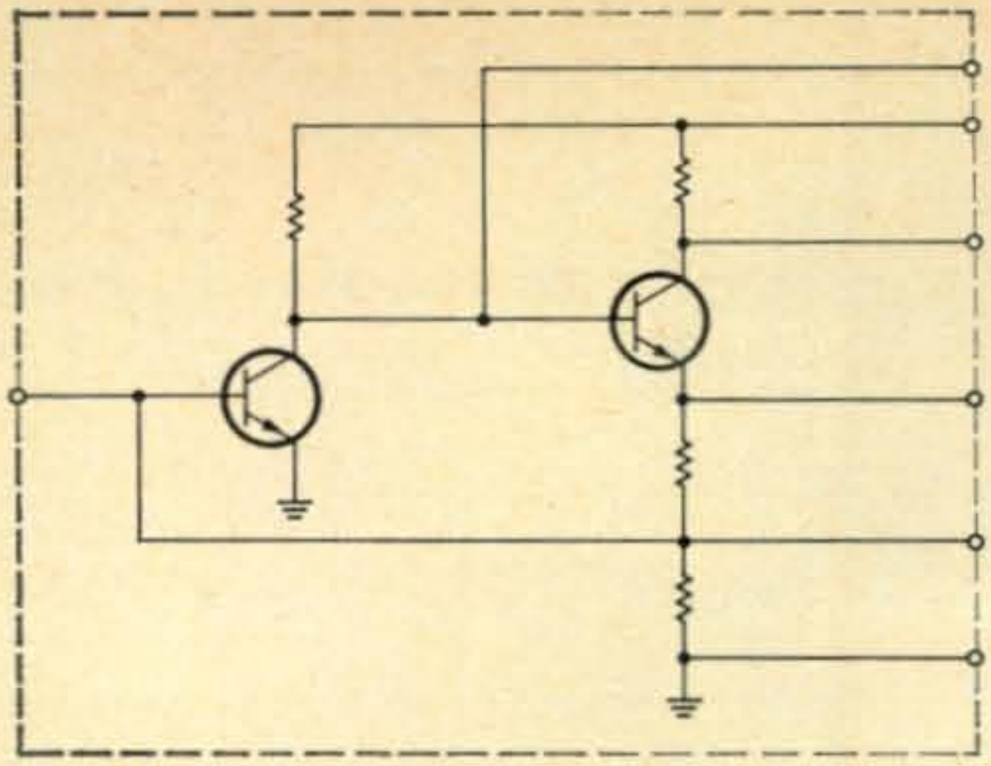


Fig. 2—A simple 2 transistor IC with a typical amplifier circuit configuration.

Single Chip IC

Several methods are used to build IC's; however, silicon is generally used as the basic material. A monolithic IC is one built using a single crystal of silicon as shown in fig. 1. Both the active and passive devices which are desired to make a particular IC are created by injecting various impurities into windows which are formed in the oxide coating on top of the silicon crystal. Direct interconnections between elements is made by evaporating some metallic element between the desired points. Although transistors, diodes, resistors and capacitors (the latter being reverse biased diodes) can be produced by this process, there are several disadvantages. Distributed diodes, because of the silicon base, literally interconnect all the devices. The range of values for the passive devices is also fairly limited.

Multiple Chip

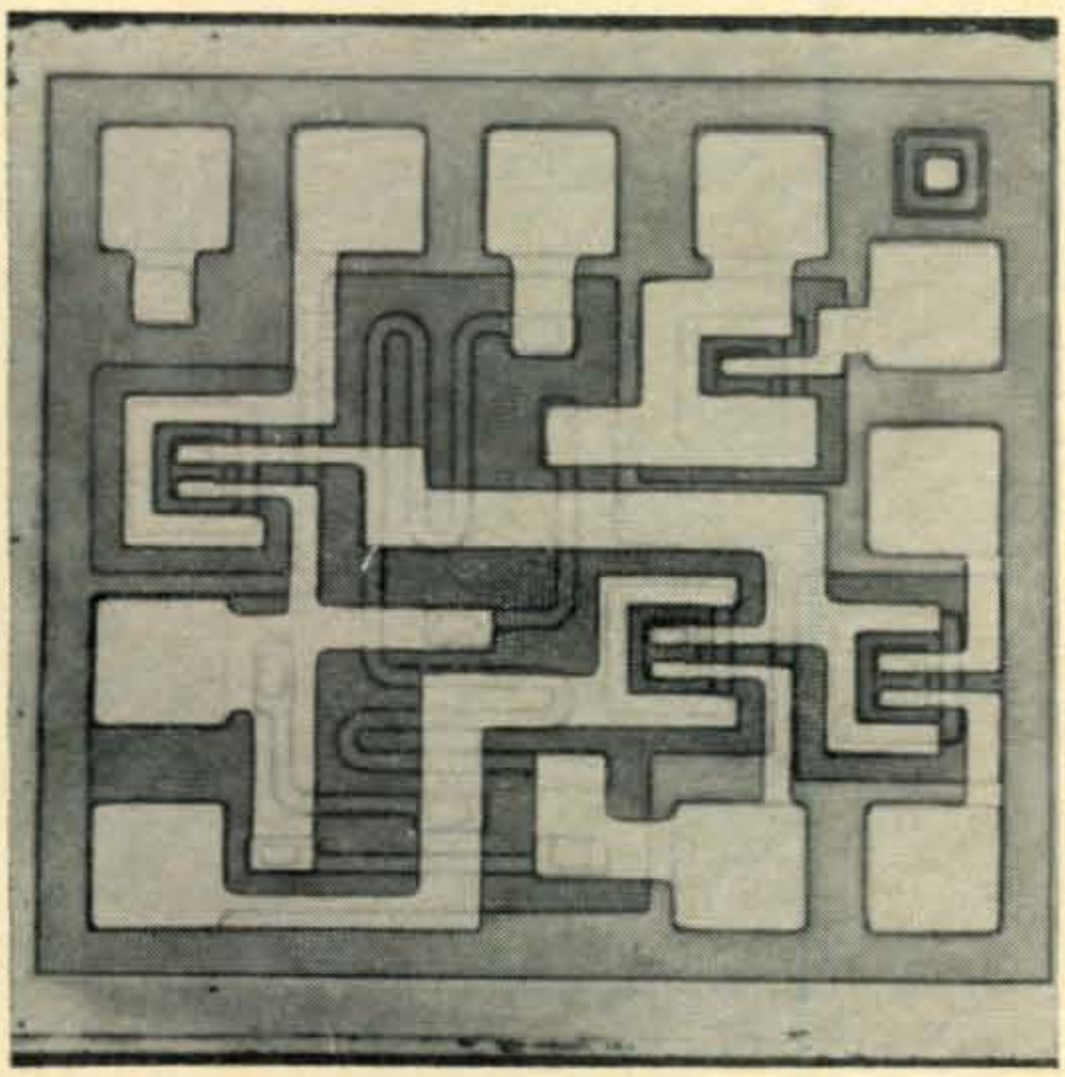
Some of the disadvantages of the monolithic or single "chip" IC are overcome by multiple chip construction. Simply, a multiple chip IC is one built up using what are in effect a number of single chips on a insulating base. Thereby, much more complicated IC's can be built than would ever be possible with a single chip. The limitations on the values of the passive components still exists, however.

A greater range in the value of passive components can be obtained by thick-film or thin-film techniques. These techniques are not new but have been used for years to produce miniature RC components for use in hearing aids, etc. The series of Sprague printed circuits, for instance, have been used at times in amateur equipment designs. With thick-film construction, the materials used to build up the resistors, capacitors and interconnections are silk-screened on an insulated base with dielectric material and thickness chosen to produce the desired breakdown voltage characteristics. Thin-film construction is somewhat similar but the materials used to build up the circuit are evaporated and then condensed on the insulated base through masks. Both techniques allow the construction of passive components in ranges approaching those of discrete components (resistances of megohm value and capacitors to about .005 mf).

Most IC's produced use some combination of the above techniques to achieve the best trade-off between cost, manufacturing ease, etc. For instance, an IC might consist of a monolithic chip plus thin-film passive elements or it might consist of multiple chip active components, thin-film resistors and thick-film capacitors.

IC Package

The size of IC's pretty well defies the imagination. An actual IC containing dozens of transistors and resistors may be no larger than a few hundreds of an inch square and requires a microscope to examine. However, since a practical means has to be provided to use the circuit they are usually placed in a normal transistor-size metal case or epoxied together with connection studs for external wiring. The photograph of the Motorola IC, for instance, shows one very



IC internal layout on a chip showing interconnections between passive and active elements.

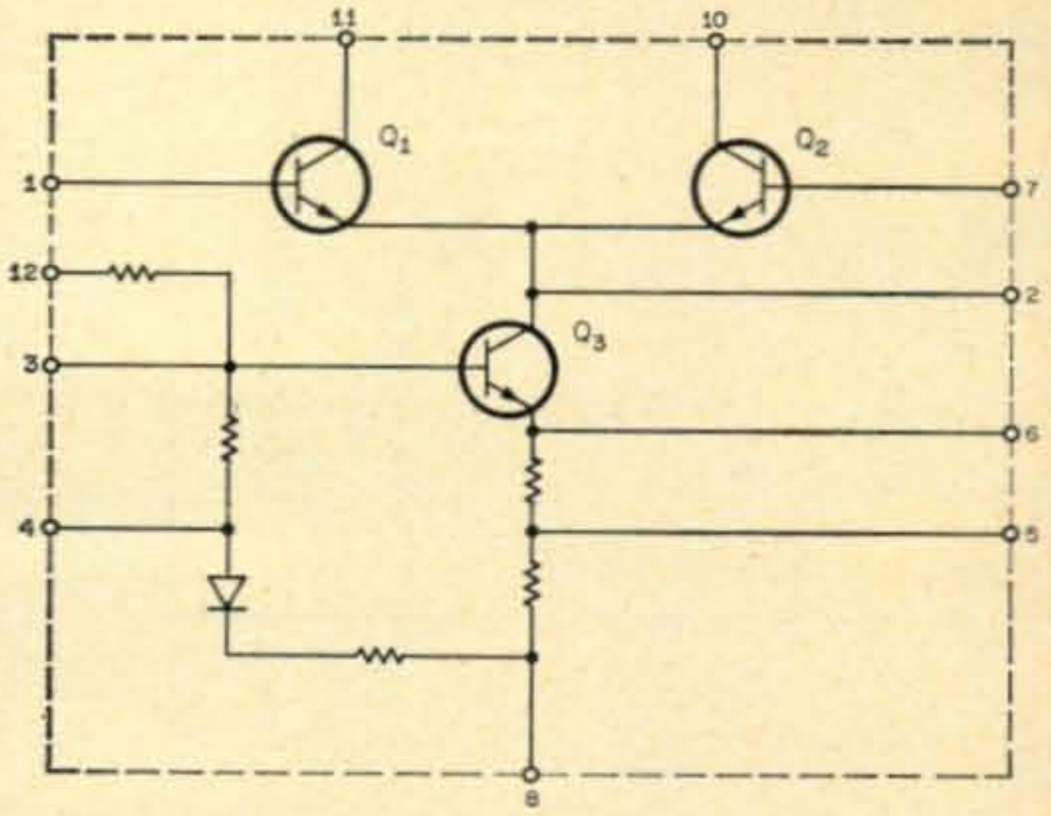
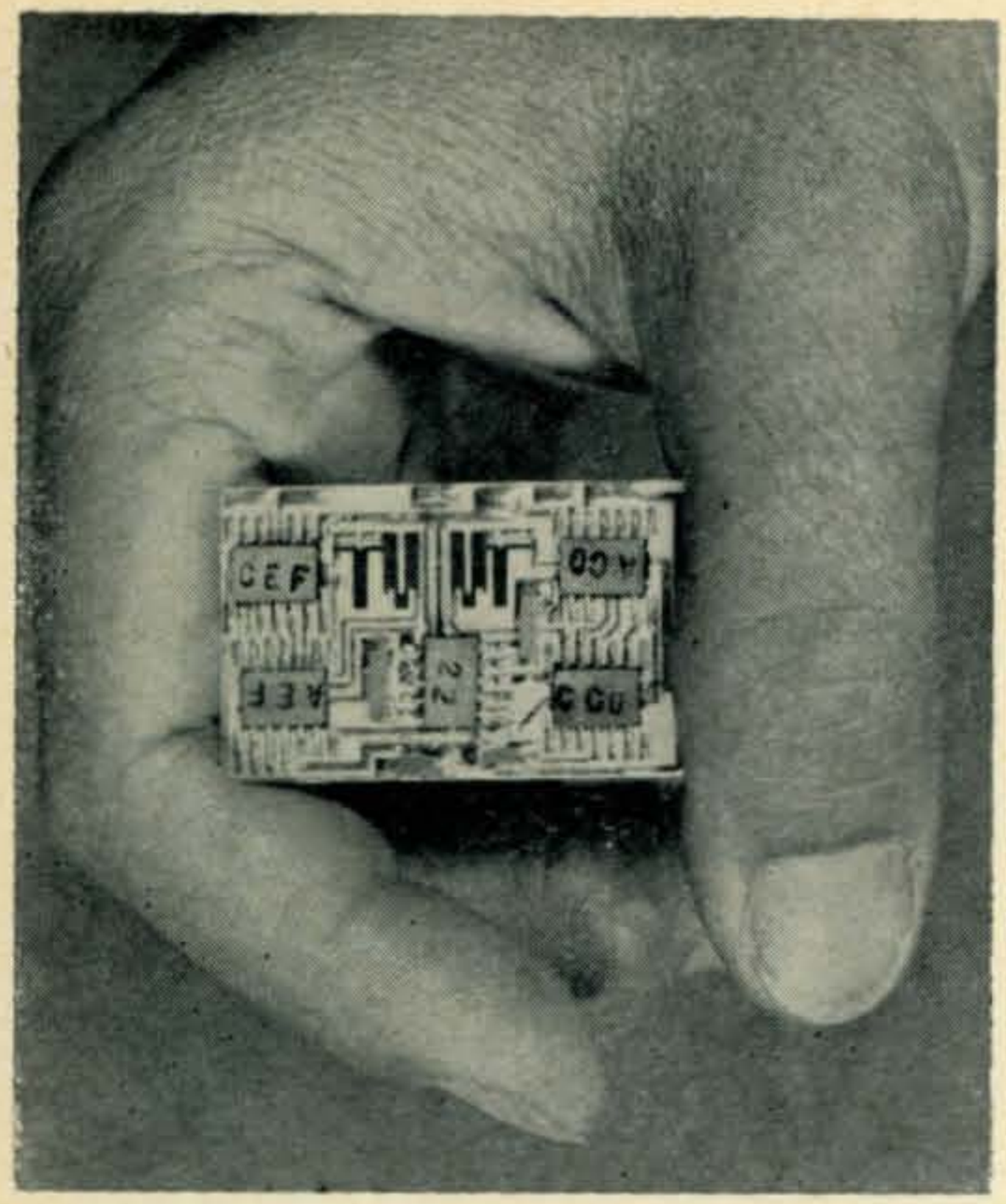


Fig. 3—The single RCA CA3005 IC can be used for a variety of stages in a receiver as shown in fig. 4.



This tiny item is a complete 455 kc i.f. amplifier produced by the Sprague Co. It contains 5 IC units (in the rectangular blocks) as well as microminiature discrete components.

common mounting case—the standard TO-5 size transistor size. No standardization exists as to the external connections used.

Originally IC's were mainly produced for digital type applications, such as computers, where an on-off or other simple switching functions were required. These functions allowed wide variations in IC properties and the switching speeds were high enough so no large capacitors are required. The improvement in manufacturing techniques which has taken place in the last two years has allowed IC's to be produced to carefully controlled tolerances and produced the so-called linear IC. The linear IC can be used wherever a continuous gain function is employed-r.f., i.f. and a.f. amplifiers and oscillators.

A simple IC circuit might appear as in fig. 2,

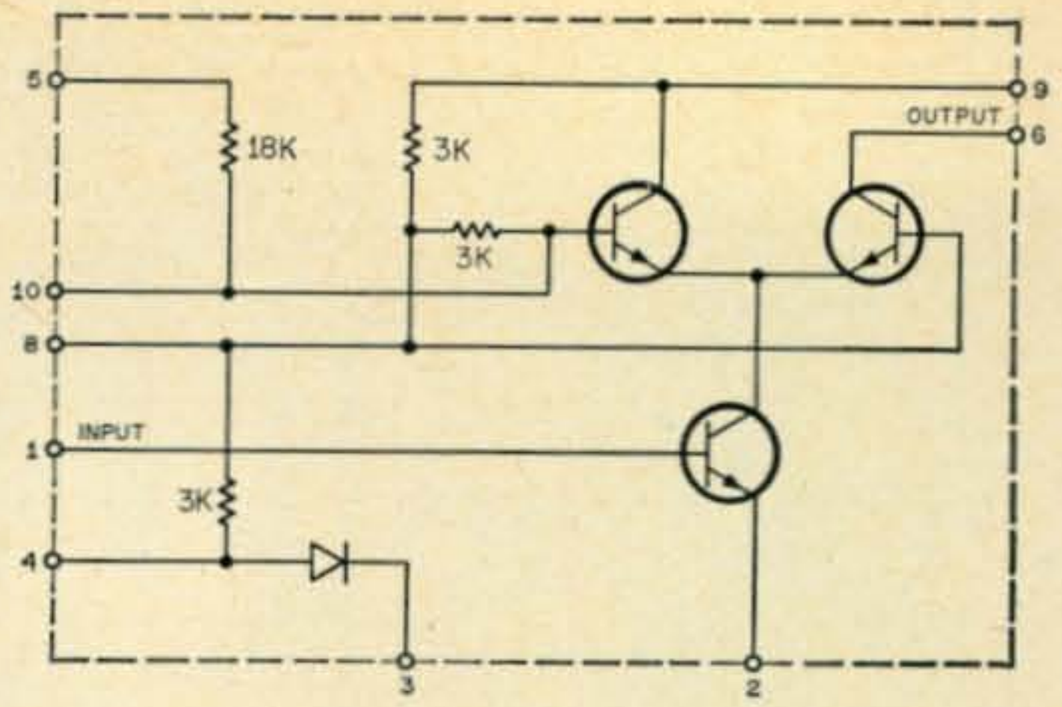


Fig. 5—The Motorola MC1550 IC is also designed for use as an r.f./i.f. amplifier.

a simple two stage transistor amplifier. It could be used as an r.f. or a.f. amplifier with the bandwidth being determined by the external components in the stage (transformers, bandwidth filters, etc.). Most IC's, however, tend to look a little unusual in their configuration to someone used to discrete component circuitry. One example is the RCA type CA 3005 IC shown in fig. 3, consisting basically of a differential amplifier (Q_1 and Q_2) whose emitter currents are regulated by the control transistor Q_3. Some of the very versatile ways in which this IC can be employed is shown in fig. 4 where it is shown connected as an r.f. amplifier, converter or i.f. amplifier. The sensitivity of the r.f. stage is about 3 microvolts and the noise figure less than 8 db.

Fig. 5 shows the schematic of another IC, the Motorola MC 1550, which is similar to the RCA IC and can be used as an r.f. or i.f. amplifier. As an r.f. amplifier it can provide 30 db of gain with a noise figure of 5 db at 60 mc. Philco, Westinghouse and Sylvania also manufacture similar units. RCA also produces an interesting IC (CA3014) for use in TV receivers. It contains 2 i.f. stages, a limiter, current regulator, discriminator and low level audio stages. Basically only the i.f. transformers must be connected to the IC to complete the chain of stages.

Many manufacturers also produce IC's in-

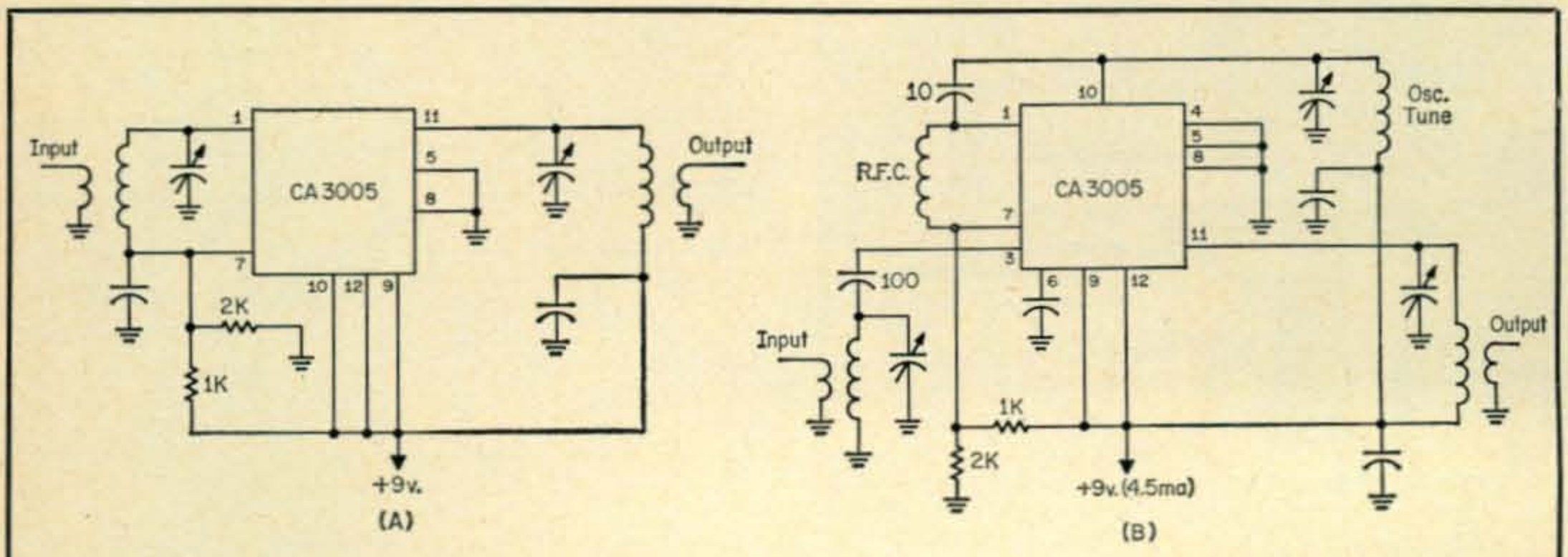


Fig. 4—The RCA CA3005 IC can be used either as an r.f. or i.f. amplifier (A) or as a complete converter stage (E). Like most other transistor circuits, except those using FET devices, crosemodulation can be a problem with high input signal levels. A variable r.f. attenuator before the input is one method to reduce such effects.

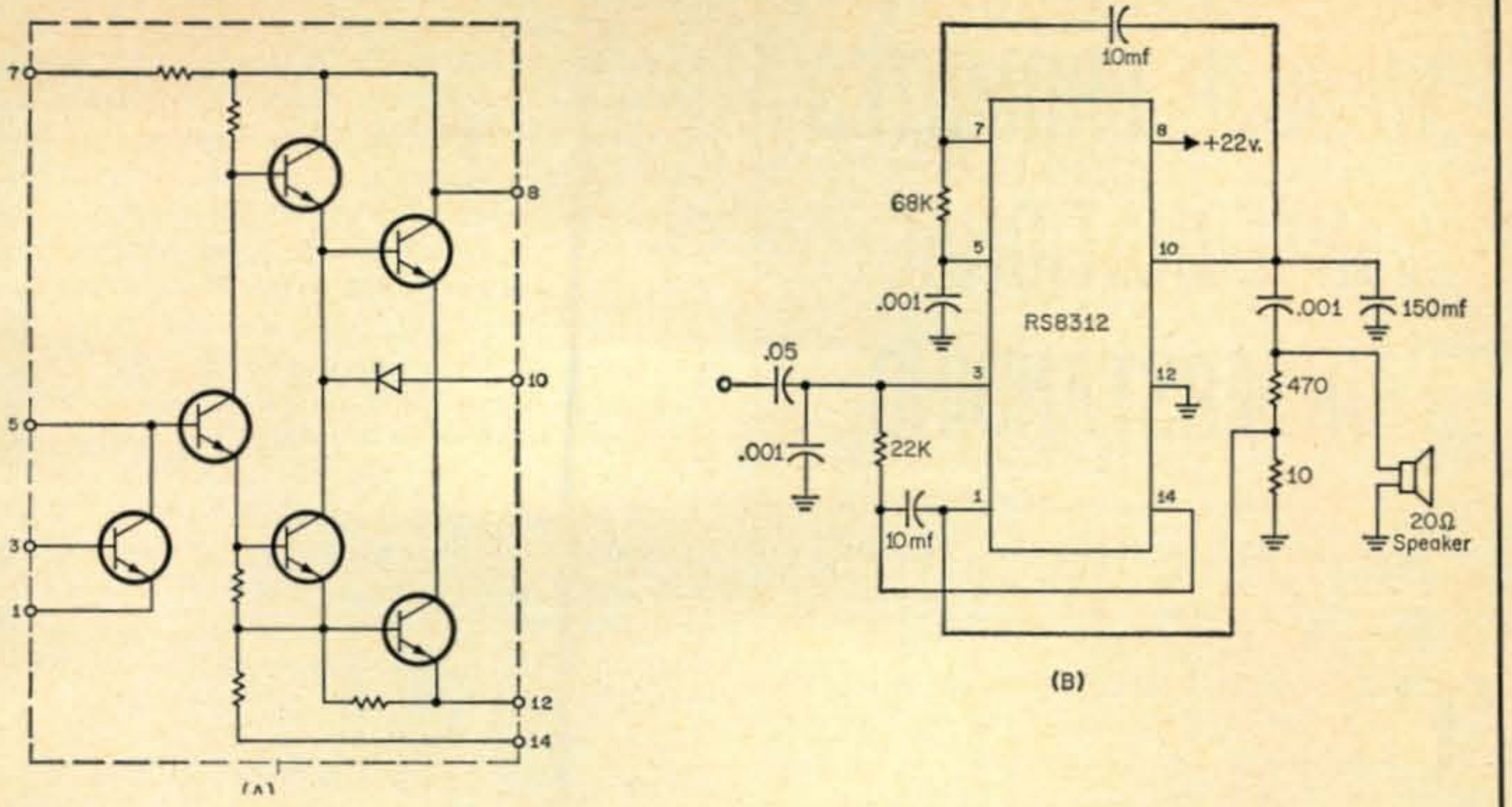


Fig. 6—The General Electric RS8312 looks somewhat complicated in its internal configuration (A) but with simple external connections (B) it can be used as a complete low-level input audio amplifier and will produce a 1 watt output.

tended for audio amplifier applications. Perhaps one of the most interesting is the General Electric RS8312 which is used in one of their phonograph models. As shown in fig. 6, it is a complete audio amplifier which produces 1 watt output. The IC itself measures about ¼ x ¾" and could be used, for instance to replace the audio stages in most amateur receivers.

Future IC

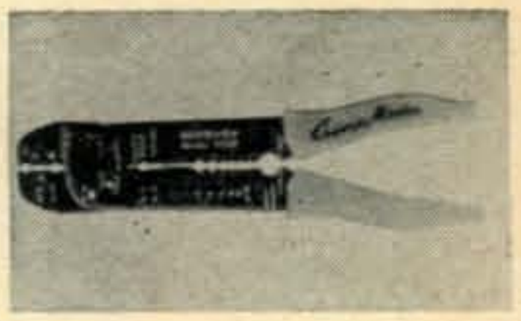
Further IC development is continuing in many directions. Forty watt linear amplifier IC's, for instance, will be available soon. The manufacturing problem of producing inductances of reasonable Q may be overcome by utilizing the inductive effects which certain transistors exhibit. Although some IC applications are several years off, their present usage in a number of consumer products—a.m. radios, TV's and phonograph amplifiers—augurs for their early incorporation in amateur equipment as well. Several miniature transmitter/receivers have been built for military applications which use IC's throughout.

The price of individual IC's in single unit quantities varies over a wide range from perhaps $15 to $2. A very rapid decrease in prices, similar to that which transistors showed, is expected in the next few years as IC's find wider application. It is quite likely that in a few years that an audio amplifier IC will be as expensive as a single audio type transistor is today.

The use of IC's will allow amateurs to build equipment of more complexity in a smaller space than ever before. Eventually it will also allow such construction to be done more cheaply than if discrete components were used. The proper use of IC's will also force those who like to experiment with circuit design to stop thinking of discrete component interconnections to achieve a stage function and instead to think of interconnecting the response characteristics of individual IC's, modified by external discrete components as necessary, to achieve a desired power level, bandwidth characteristic, and so on. ■

New Amateur Product

Aerovox



THE Distributor Division of the Aerovox Corporation has announced a new universal "Crimp-Master" terminal attaching tool Model 10002 which boasts many other uses. The Crimp-Master can be used to attach both insulated and non-insulated terminals with all wire sizes from 22 to 10. It also will attach ignition terminals, strip wire sizes from 10 gauge to 22 gauge, and cut all bolts from 4-40 to 10-24 in diameter. It has insulated handles. The Model 10002 sells for $5.99. For more information write to: Aerovox Corp., Distributor Sales, New Bedford, Mass., or circle 64 on page 110.

WA8CJP PROMOTES INTERNATIONAL UNDERSTANDING

LOUISA B. SANDO,* W5RZJ

THROUGH our hobby of amateur radio YLs and OMs the world over help foster international understanding by DX QSOs, emergency work, message handling, and the friendships and exchanges that often result. International understanding and goodwill also can be ideally fostered by personal contacts, and many such personal visits are being arranged by the Association for World Travel Exchange. This is a non-profit organization formed in 1952 to provide hospitality exchanges between North America and other countries of the world.

Hostess for Central Ohio for AWTE is YL Ruth Williamson, WA8CJP. Ruth and OM Vincent have made this a real hobby and since August 1963 they have placed 200 foreign guests with forty families in the Ashley, Ohio area. Guests have been from Iran, Switzerland, Italy, England, Denmark, Norway, Sweden, Finland, New Zealand, Holland, Germany, Austria, France, Nigeria, India, Brazil, Belgium, Tanzania, Korea and the Soviet Union. The only ham among the visitors to date was DJ7YO.

A visit by a group of 27 Russians—all University professors of English in their homeland —last summer marked the first time these Russians had the opportunity to visit in individual homes. Earlier stops on their 2,000 mile trip from Georgetown University in Washington, where they were studying, had been at hotels. On this occasion some seventeen families of the community held a covered dish supper for the visitors at the Ashley School where the Russians met their hosts for the night.

At the same time the Russians were in this country, 27 American teachers of Russian were in Russia as part of the Summer Exchange, Institute of Languages, which for the last two years has been conducted by Georgetown University.

Prime purpose of the visits in American homes is to dismiss misconceptions that foreigners have about life in America, and also the misunderstandings that Americans may hold concerning other countries.

Ruth comments, "Lasting friendships through the exchange of ideas and concepts with citizens of other nations provide the impetus to further world friendship, which in turn, can provide the foundation for lasting peace. A valuable contribution can be made toward improving international understanding if more hospitality tours can be arranged throughout the world. I hope and trust that the influx of people and ideas from every land will continue to be welcome and will serve to further strengthen and enrich the fibre of American life throughout every age."

Besides her AWTE activities Ruth is a busy mother of four, and a registered nurse who works in a doctor's office, and she still finds time for amateur radio. WA8CJP began with a Novice license in 1963. She checks into two Navy MARS nets and is editor (and printer with help of Maxine, WA8ALT) of *The Log*, club paper of the Marion VHF Highbanders. Ruth holds an ARRL Public Service Award for her work when a tornado passed through the Ashley area on Palm Sunday in '65, during which time Ruth dispensed both nursing aid and communications help at the tornado disaster scene using her mobile rig. The only ham in her family, Ruth loves to build gear as well as to operate.

Ruth has served as treasurer of the Buckeye Belles (and it was thanks to *The Buckeye Burr* that we learned of Ruth's many activities). She also is active in YLRL, operating W8YL during the '64 Columbus convention.

The four Williamson jr. ops are Madeline, who is completing her sophomore year at Ohio Wesleyan Univ. majoring in music and is on the Dean's list; John, 14, an honor student who at 6'2" is high point player on his basketball team; Wayne, 12, who enjoys most all sports, and Elaine, 6, just starting school.

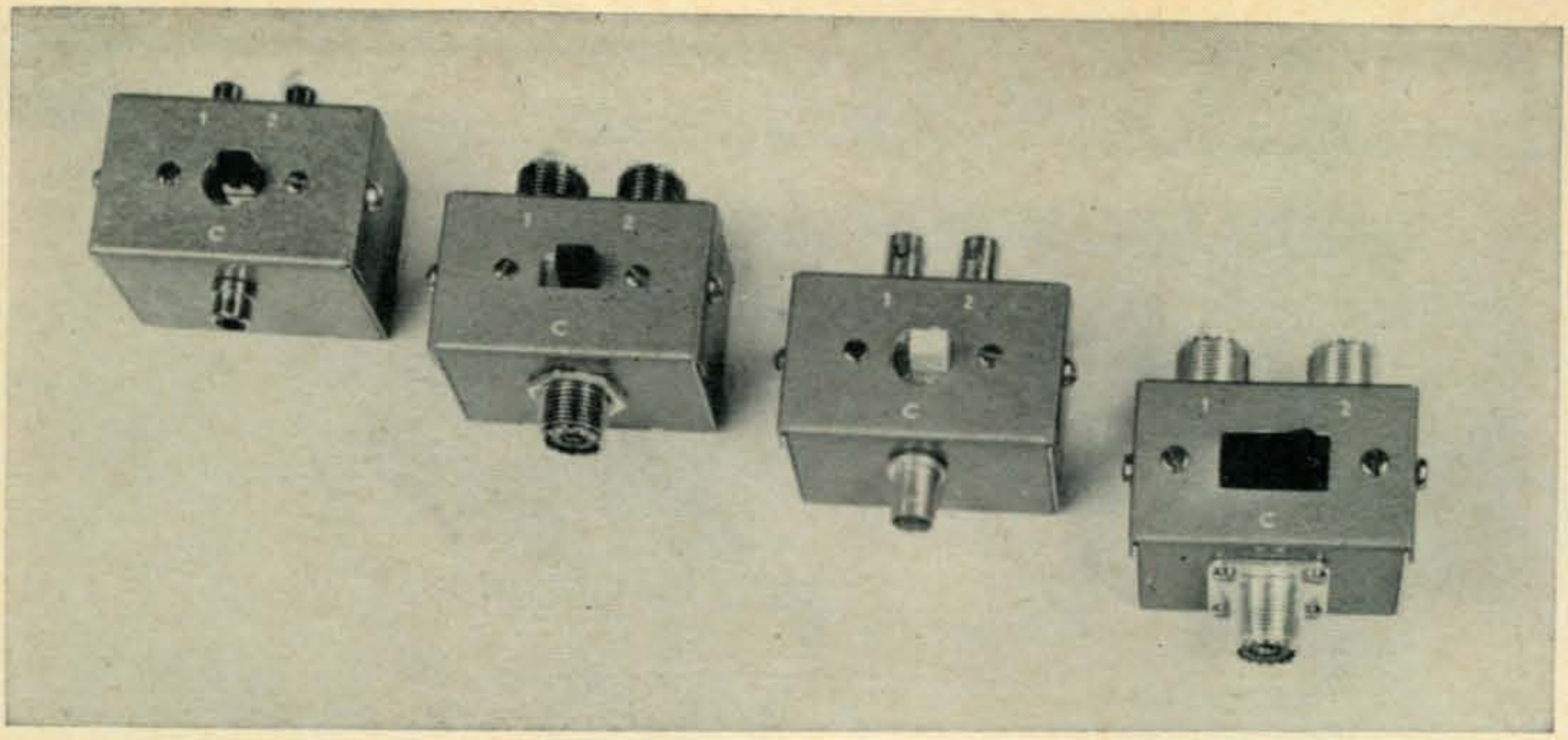
A family hobby is traveling and Ruth figures they have tented over 6,000 miles on vacations. A new "HI-LO" trailer family Christmas gift will be used for future trips, to Mt. Rushmore this summer, they hope, and to YLRL's 5th International Convention at Denver in 1968.

Congratulations, Ruth, and keep up your good work!

Anyone interested in working with the Association for World Travel Exchange can contact this organization at 38 West 88th St., New York, N.Y. ■

WA8CJP, Ruth Williams, loves to build gear as well as operate. Her second hobby is placing foreign visitors in homes in the Ashley, Ohio, area, as Central Ohio hostess for the Association of World Travel Exchange.

*4417 - 11th St., N.W., Albuquerque, New Mexico 87107



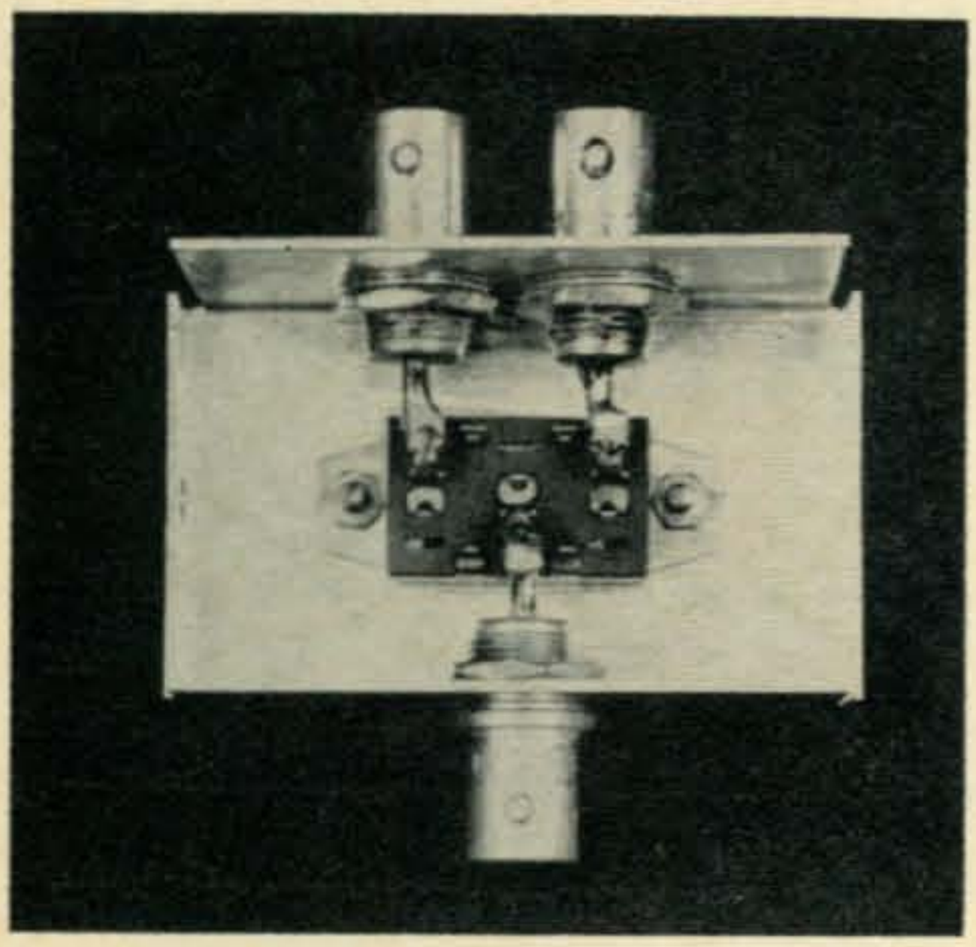
A variety of Finger-Tip coax switches constructed using rocker or slide-type switch elements and UHF, BNC or phono-type connectors.

Finger-Tip Coax Switches

BY WILFRED M. SCHERER,* W2AEF

THE Finger-Tip coax switches are simple and inexpensive jobs for service up to at least 144 mc and with r.f. power up to 1 kw. Designed for table-top and portable use, they are made up with a rocker-type or slide switch element which may be easily operated with one finger, and unlike conventional rotary-type coax switches, they do not have to be fastened down to allow operation without holding them in place by hand. They also are very small and can be placed within easy reach at the operating position or wherever it may be convenient to run the associated coax cables.

*Technical Director, *CQ*.



Internal wiring showing terminals of slide-type switch soldered directly to connectors (in this case, type UG-625/U BNC).

These compact switches should find many handy uses around the ham shack for switching antennas, dummy load, exciters, linear amplifiers, receivers, etc. On the bench, in the lab or in the field they will be found most convenient for use where portability and ease of handling are desired for not only most normal operational functions, but also for many test applications such as those that may require switching equipment back and forth between test gear or antennas for performance comparisons.

The Finger-Tip switches are s.p.d.t. jobs and thus are limited to two working positions; however, they are low enough in cost to make it feasible to cascade one or more units for additional positions or to use two separate units where dual transfer circuits are required such as for switching between exciter and linear-amplifier operation. Some typical arrangements are shown at fig. 1. An alternate transfer-switch affair, for more convenient handling with two rocker-type switch elements mounted in one case, is shown at fig. 2.

Construction

The construction of the Finger-Tip switches is illustrated in the photographs. The rocker-type switch is the type that operates a small high quality slide switch (Stackpole type RS-36-1-OB).[1] This switch has silver plated contacts and carries a rating of 6 a. @ 125 v.a.c. and 3 a. @ 250 v.a.c. These ratings primarily concern circuit-breaking conditions, but from them we can deduce that the steady current-carrying capability is at least 6 a. and the voltage breakdown is at least 250 v, enabling the switch to handle 1000

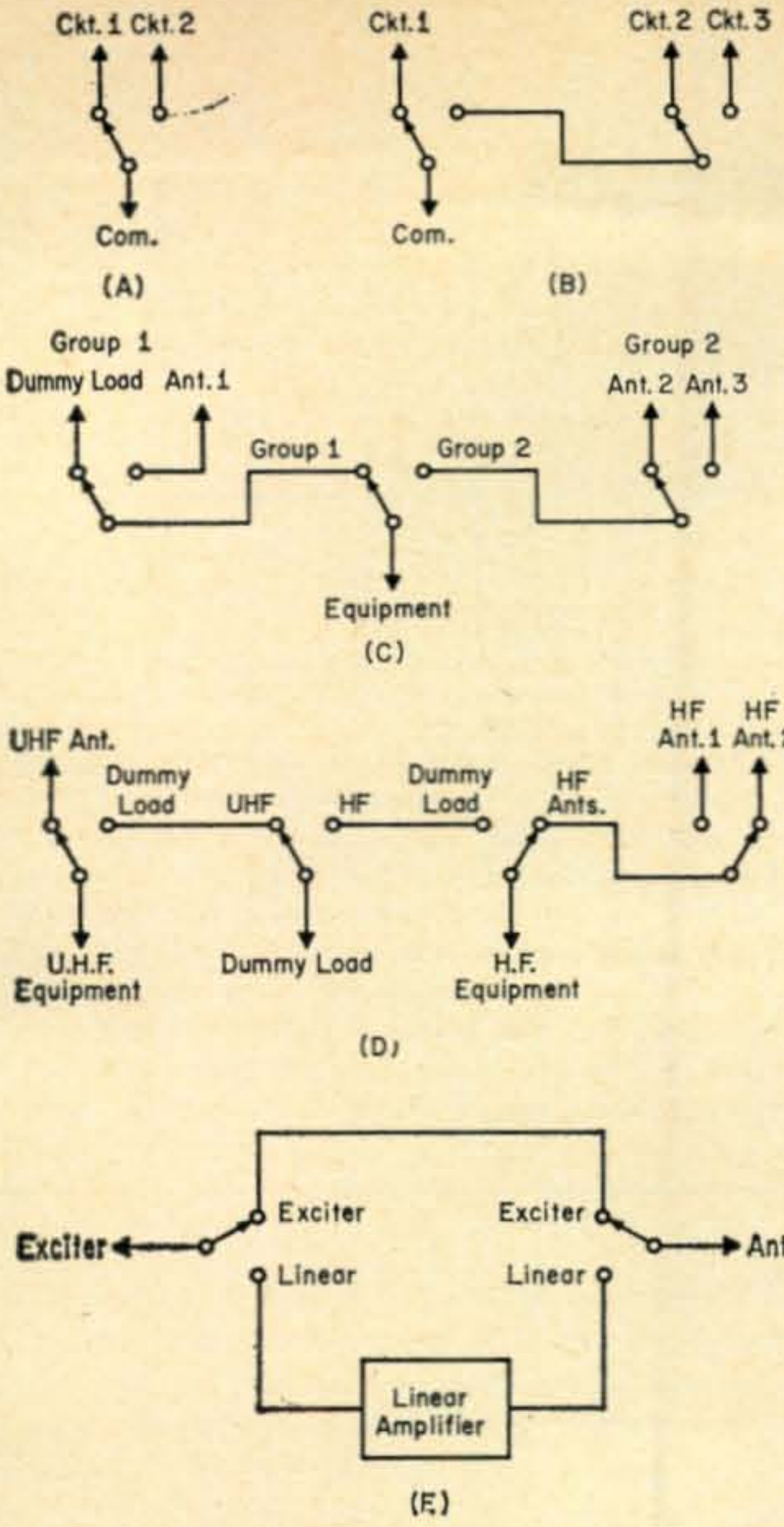


Fig. 1—Method used for cascading Finger-Tip switches for additional working positions in a number of typical applications. (A)—Basic switch circuitry. (B)—Single-pole, three position. (C)—Single-pole, four position. (D)—HF/UHF equipment setup. (E)—Exciter-linear transfer setup.

watts of power on 50-ohm circuits (when the s.w.r. is low). This was found possible even with r.f. as may be seen by the performance results given later.

The units with the standard slide-type switch element use the Continental-Wirt type G624 which also is a 6 a. unit with silver plated contacts and terminals. Type G324, although only a 3 a. unit, was also found to hold up well with 1 kw.

The standard slide-type switch element costs less than the rocker type and usually will be easier to locate, but the latter is more impressive looking and handier to operate. On the other hand, the performance of the *specified* slide type is somewhat better, particularly in the u.h.f. range as indicated by the performance measurements.

The Finger-Tip switch is built in a 1½" × 1⅜" × 2¼" aluminum box.[2] Although a larger box may be used, it is recommended that it be kept as small as possible in order to allow short leads to the connectors. The specified box is an interlocking type which was selected not only for its small size, but also because the folds of each section, unlike those of the mini-type boxes, allow the desired orientation of the components when the box is placed right-side up.

The connectors should be located so that their hot terminal clears the switch-element body and yet where they are close enough to allow the switch tabs to be bent toward and soldered directly to the connector terminal. In order to make it easier for the builder, locating dimensions for various type connectors and switch elements are given at fig. 3.

Connectors may be the SO-239 UHF, UG-625/U BNC or phono-jack types as need dictates. For our lab use, we made several models with various type connectors to meet most situations. These are shown at the photos. Even though the phono jacks are of the ordinary variety, their performance was found to be as good as the more sophisticated connectors, but if

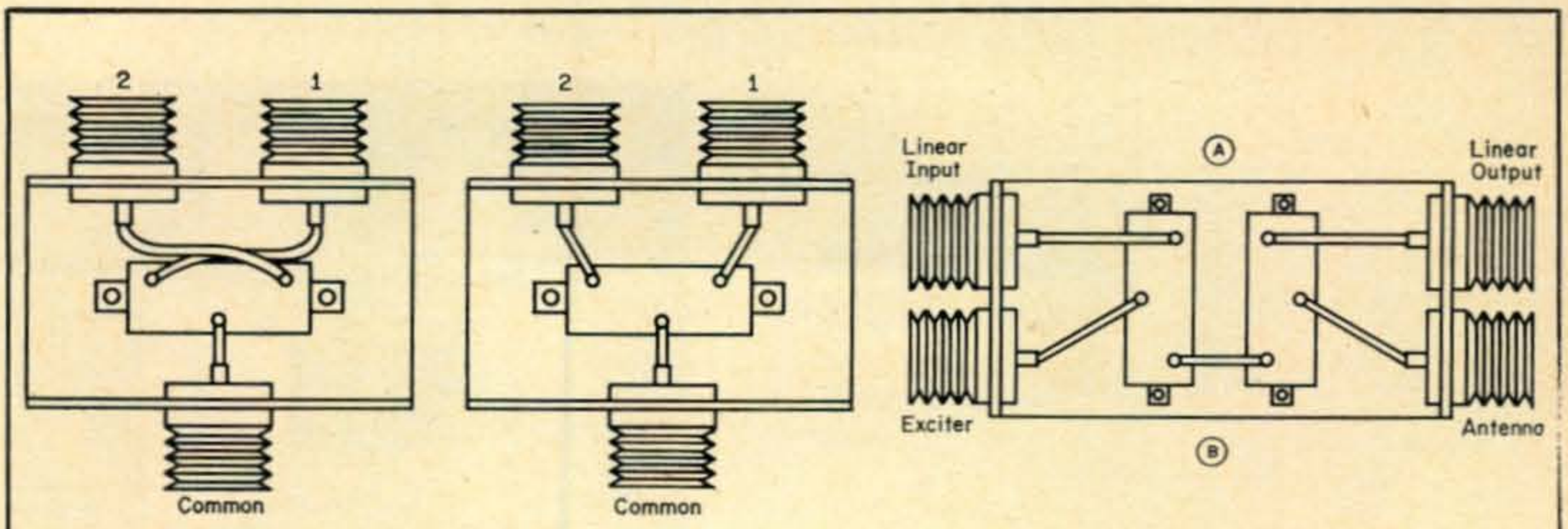


Fig. 2—Wiring layout for Finger-Tip coax switches. A—Arrangement with rocker-type switch. B—Arrangement with standard slideswitch. C—Wiring for two rocker-type switches installed in one box for exciter-linear transfer. When the box is rolled over, side 6 will be positioned where A is now indicated and depressing the rocker-switch arm toward B will engage the linear amplifier. Use 3¼" x 2⅛" x 1⅝" minibox.

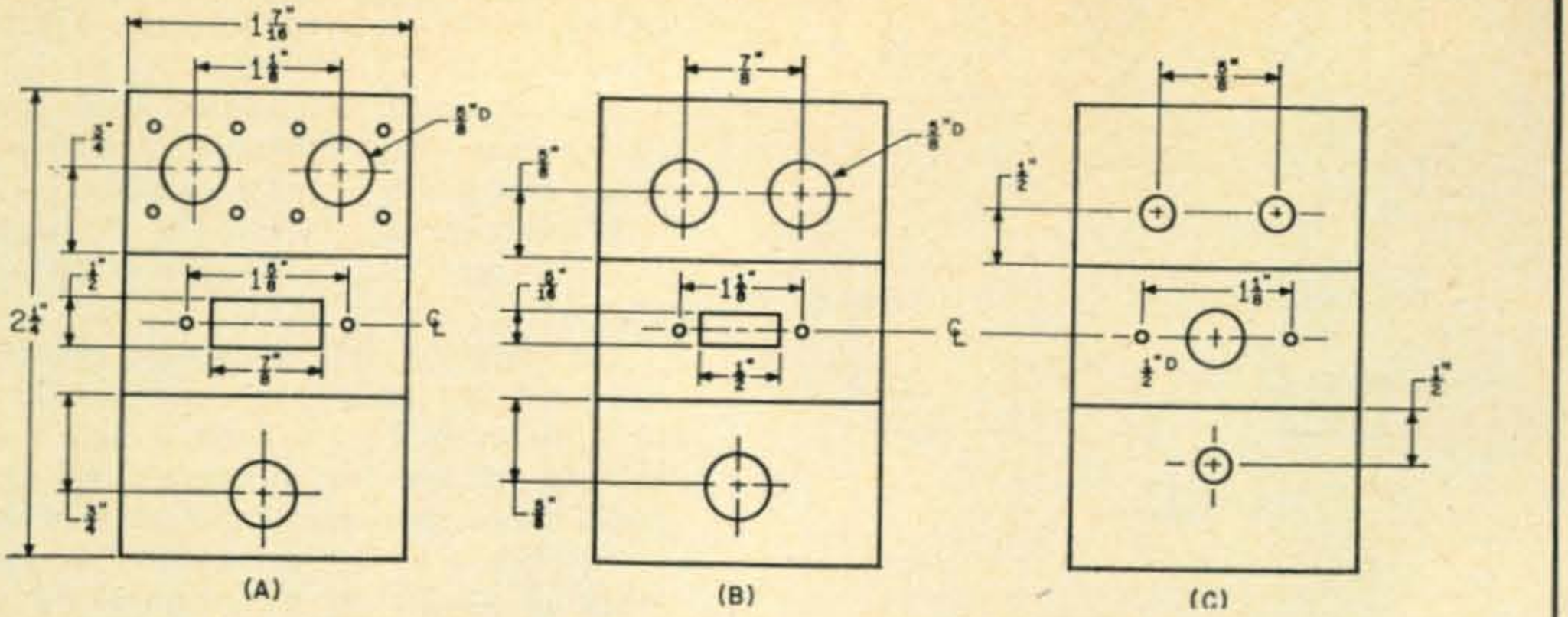


Fig. 3—Dimensions for locating connector holes and switch cutouts of the Finger-Tip switches as constructed in LMB M-00 boxes. The drawings are shown in a flat plane with the top panel of the box represented by the center section; the sides by the adjoining sections. The switch cutout should be centered in each case. The single hole in one side also should be centered between the edges of the corresponding side of the box. (A)—For rocker-type switch and SO-239 connectors (flange of single-hole mount). Screw holes for flange mounting may be located using a connector for a template. Drill these mounting holes with #42 drill and use #4 self-tapping screws. For switch-mounting holes, use #30 drill. Install switch with #4 screws and nuts. (B)—For conventional slide switch and SO-239 connectors. (C)—For conventional slide switch and phono jacks (¼" dia. holes) or UG-625/U BNC connectors (⅜" holes). Note alternate slide-switch cutout which may simply be a ½" diameter hole.

you're a bit finnicky, you might use the Switchcraft type 3505F which are nylon insulated for r.f. use.

SO-239 connectors for single-hole mounting[3] are a little more costly, but make a neater appearance and are easier to install than the flange-mount type. If they are used in a rocker-switch unit, the length of the terminal for the common connector will have to be shortened, because of inside-space limitations.

It also should be noted that for convenient circuit identification when the rocker switch is used, criss-crossed wiring must be made between the switch terminals and the connectors, to enable the depressed side of the rocker arm to correspond with the connector locations. Large size wire should be used.

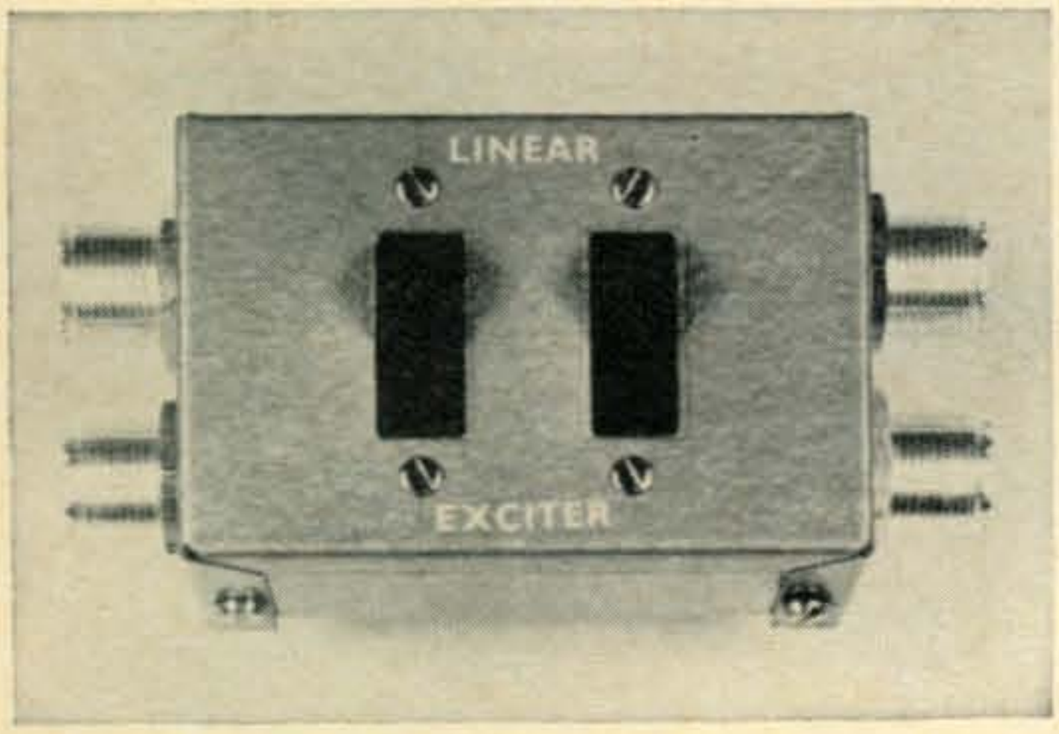
If it should be desired to permanently mount a Finger-Tip switch, such as on a wall, holes for mounting screws may be drilled on the rear of the switch box. This section of the box may be first secured, after which the half with the switch components may be slipped on it.

Performance

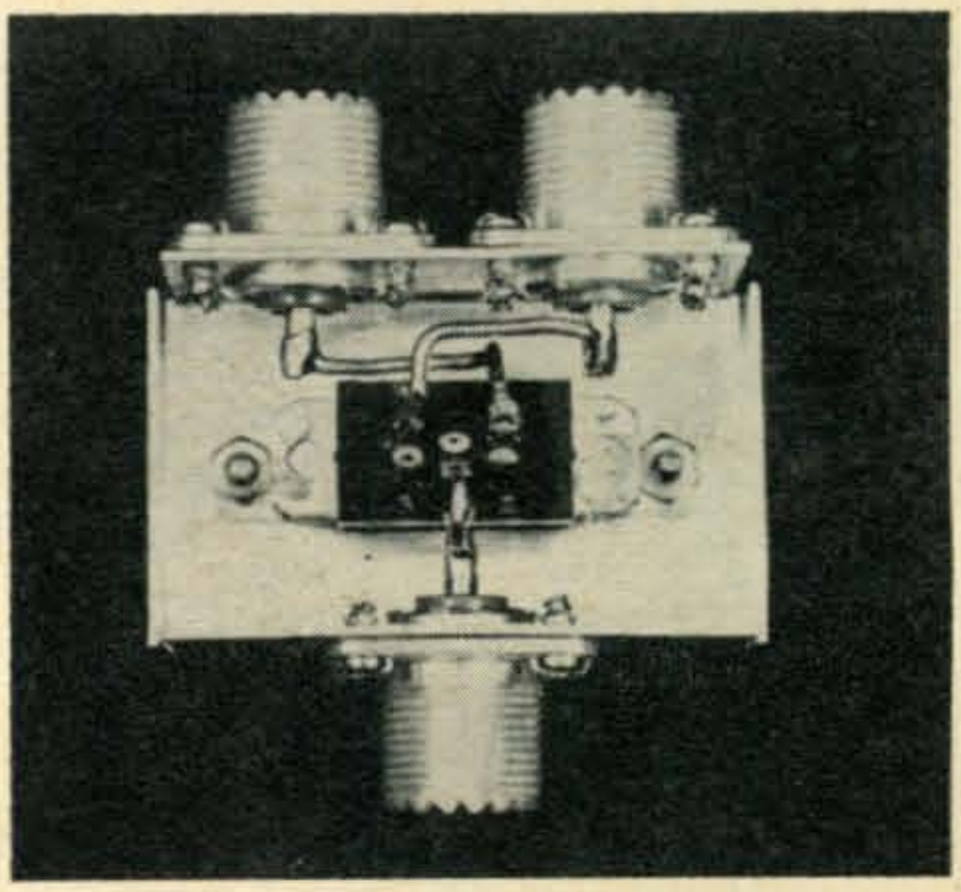
Surprisingly enough, measurements and on-the-air operation of the Finger-Tip switches (including the phono-jack types) have indicated performance equal to or better than many of the conventional "coax" switches[4] and lead to the suggestion that you "don't sell the lowly slide switch short".

The test results are as follows:[5]

[*Continued on page 100*]



Finger-Tip transfer-type coax switch with two rocker-switch elements. The antenna connector is at upper right with the one for linear-out below it. At upper left is the exciter-out connector with the linear-input one below it.



Internal view showing criss-crossed wiring of rocker-type switch as explained at fig. 2 and in text.

A SIMPLE SEMI-BREAK-IN SYSTEM FOR PHONE AND C. W.

BY RICHARD E. FAST,* WA1EBU

THERE are still many amateurs on the air today using inexpensive transmitters and receivers not having automatic antenna switching built into the units. If you fall in this category the circuit shown in fig. 1 is the answer to smooth c.w. and phone operation. If you already own a commercial antenna relay the cost is small; if not, 20 dollars should easily cover the cost. All parts are readily available; in fact, most will probably come out of the junk box we all own.

Circuit Operation

Here's how the circuit operates. The plate current of V_1 controls relay K_1. The plate current of V_1, in turn, is controlled by the setting of R_2. Control R_2 is set so that with no voltage applied to the control grid K_1 just drops out.

When used for phone operation, audio (about 2 volts from the speech amplifier) is fed to CR_1 and the rectified voltage appears across the C_1-R_1 combination. The voltage polarity will be plus at the grid with respect to ground. The increased plate current of V_1 will trigger K_1. Relay K_1 will trigger K_2, an antenna relay.

For c.w. operation the key is connected to the circuit through CR_2. When the key is closed the voltage from the 1.5 volt battery is applied to the grid of V_1 driving it positive. Again, K_1 is activated triggering K_2. The function of CR_2 is to keep any positive voltage from the keying circuit (cathode keying) out of the V_1 grid circuit.

If the transmitter is grid block keyed then CR_2 should be connected as shown by the dotted lines or the negative voltage may cut off V_1 preventing K_1 operation.

Muting

If the antenna relay used has muting contacts then K_1 can be a s.p.s.t. If the K_2 relay does not have auxilliary contacts then K_1 should be a d.p.d.t. with one section used for receiver muting.

Construction and Adjustment

The entire unit can be built into the transmitter or in a minibox and mounted on the rear near K_2. B plus and filament voltage can be picked up from either the transmitter or receiver as the power requirements are small.

Initially, R_2 is adjusted with no signal or voltage at the grid of V_1 so that it just drops out. Control R_1 adjusts the length of time K_1 remains closed. The values shown will keep K_1 energized for a maximum of about 5 seconds (R_1 set at 50K).

On phone operation R_1 will control the release time while R_2 will adjust the sensitivity. The setting of R_2 will be determined by the value of the B plus and the sensitivity of K_1.

The adjustment of R_1 will vary for different keying speeds. If you are sending slow set R_1 for a longer time constant. ■

*320 East 15th Street, Idaho Falls, Idaho.

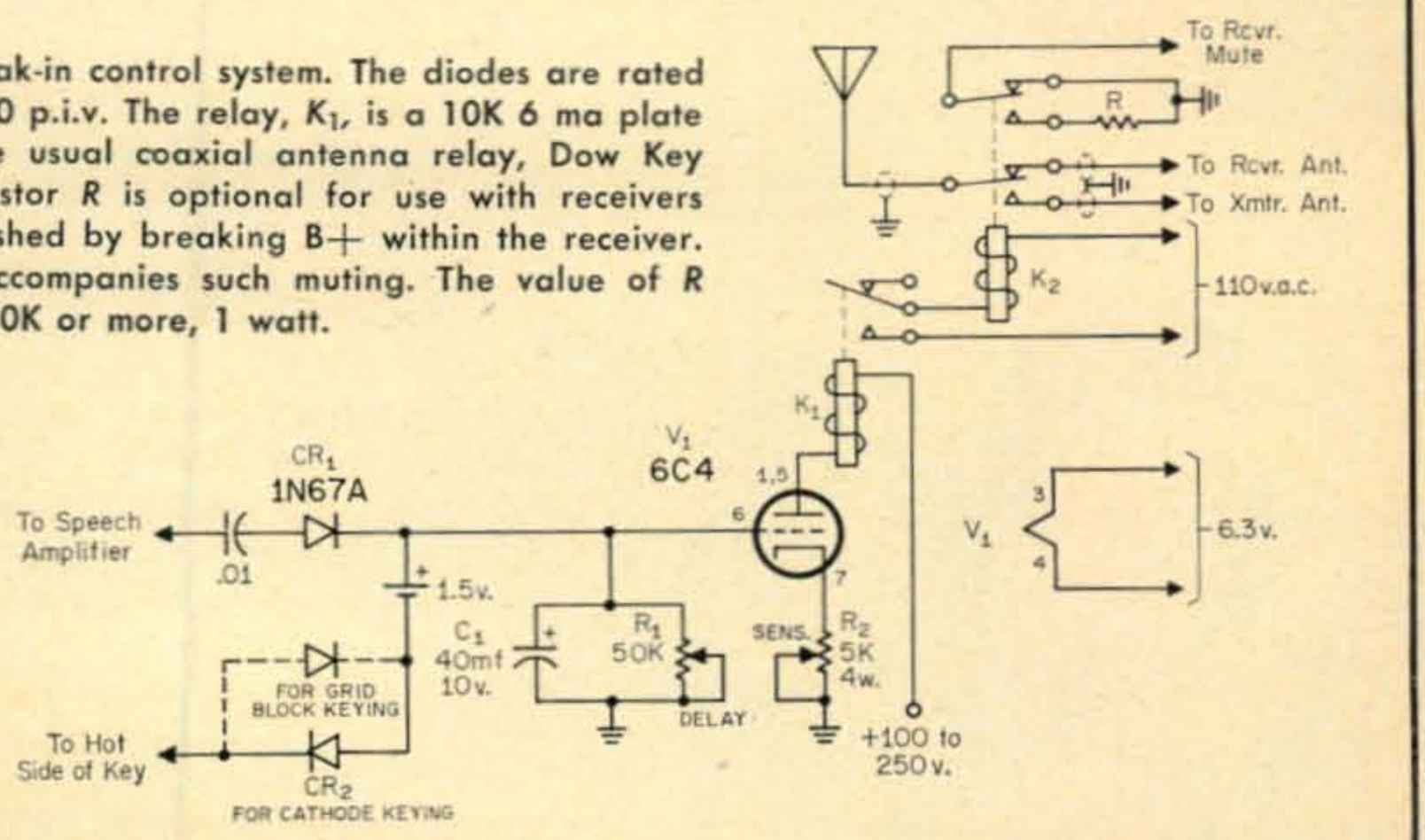


Fig. 1—Circuit of the break-in control system. The diodes are rated for at least 100 ma at 200 p.i.v. The relay, K_1, is a 10K 6 ma plate type relay and K_2 is the usual coaxial antenna relay, Dow Key DK60 or equivalent. Resistor R is optional for use with receivers where muting is accomplished by breaking B+ within the receiver. A loud "pop" usually accompanies such muting. The value of R may be on the order of 50K or more, 1 watt.

International Mission Radio Association News

BY TOM AQUINAS COX, O.F.M. CAPUCHIN W2CBX*

I would like to express my thanks to those of you who found time to respond to previous articles in *CQ*. I appreciate your interest in and your good wishes for IMRA. We are glad to have you with us.

IMRA, as I have said before, wants to serve people who are dedicated to the betterment of their fellows. We want to provide these overseas workers with radio communications and equipment. The members of IMRA feel this service will promote the cause of amateur radio while supplying the needs of others. It is not too late for you to join with IMRA. Not only would we like to have you with us, we need you. Do your part for amateur radio and for people in overseas service by participating in IMRA activities.

Last month I mentioned briefly the two IMRA communications service systems already established. They are both operational on the same day and time, Wednesday, at 1830 GMT, but on different bands, 14.270 mc and 21.393 mc. These systems are designed to supply phone patch or other communications services for stations in Latin America.

There are many State-siders south of the border working with our American brothers. There are teachers, doctors, clergymen, social workers, Peace Corps Volunteers. IMRA wants to help these people in their mission.

A phone patch with ones family or friends means a lot to a man far away from home who is spending his life serving people. To such a man, ham radio brings comfort, news and a sharing of experiences. In the March issue of *CQ*, Lionel Ducharme, VE8OX, told us in glowing terms of the importance of amateur radio as a vital link with the folks back home.

Through its communications service IMRA wants to help eliminate "hit and miss" situations in international third party traffic. How many times have you tuned across the bands and heard DX stations calling "CQ Buffalo," or "CQ Cincinnatti?" With IMRA on the air, these folks overseas, who probably don't have too much time to search for contacts in the States, can be assured of finding a station ready and willing to provide communications service.

Here is another reason why IMRA wants and needs you. The more stations we have monitoring the Service Systems frequencies, the quicker and more efficient will be the service. I don't want to give the impression that we are being overloaded with traffic from Latin America at the present time. However, once IMRA has proved its value, I am sure we will be expanding our service. Help us show the value of this communications service. Join us on frequency if you can.

I would like you to meet a few more IMRA members. These gentlemen are all working in Latin America and will be participating in our communications service.

Down in Peru, we have an old friend and may I add, a wonderful fellow. George Flynn, OA1B, is a displaced New Englander who has been teaching in the city of Piura for the past eight years. You might remember him as K1KOK.

George loves his work in Peru, but I sometimes get the impression he is teaching his students about the Boston Tea Party and Paul Revere. George has been quite fortunate, however, in being able to keep in contact with his folks back home. His good friend and another IMRA member, Syl Connely, W1MD, is able to patch him into his family almost every week. George runs a KWM-1 and a 30L1 on 20 and 15 meters. You'll be able to meet him on the IMRA communications service system from time to time.

Down to the south even further, we have a new comer to IMRA. Padre Joe Ryan, CE1HI. Padre Joe has been working in Africa, Chile and its surrounding area for better than eight years and doesn't know when he will be home for

*Mary Immaculate Friary, Garrison, New York.

IMRA member, Padre Tom Gross, HC1AM, Quito, Ecuador.

good. Home, by the way, for Joe is St. Louis, Mo. He puts a strong signal back into the States on 15 meters. Padre Joe runs a TR4 and uses a Quad antenna. You can find him on the air Sunday afternoons or on the IMRA network. He is always looking for phone patches. It is not that he is attempting to talk with his family all the time, but there are many Peace Corps Volunteers in his area. These folks come from all over the States and Joe likes to help them out with communications when ever he can.

Besides State-side communications, Padre Joe has found amateur radio an indispensable service in his work. He is able to keep in contact with his co-workers both in Bolivia and in Chile. Mail, telegraph, and telephone services are very poor in his area. For example, sometimes it takes two weeks to get a letter from La Paz, four or five days to get a cable, and there just isn't any telephone connection at all.

Often Padre Joe has been called upon to use his rig to arrange immediate shipment of urgently needed medicines. Without Joe and his ability as an amateur radio operator, some dispensaries would have to wait days just to place an order for supplies.

IMRA wants to help Padre Joe and the people he is working with. Joe does have communications ability. His whole community benefits from it. But there are others, who have the skill, but have no equipment. We'd like to do something about that. We want to get equipment for these people. We want to extend the service of amateur radio all over the world.

Padre Joe is on the hunt for a few odds and ends, like six 6JE6 tubes, plus some 15 and 3 amp fuses. He would appreciate hearing from you. Write Padre Joe Ryan, Casilla 787, Arica, Chile.

One of Padre Joe's buddies, Padre Ted Meisner, is over in LaPaz. Ted, CP1EE requested that IMRA establish a communications service some months ago. Now that IMRA services are on the air, look for Padre Ted on Wednesday afternoons. He is on 20 meters, and he runs the Swan 350 with the SB-200. Ted too likes to run phone patches for the other State-siders working with him. He is on the lookout for St. Louis, Louisville, Chicago, Detroit, and Ontario. With this one station, Ted is able to serve many. With the IMRA network on the air, Ted will be able to serve them all more dependably.

Padre Ted has been overseas for two and a half years, and he is totally convinced of the service value of amateur radio. He wishes to pass along his thanks and deepest gratitude to the many North American stations who have been generous in providing him and many others with communications service.

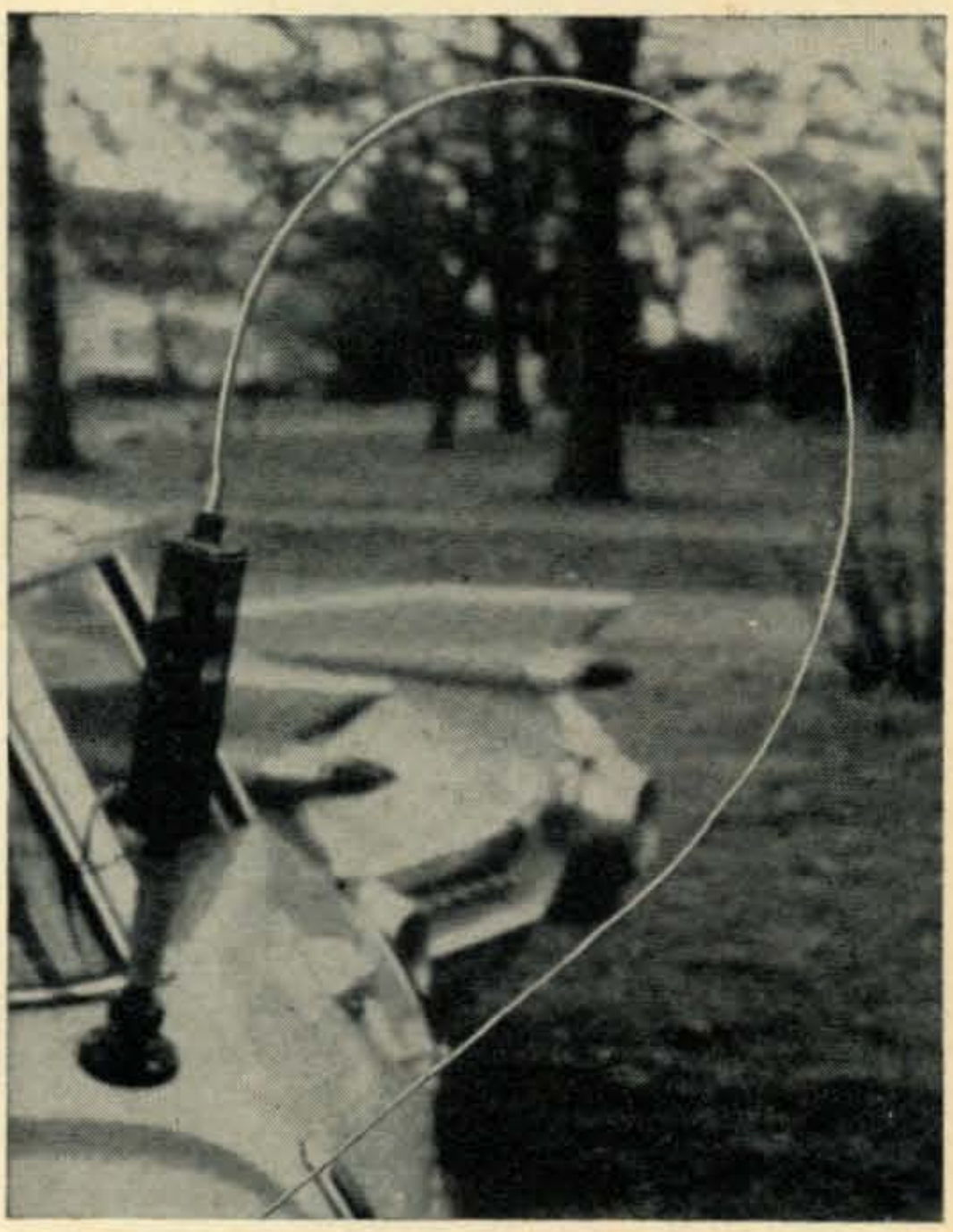
Another friend of IMRA is Padre Tom Romero Gross. Tom, HC1AM, is an old timer in Quito, Ecuador. He is on the air almost daily on 20 meters at 1400 GMT. He likes to talk with his family in New York and California. Padre Tom looks to the day when he will be on s.s.b. but at present his old B&W is serving him quite faithfully.

I would like to quote a section of a letter I received from Tom a few weeks ago.

"May the good Lord reward you all for your thoughtfulness about your fellowmen and missionaries who live in countries where good communications are needed so badly and where decent equipment is almost impossible to get. Someday, with the help of IMRA, I hope to be able to work via radio."

Again, I wish to thank those of you who have sent your encouragement and good wishes to IMRA. I hope to hear from many more of you soon. If possible, look for us on the air. Next month I hope to tell you more about our annual convention. If you can be with us in Ashville, North Carolina, on August 7th and 8th, I promise you an interesting and enjoyable time. Remember look for us Wednesday, at 1830 GMT on either 21.393 mc or 14.270 mcs. ■

BY THE WAY...



When Ralph W. Campbell, W4KAE, brought his station wagon in for a car wash he didn't count on the extra benefits he would receive along with a clean car. During the wash process when the large rollers come down to scrub the top, they caught Ralph's antenna and started winding it up. Before anyone realized what had happened and could stop the machine the back of the car had been lifted off the ground and was suspended by the antenna. Once lowered it looked like the above photo and as far as we can tell still works. How many of you can boast of an antenna that has been tested for tensile strength while your car was being washed. If you don't care to try it out you can always clip your antenna down.

NEW

Poly Quad

ANOTHER GLASDRAMATICS® EPOXY-FIBERGLASS PRODUCT

STRONGER...MORE EFFICIENT... MORE ECONOMICAL!

2 el . . . tri-band (20-15-10)

POLY tri QUAD KIT

$59.95

F.O.B. Walkerton or include $3.50

- 8 Zip-Glas Spreaders (13')
- 2 Universal Starmounts
- 1 Boom-to-Mast Adapter
- 1 Instruction Manual

...this great new kit offers you power gain comparable to a 3 el beam, yet so lightweight you can rotate it with a TV rotor...all the superior efficiency of the quad . . . lower angle of radiation...greater capture area...reduced QRN and QSB . . . plus rugged Poly Quad quality construction . . . and all at an amazingly low price . . .

3 el Kit . . . . . **$ 89.95**
4 el Kit **$119.95**

Not Ready For Tri-Band?

...you get the same quality with POLY duo QUAD Kits (15-10) starting low as $54.95 and 10 meter POLY mono QUAD Kits...for further information about kits or individual components write directly to Polygon Plastic Co.

EXCLUSIVE

ZIP GLAS

TELESCOPIC FIBERGLASS SPREADERS

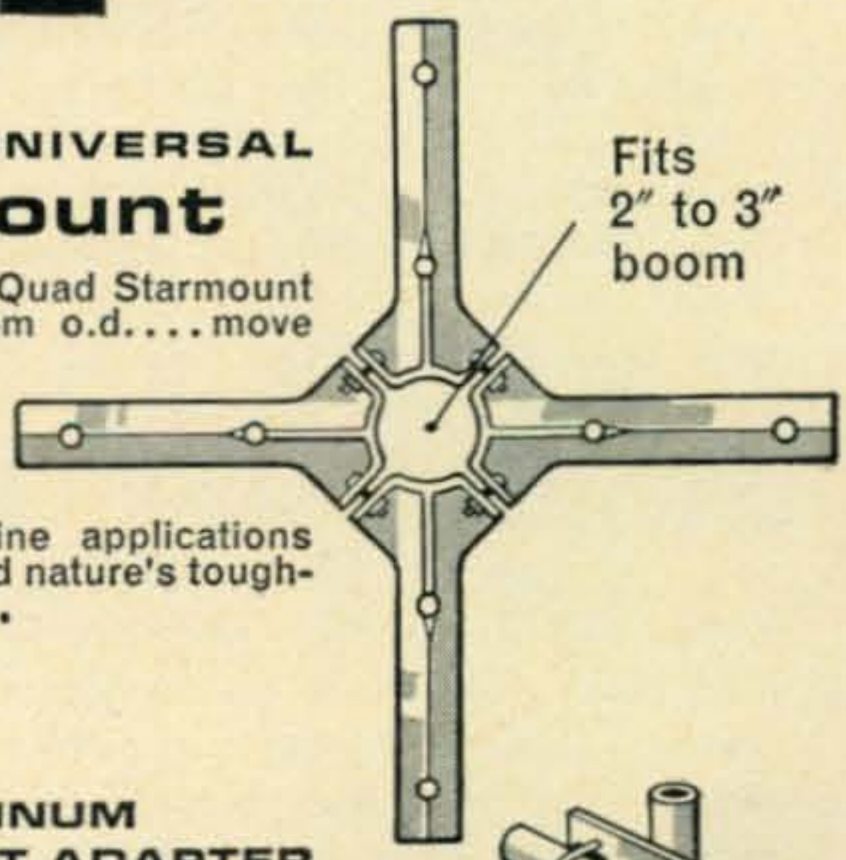
action engineered with compressional and tensional strength superior to anything else on the market . . . prestressed . . . lightweight . . . epoxy impregnated, epoxy painted so they're corrosion resistant . . . won't shrink, split or splinter . . . jam open in seconds . . . tested for winds in excess of 80 mph . . . sky-blue color to reduce neighbor and XYL objections . . .

What Makes Poly Quad So Different?

Glasdramatics — Polygon's exclusive, patented process of weaving, winding and drawing continuous strands of fiberglass filaments before permanently bonding with resins.

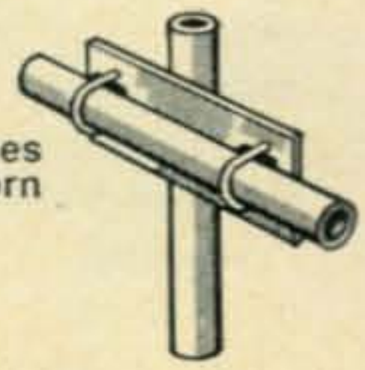
EXCLUSIVE UNIVERSAL

Starmount



you save . . . the Poly Quad Starmount accepts 2" to 3" boom o.d. . . . move up to multi-el array without discarding this hardware . . . rigidly die-cast of 360 aluminum alloy . . . tested in many marine applications . . . proved to withstand nature's toughest test—salt water . . .

RUGGED ALUMINUM BOOM-TO-MAST ADAPTER



brawny 5052-H34 aluminum alloy plate . . . combines the best of mechanical strength with stubborn corrosion resistance . . . hardware included.

POLYGON PLASTIC COMPANY, *Division of Plas-Steel Products, Inc.*
67 Industrial Park • Walkerton, Indiana 46574 • Phone 586-3122.

For further information, check number 27, on page 110

1967 ARMED FORCES DAY COMMUNICATIONS TESTS

EACH year on the third Saturday in May the Department of Defense sponsors the observance of Armed Forces Day. As a part of this observance the Departments of the Army, Navy and Air Force annually conduct communication tests designed to demonstrate to the world the close partnership and mutual respect enjoyed between U.S. amateur radio operators and the U.S. military. This year's program will be conducted on Saturday, May 20, 1967 and all licensed radio amateurs are encouraged to participate.

The wholehearted support of the American people is basic to a strong Department of Defense. Such support requires knowledge and understanding of what the Department is doing and why it is doing it. Throughout the years amateur radio has consistently made contributions to communications training, international goodwill, military morale and the general public service. The Armed Forces Day Communication Tests are intended to be a tangible demonstration of the firm and long standing Department of Defense policy to encourage and support amateur radio activity.

On this eighteenth observance of Armed Forces Day, several military radio stations will participate in communication tests which include military-to-amateur crossband operations and receiving contests for both c.w. and RTTY.

Special QSL cards confirming crossband communications will be forwarded to those amateurs who establish two-way contact with participating military stations. Certificates will be awarded to those who aptly demonstrate their operating ability and technical skill by receiving a perfect copy of the Secretary of Defense originated c.w. and/or RTTY message(s) transmitted during the receiving contest portion of the communication tests. Short wave listeners will not qualify for a QSL card in confirmation of crossband communications. However, anyone who has the equipment and abilities may copy the Secretary of Defense messages and receive a certificate.

Military To Amateur Crossband Test

Military radio stations WAR, NSS, NPG and AIR will be on the air from 201400 GMT to 210245Z GMT. During this test of crossband operations, the military stations will transmit on specified military frequencies while amateur stations will transmit in the indicated portions of the amateur bands. Contacts will consist of a brief exchange of locations and signal reports. No traffic handling will be permitted.

Station	Military Frequency	Emission	Amateur Band (mc)
WAR (Army Radio Wash., D.C.)	4001.5	c.w.	3.5-3.65
	4020	c.w.	3.65-3.8
	6992.5	c.w.	7.0-7.1
	7325	c.w.	7.1-7.2
	14405	c.w.	14.0-14.2
NSS (Navy Radio Wash., D.C.)	3397.5	c.w.	3.5-3.65
	4012.5	RTTY	3.60-3.65
	4015	c.w.	3.65-3.8
	4040	s.sb.	3.8-4.0
	7301	c.w.	7.1-7.2
	7380	RTTY	7.0-7.05, 7.1-7.15 ar 14.05-14.10
	14386.5	s.s.b. (u.s.b.)	14.2-14.35
	14480	c.w.	14.0-14.2
	143820*	a.f.s.k. RTTY/ a.m.	144.0-145.5
NPG (Navy Radio San Francisco)	4001.5	RTTY	3.65-3.8
	4005	c.w.	3.5-3.65
	4013.5	s.s.b.	3.8-4.0
	4016.5	c.w.	3.65-3.8
	7301.5	s.s.b.	7.2-7.3
	7332	RTTY	7.0-7.2
	7375	c.w.	7.1-7.2
	13975.5	c.w.	14.0-14.2
	14383.5	s.s.b. (LSB)	14.2-14.35
	20954.5	s.s.b.	21.0-21.45
	49.692 mc	a.m.	50-54
	143.700 mc**	a.m.	144-148
	148.410 mc	a.m./f.m./ a.f.s.k.	144-148
AIR (Air Force Radio Wash., D.C.)	3347	RTTY	3.5-3.8
	3397.5	c.w.	3.5-3.8
	4025	s.s.b.	3.8-4.0
	6997.5	c.w.	7.0-7.2
	7305	s.s.b.	7.2-7.3
	7315	RTTY	7.0-7.2
	7458.5	c.w. (Novice only)	7.15-7.2
	13995	c.w.	14.0-14.2
	14397	s.s.b.	14.2-14.35
	20928	s.s.b.	21.35-21.45
	20994	c.w.	21.0-21.1

*Provided it is consistent with operational and training commitments, this frequency will be keyed from a U.S. Navy aircraft flying between Washington, D.C. and Boston, Massachusetts during the major portion of the time allotted for military to amateur crossband contacts. The flight path will be over Baltimore, Philadelphia, New York City and Hartford, Connecticut. The call sign NSSAM will be utilized from the aircraft.

**Provided it is consistent with operational and training commitments, this frequency will be keyed from a U.S. Navy aircraft flying between San Diego and Seattle during the major portion of the time allotted for military to amateur crossband contacts. The call sign NPGAM will be utilized from the aircraft.

C.w. Receiving Contest

A c.w. receiving contest will be conducted for any person capable of copying International Morse Code at 25 words per minute. The c.w. broadcast will consist of a special Armed Forces Day message from the Secretary of Defense addressed to all radio amateurs and other participants. The schedule for this broadcast is as follows:

Time	Transmitting Station	Frequencies kc
20 May 1967		
210300 GMT (202300 EDST) (201900 PST)	WAR—Army	3345, 6992.5, 14405
	NSS—Navy	3397.5, 4015, 7301, 14480
	NPG—Navy	4005, 4016.5, 7375, 13975.5
	AIR—Air Force	3397.5, 7315
	A6USA—Army Radio San Francisco	6997.5
	AG6EA—McClellan AFB California	4580, 7332

RTTY Receiving Contest

This is a test of the operator's technical skill in aligning and adjusting his equipment, and serves to demonstrate the growing number of amateurs becoming skilled in this method of rapid communications. The RTTY broadcast will consist of a special Armed Forces Day message from the Secretary of Defense to all radioteletypewriter enthusiasts. The message will be transmitted at 60 words per minute in accordance with the following schedule:

Time	Transmitting Station	Frequencies kc
20 May 1967		
210335 GMT (202335 EDST) (202135 CST) (201935 PST)	WAR—Army	3347, 6992.5, 14405
	NSS—Navy	4012.5, 7380
	NPG—Navy	4001.5
	AIR—Air Force	3397.5, 7315
	A6USA—Army Radio San Francisco	6997.5
	A5USA—Army Radio Fort Houston, Texas	4025
	AG6EA—McClellan AFB	4580, 7332
	California AG3HQ—Scott AFB Illinois	4590, 7540

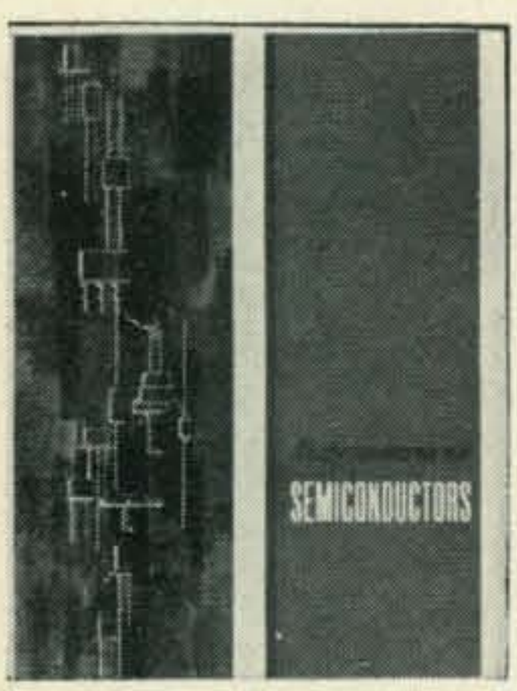
Submission Of Competition Entries

Transcriptions should be submitted "as received." No attempt should be made to correct possible transmission errors.

Time, frequency and call sign of the station copied as well as the name, call sign (if any) and address of the individual submitting the entry must be indicated on the page containing the text. Each year a large number of perfect copies are received with insufficient information, thereby precluding the issuance of a certificate.

Completed entries should be submitted to the Armed Forces Day Contest, Room 5A522, The Pentagon, Washington, D.C. 20315 and postmarked no later than 31 May 1967. ■

New Amateur Products



Amperex

AMPEREX announces the latest edition of their condensed semiconductor catalog. It contains basic data on all Amperex semiconductor devices. Free copies of the condensed catalog may be had by writing to Amperex on company letterhead. Direct request to Amperex Electronic Corporation, Advertising Dept., Hicksville, L.I., N.Y., 11802, or circle 68 on page 110.

JFD

THE JFD Electronics Co., Components Division, has just announced a universal top tuning assembly which adapts all JFD piston trimmers for top tuning and vertical mounting. These components are ideal for use in communications and other types of circuits where space is at a premium. For additional information write for Data Sheet PT/TT67. JFD, 15th Avenue at 62nd St., Bklyn., N.Y., 11219 or circle 69 on page 110.

A POWER BOOST FOR THE ULTIMATE EXCITER

BY CAPTAIN PAUL H. LEE, USNR, W3JHR*

Reworking the final stages of the Ultimate SSB Exciter[1] to use a 7094 instead of the 6146 produces some desirable benefits. If run at the full power capability an input of 400 to 450 watts p.e.p. is available. Also, long life is assured for the output tube in addition to stable operation on the higher bands.

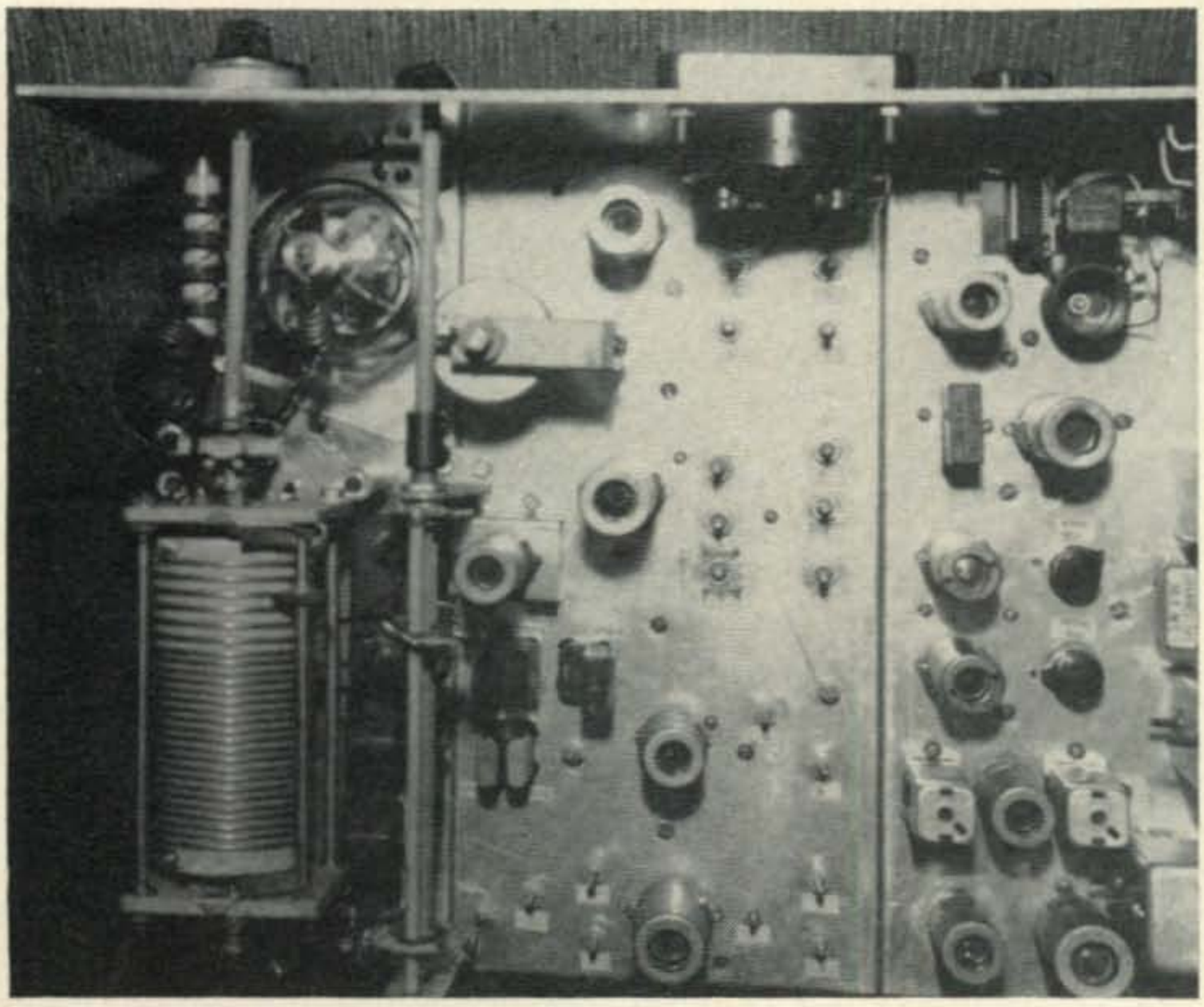
In a recent issue of this magazine[1] I described my general coverage s.s.b. exciter, which is not only an excellent driver for the 4-1000A final amplifier[2] but is also a fine little transmitter in itself. I have used this exciter for approximately three years, and it has proven itself to be as good as any commercially built unit, and as far as I am concerned it is better, for it has features which I personally wanted. My only criticism has been, not of the exciter itself, but of the type 6146 (and type 6146B) tubes. Some of these have turned gassy after relatively short periods of use. Others have been difficult to stabilize on 10 meters, even with neutralization. With 750 volts plate voltage and 195 volts screen voltage, the 6146s have been running right up to maximum static ratings, although they have not been "pushed" very hard to drive the 4-1000A final stage.

For some time I have been trying to decide on a suitable replacement for the 6146s which would run at a reasonable percentage of its full ratings, while yet providing a factor of safety. Several months ago I acquired a pair of RCA type 7094 tubes whose condition was somewhat dubious, but I was willing to gamble and try one. A check of the tube handbook rating sheets showed that the 7094 would run quite "light" at only 750 volts plate voltage, and that 300 volts would be required for the screen. The characteristic curves showed me that the driving power available from the 6CL6 stage in my exciter would be sufficient to drive a 7094 to a bit more output that was possible with the 6146s, even at these low

*5209 Bangor Drive, Kensington, Maryland 20795.

[1] Lee, Paul H., Capt., "The Ultimate SSB Exciter," *CQ*, Feb. 1967, p. 24.

[2] Lee, Paul H., Cdr., "The Big Brother Linear," *CQ*, Sept. 1960, p. 32.



Top view of the s.s.b. exciter showing how the 7094 fits in the space formerly occupied by the two 6146 tubes. The neutralizing capacitor is at the right of the tube.

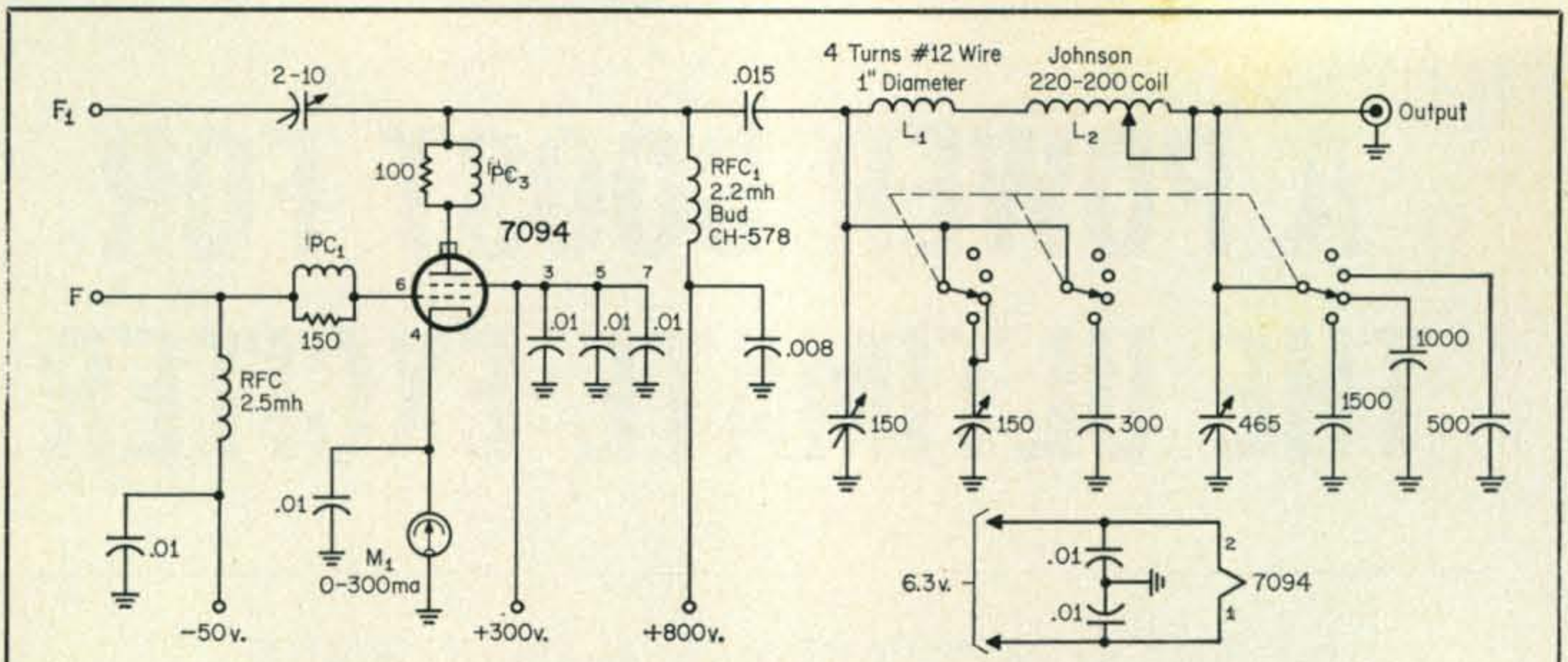


Fig. 1—Revised circuit of the final amplifier of the Ultimate S.S.B. Exciter[1]. The 7094 socket is the Johnson 122-247-1 used without the base shield ring. The necessary changes and wiring techniques are discussed in the text. PC_1 and PC_3 were retained from the original article.

L_1—4 t #12 1" da., 1" long.
L_3—18 microhenry variable indicator, Johnson 220-200.
RFC_1—2.2 mh, Bud type CH-578.

plate and screen voltages. Thus, this tube seemed to be one which I could install and forget. It would never be loaded to maximum, and would run quite cool. A study of several articles in handbooks in which 7094s were used showed that there would be nothing unusual in the circuitry, and that the 7094 could easily be used in place of my 6146s, with 6.3 volts filament voltage. The only question remaining was one of space, and that was easily solved, as you will see.

Modifications

As the first step in the modification of the exciter, the 6146s were removed from their sockets, all wiring to the sockets was unsoldered, and the sockets were removed from the chassis. This left two vacant holes, which were covered by a piece of 16 gauge aluminum sheet, 3" by 4" in size. A Johnson type 122-247-1 "septar" socket was procured for the 7094 tube.

It was found that the 7094 with its larger bulb would not fit in the space available until the variable tuning capacitor and its extension shaft were moved ¾" to the right from their previous location. Thus, this was the next step. The plate tuning capacitor was removed, new mounting holes were drilled, and it was reinstalled in its former location under the rotary coil, but ¾" to the right. A new hole was drilled in the front panel for the extension shaft. This caused the tuning dial to be out of line with the rotary coil dial and the output capacitor dial, but this was a very minor sacrifice.

With the location of the 7094 tube determined, a 2¼" hole was cut in the chassis with a Greenlee punch, through the new cover plate for the 7094 tube. The 122-247-1 socket was centered under the hole and mounted below the chassis, with ⅛" spacer washers between socket and chassis. Next, the plate r.f. choke, plate blocking capacitor, and high voltage bypass capacitor were removed. A Bud type CH-578 2.2 mh r.f. choke was substituted for the previous one. The 4 turn plate tank coil was removed. Then, with the 7094 tube in place in its socket, all of these components were rearranged to provide the most convenient layout. The r.f. choke ended up being mounted on the back of the panel, extending out horizontally to the rear, alongside the tube. The arrangement can be seen in the photographs.

Next, the 7094 socket was wired in. The grid parasitic suppressor and the 0.01 mf ceramic bypasses were used again. The three screen terminals of the 7094, paralleled internally in the tube itself, were connected in parallel on the socket using ¼" by 1/16" copper strap. The circuit of fig. 1 shows a bypass capacity of 0.03 mf on the screen. This is composed of three 0.01 mf capacitors in parallel. One of these was connected from each screen terminal to a ground lug fastened to the adjacent socket mounting bolt. Each filament terminal was also bypassed to ground with a 0.01 mfd. ceramic capacitor in a like manner. The grid r.f. choke and cathode lead, each with its 0.01 mf bypass, were reconnected.

Neutralizing

The final bit of installation was that of the neutralizing capacitor. The previously used aluminum plate which had been mounted on its feedthrough insulator adjacent to the 6146s was discarded. The neutralizing capacitor used in this modification was an old Hammarlund type found in my junk box. The present Hammarlund equivalent type is the type NZ-10, a component with a maximum capacity of 10 mmf. Both this one and the old one I used are of the disc type. I mounted mine as close as possible to the tube and the feedthrough insulator.

With the tube in position in its socket, a piece

of ⅛" wide copper braid was connected to the neutralizing capacitor, to the plate parasitic suppressor, and to the plate blocking capacitor. The braid forms a flexible plate lead which permits easy removal of the heat dissipating plate connector from the tube's plate terminal.

General

With the tube socket mounted ⅛" below the chassis, it is necessary to loosen one set screw and remove the extension shaft on the plate capacitor bandswitch in order to remove the tube from its socket and insert a replacement. If I had been able to use a Greenlee punch of sufficient size to make a hole large enough for the 7094 bulb, I could have submounted the socket at least ¾" below the chassis, and then perhaps the tube could be removed without removing the extension shaft. However, I do not expect to be replacing the 7094 tube very often. One word more; the extension shafts are all of ¼" wooden dowel rod, not of metal, even though insulating shaft couplings are used. Thus, all stray metal is kept away from the r.f. fields in this stage, and current loops to the panel are avoided.

Next, the v.r. tubes in the power supply were replaced with two VR150 tubes, to provide 300 volts screen voltage for the 7094 tube. Then the primary taps on the CG-301 plate transformer were changed to give me a boost in exciter plate voltages. The plate voltage for the 7094 became about 800 volts, with a very slight increase in plate voltage on the smaller tubes. With voltages on, the bias resistor in the power supply was adjusted to give an idling plate current of 25 ma in the 7094.

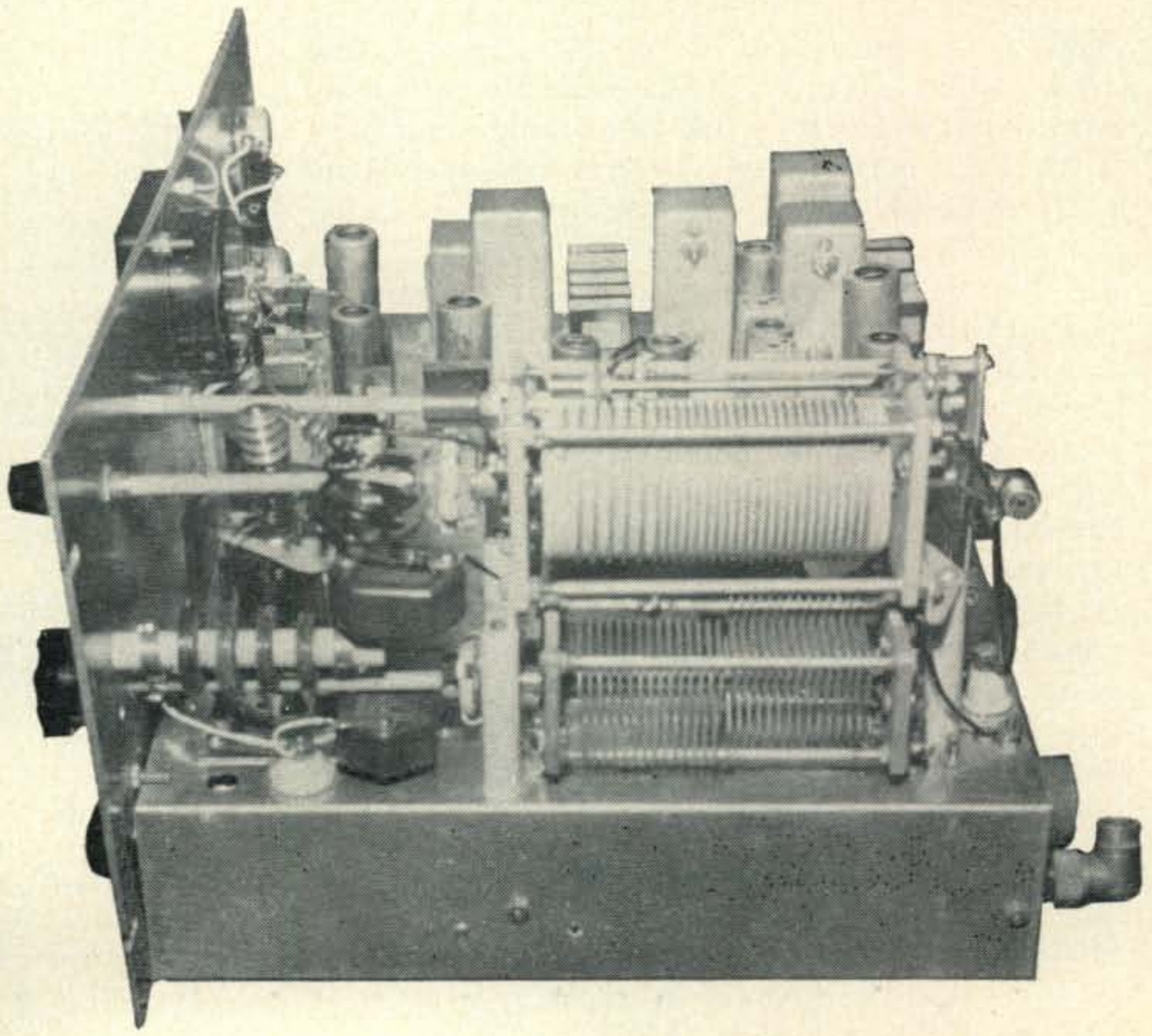
The first 7094 gave me a moment of fear when it proved to be gassy, and its plate current suddenly went off scale at irregular intervals. Inasmuch as I had "liberated" them from a cooperative friend at practically no cost, I could not cry "foul" at this point, but proceeded to find the second one to be good. The stage was very easily neutralized, and in this bridge neutralizing circuit with the 250 mmf capacitor from plate tank to ground in the 6CL6 stage, neutralization of the 7094 occurred with the disc capacitor set at about ½" spacing, which was expected. Neutralized at 10 meters, it holds perfectly on the lower bands; its stability is absolute.

Performance

Now we come to the subject of performance. I first tested the 7094 on 10 meters, and found that I could remove the 15K loading resistor from position 6 of the 6CL6 bandswitch. This resistor had been necessary with the 6146s for stability. The 7094 thus provided much better performance on 10 meters, with more output than from the 6146s, with perfect stability. I found it necessary to adjust the 6CL6 tuning slug slightly, for maximum drive.

Proceeding to the other five bands in turn, a slight readjustment of each 6CL6 tuning slug was made, and as on 10 meters the 7094 was perfectly stable, with more output than the 6146s had given for an equal input. Thus, the conversion was finished, and the unit is now in service here at W3JHR, driving the 4-1000A. The 7094 should last a long time with only 800 volts on its plate, and I look forward to very successful operation with this unit for many years.

You might now ask what this change "bought" for me besides having a tube which is obviously operating with considerable factor of safety. To this I can answer that the single tube operates with greater efficiency than two smaller ones in parallel on the higher frequency bands. This is especially true at 10, 15 and 20 meters. Why is this true? One reason is the fact that the 7094 possesses an output (plate to cathode) capacitance of only 0.2 mmf, whereas the 6146 output capacitance is 8.5 mmf (and two in parallel have an output capacitance of 17 mmf). In the design of a tank circuit for 10 meters, for example, the input capacitor of the pi-network is



Side view of the 7094 section of the s.s.b. exciter showing the mounting of the r.f.c. and plate capacitors next to the 7094.

quite small. Let us assume for the sake of example that for a given plate load impedance and for maximum efficiency it should be 15 mmf. With a tube whose output capacity is only 0.2 mmf, the tank capacity plus strays can be 14.8 mmf, which will provide an efficient tank circuit. With a pair of tubes whose output capacity totals 17 mmf, there is no capacity left to be assigned to the input capacitor of our efficient tank circuit! Thus, in order to tune the stage, we have to end up with a variable capacitor which we do not need, nor want from the standpoint of efficiency, plus a tube output capacity which is in itself greater than the total capacity required in the tank circuit. No wonder the efficiency suffers! At higher frequencies tank circuit losses increase considerably with the lower *Q* which results from a higher-than-normal tank capacity. The advantages of using a single low-output-capacity tube are readily apparent.

This leads to a critical comment concerning some amplifiers which use many small tubes of the TV sweep output variety in parallel to achieve a nominal kilowatt rating. This is a *very poor design!* For example, I was personally intrigued by and interested in the 6DQ5 when it first appeared a few years ago, after reading articles which gave glowing accounts of its usefulness as an s.s.b. linear amplifier. I tried one in my exciter, but even one had such a high output capacity (11 mmf) plus high input capacity (23 mmf) and other undesirable features, that I quickly discarded it and returned to the 6146. The single 6DQ5 was very poor on 15 meters, and absolutely useless on 10 meters, and a pair of them in parallel would have been even worse.

Thus, there is no substitute in this business for good design. There is no way to get something for nothing, and any attempt to do so results in a piece of equipment which is built down to a price, rather than built for quality and performance.

There is one more thing that the 7094 buys for you, and that is the ability to use this exciter as a transmitter by itself, with a plate voltage of 1500 volts or so on the final tube, which means a power input capability of 400 to 450 watts p.e.p. A pi-network input capacitor of slightly greater plate spacing could easily be substituted for this type of operation. The power supply requirements would be 1500 volts plate and 400 volts screen for the 7094, 50 to 75 volts bias, and 300 to 350 volts for the low powered stages. The 6CL6 would be quite sufficient to drive the 7094 under these conditions. I personally have no desire to use the unit this way, inasmuch as I have the 4-1000A amplifier whose big tube simply loafs along at 1 kw average (2 kw p.e.p.) input. However, for the fellow who wants medium power with one unit, the 7094 output stage with 1500 volts is a very fine answer. ■

"And Away They Go....."

We ran an article in last November's issue called "Help Wanted—Male," in which we were looking for someone to accompany a New York radio personality, The Amazing Randi, on a three month trip through the jungles of Ecuador and Peru.[1] The call was answered and during March four members of "The Randi Expedition to The Land Of The Incas" left on an Ecuatoriana flight for Guayaquil, Ecuador to begin a three to four month tour. The group photo shows the hearty band with the Drake TR-4 transceiver which will provide communications for the group. Should you wish to contact the group at any time, please contact Maj. H. Jordan, 9 Surrey Drive, Hazlet, New Jersey, (phone 201-264-1141), and he can inform you as to times and frequencies. Although its not rare DX, and you can't win anything, and we doubt that special cards will be offered, you just might simply enjoy talking to the group as they travel over thousands of miles of desert and mountain territory. ■

[1]Help Wanted—Male, *CQ*, November, 1966, p. 40.

The stalwart band shown in front of The Overseas Press Club in New York prior to their departure. You can tell its New York by the snow. Shown are: Russell Shoub, from Montreal, Canada, Patric Jordan, of Hazlet, N.J., Jaime Carajal, from Quito, Ecuador, and the Amazing Randi complete with beard and bush hat.

Join "THE TROUBLESHOOTERS"

who get paid top salaries for keeping today's electronic world running

Suddenly the whole world is going electronic! And behind the microwave towers, push-button phones, computers, mobile radio, television equipment, guided missiles, etc., stand THE TROUBLESHOOTERS—the men urgently needed to inspect, install, and service these modern miracles. They enjoy their work, and get well paid for it. Here's how you can join their privileged ranks—without having to quit your job or go to college to get the necessary training.

JUST THINK how much in demand you would be if you could prevent a TV station from going off the air by repairing a transmitter...keep a whole assembly line moving by fixing automated production controls...prevent a bank, an airline, or your government from making serious mistakes by servicing a computer.

Today, whole industries depend on electronics. When breakdowns or emergencies occur, someone has got to move in, take over, keep things running. That calls for a new breed of technicians—The Troubleshooters.

Because they prevent expensive mistakes or delays, they get top pay—and a title to match. At Xerox and Philco, they're called Technical Representatives. At IBM they're Customer Engineers. In radio or TV, they're the Broadcast Engineers.

What do you need to break into the ranks of The Troubleshooters? You might think you need a college degree, but you don't. What you need is know-how—the kind a good TV service technician has—only lots more.

What You Need to Know

As one of The Troubleshooters, you'll have to be ready to tackle a wide variety of electronic problems. You may not be able to dismantle what you're working on—you must be able to take it apart "in your head." You'll have to know enough electronics to understand the engineering specs, read the wiring diagrams, and calculate how the circuits should test at any point.

Learning all this can be much simpler than you think. In fact, you can master it without setting foot in a classroom or giving up your job!

For over 30 years, the Cleveland Institute of Electronics has specialized in teaching electronics at home. We've developed special techniques that make learning easy, even if you've had trouble studying before. Our AUTO-PROGRAMMED™ lessons build your knowledge as easily and solidly as you'd build a brick wall—one brick at a time. And our instruction is personal. Your teacher not only grades your work, he analyzes it to make sure you are thinking correctly. And he returns it the same day received.

Get FCC License or Money Back

Two-way mobile work and many other types of troubleshooting call for a Government FCC License. Even if your work doesn't require a license, it's a good idea to get one. It will be accepted anywhere as proof of good electronics training.

The licensing exam is so tough that two out of three non-CIE men who take it fail. But 9 out of 10 CIE graduates pass. That's why we can offer this warranty. If you complete one of our license preparation courses, you will be able to get your FCC License—or your money back.

Mail Coupon for 2 Free Books

Want to know more? Mail coupon for our 40-page catalog describing CIE courses and special book on how to get a Government FCC License.

ENROLL UNDER NEW G.I. BILL
All CIE courses are available under the new G.I. Bill. If you served on active duty since January 31, 1955, or are in service now, check box in coupon for G.I. Bill information.

CIE **Cleveland Institute of Electronics**
1776 E. 17th St., Dept. CQ-28, Cleveland, Ohio 44114

Cleveland Institute of Electronics
1776 E. 17th St., Cleveland, Ohio 44114

Please send me without cost or obligation:

1. Your 40-page book "How To Succeed In Electronics" describing the job opportunities in electronics today, and how your courses can prepare me for them.
2. Your book on "How To Get A Commercial FCC License."

Name_____
(Please Print)
Address_____
City_____
State_____ Zip_____
Occupation_____ Age_____
☐ **Check here for G.I. Bill information**
Accredited Member National Home Study Council CQ-28

For further information, check number 2, on page 110

GRUMBLES

by Sam

MOST bubbles eventually burst—or is it *bust?* Anyway, ham radio seems to be faced with one of the biggest and most hilarious plans-gone-boom in its history. I'm talking about the much heralded round-the-world jaunt of the world's foremost professional DX operator; now they're trying to say that he may not have had permission to operate from some of those exotic locales, and that some of the places he "operated from" may have actually been an offshore boat. What's even worse, they're saying that if you sent a buck to his QSL manager you'd get back the QSL of your choice even if you claimed that the contact was on 11 meters. A $25 donation to the DXpedition might even bring you a fabulous array of juicy DX cards—almost *instant DXCC!*

Obviously the clamor is ridiculous! I mean that if our globe trotting brother even bothered to leave the U.S. at all he was out of his ever lovin' cranium—the DXpedition bit could have just as easily been handled right from his home QTH. As a matter of fact, I've been sort of toying with the whole idea myself for quite some time now—a DXploitation (a special type of DXpedition) for the ham who has the unfortunate need for both funds and a big name in the hobby.

With my plan, everybody comes out ahead. Rich hams get a chance to spend their money on a worthwhile cause (me), rare and exotic callsigns and QSL's will abound, DXCC awards will flow like pink tickets on CB, many stories will be generated to fill the pages of ham publications, free ham equipment will drift my way, and I'll achieve twice the fame of any of the current group of professional amateurs.

Eventually I will branch out into a QSL card printery and—remembering that my cards will be worth $1 per—I will be able to retire to a genuine DX location and go straight.

My plan? It's simple, anyone can do it—in fact the more participants who embark on DXploitations, the happier all will be.

Location. Go out and dig yourself up a trivia expert; you know, one of those guys who have memorized everything about every film to come out of the Hollywood hopper for the past 40 years. Get him to find you an exotic location from a film epic. There are several advantages to this as opposed to just "making up" a location.

For instance, my own DXploitation will "take me" to the "lost island of Kioga," as seen in the 1938 serial thriller "Hawk of the Wilderness" starring Bruce Bennett (alias Herman Brix). Hopefully, many of the well heeled older hams spent their young lives in the movies and may even vaguely remember hearing of Kioga somewhere.

The place was chosen mainly so that I can contact the TV distributor of the film for a set of publicity stills showing the natives in front of the flora and fauna—a realistic touch for my *QST* story on the trip.

There are dozens of potential DX locations—all right from Hollywood—and any ham operating from one will be an immediate hit. I have already staked out Murania, Shangri-La, Atlantis, Atragon, Grand Fenwick, Mora Tau, Utopia, Sarkhan, Valhalla, Zahrain, and even Rainbow Island (at least Dorothy Lamour is on Rainbow Island).

I don't recommend Skull Island, nobody would be crazy enough to swallow your claim to a ham station in King Kong's hometown.

Callsign/QSL. Here's where you can really shine because recent DXpedition activity has already blazed the path for you to make up your own callsigns from any of several callsign prefix blocks which aren't assigned to a particular country. Remember 1M4A and 1S9WNV used just recently? They were made up in exactly this manner, since 1AA to 1ZZ is still unassigned and therefore fair game (as is 7OA-7QZ, 8OA-8RZ, 9HA-9HZ, 9VA-9WZ, and any call beginning with a zero).

I have selected for my own use the call 1B3GT since I can get many free QSL cards from local TV shops by simply ripping the end flaps from empty 1B3 tube cartons. Free QSLs can be obtained in a similar manner for the callsigns ØATS (a Quakers' can), ØBØE (any music

*c/o *CQ*, 14 Vanderventer Ave., Port Washington, L.I., N.Y. 11050.

Let's all play "DXafink," which twin is the phoney? My proposal would place cards just like these on ham shack walls throughout the world. Nobody will be able to sort out the DXploitations from the DXpeditions. The card from AC8XA is actually being sent out by a "K2" ham who long ago realized that a raunchy stateside call would have little wall appeal.

shop), and ØP1UM (college kid). A little imagination in this area can give you a lot of latitude.

The DXploitation. Once you have selected a location, armed yourself with at least 3,000 QSL cards, made arrangements for the publication of your DX memoirs, you can then contact major equipment manufacturers to supply you with free gear.

The trip is then announced in all ham publications (including and especially those little DX newsletters). About a week before your scheduled "arrival date" you will begin to receive QSL cards and money from the stations who have "worked" you. A few operators with *some* conscience will say that the QSO was while you were MM on the way to the place. Answer *all* cards—even if they come from Novices.

By the time you run out of cards, you will have a nice lecture tour set up and can then plan your next "trip."

Past DXploitations. For all we know half of the so-called DXpeditions in the past may have been done in just this manner. As a matter of fact, it seemingly makes little difference to anybody (except maybe the League, and you know what kind of squares they are) if *all* of the DXpeditions are out and out frauds.

To many DX operators, ham radio is not an end—it's the means to an end. The "end" being the collection of an impressive array of wallpaper and ornate awards. It makes little difference to these creeps about the name of the guy they worked, what he likes or dislikes, whether or not his wife has bunions, or if he might like to have your spare Callbook. All that matters is that he had sufficient time to hurriedly wedge his callsign into the contact to make the QSO legit, and has then confirmed his friendship with a piece of paper. QSO not withstanding, if he fails to send the piece of paper he's a no good rat.

I'm not even talking about the fellow who embarks on a world cruise, risks his life, just to "give the boys" few thousand such pseudo-contacts. Well, I guess at a buck or two a shot he can't go wrong—there are always enough idiots in the world to make such a trip worthwhile.

Some say that a DX QSL card attests to the proficiency of the operator and his equipment. What I can't understand is that if you can work, say an Australian, with the ol' full gallon pulverizer, then why become a raving madman at the first sign of a station only ⅓ of the distance away? You've already proven that you can work halfway around the world—which means that you have the technical capability of putting your signal into virtually every ham shack on the planet. Guess, it must attest to how obnoxious you can be, since, regardless of how many stations with the same technical capability try for one of these contacts, relatively few actually nail him.

Of course CB'ers, in their own bumbling way, have hit upon the answer to the whole problem. Not being permitted to actually work distant stations, they simply walk around at jamborees (or list their names in magazines) and *swap* cards. This seems to be a much more sensible approach to the collecting of QSL's, and it doesn't even require that you own a fancy rig with a multi-element beam. But, of course, there isn't a $1-charge-per-swap involved, so it will probably never become popular with the sophisticated ham.

It's really astounding to see the attitudes of DX operators since this current turmoil has erupted. Those operators who have a batch of countries "confirmed" from the allegedly fraudulent DX'er are up in arms. They are furious that they might lose a few country credits, they are blissfully unconcerned that they may have been taken for the biggest ride ever, been made fools of, been gypped out of their money, and been party to giving the American ham a gigantic black eye with many governments and overseas operators. Blindly, and without question, they offer their support to this fellow who has come under heavy attack from very responsible quarters within the hobby. Yup, the damned League is "out to get" DX operators after all these years. They have trumped up the charges as a personal vendetta, gone out and eagerly sought a rather large libel suit. Hogwash!

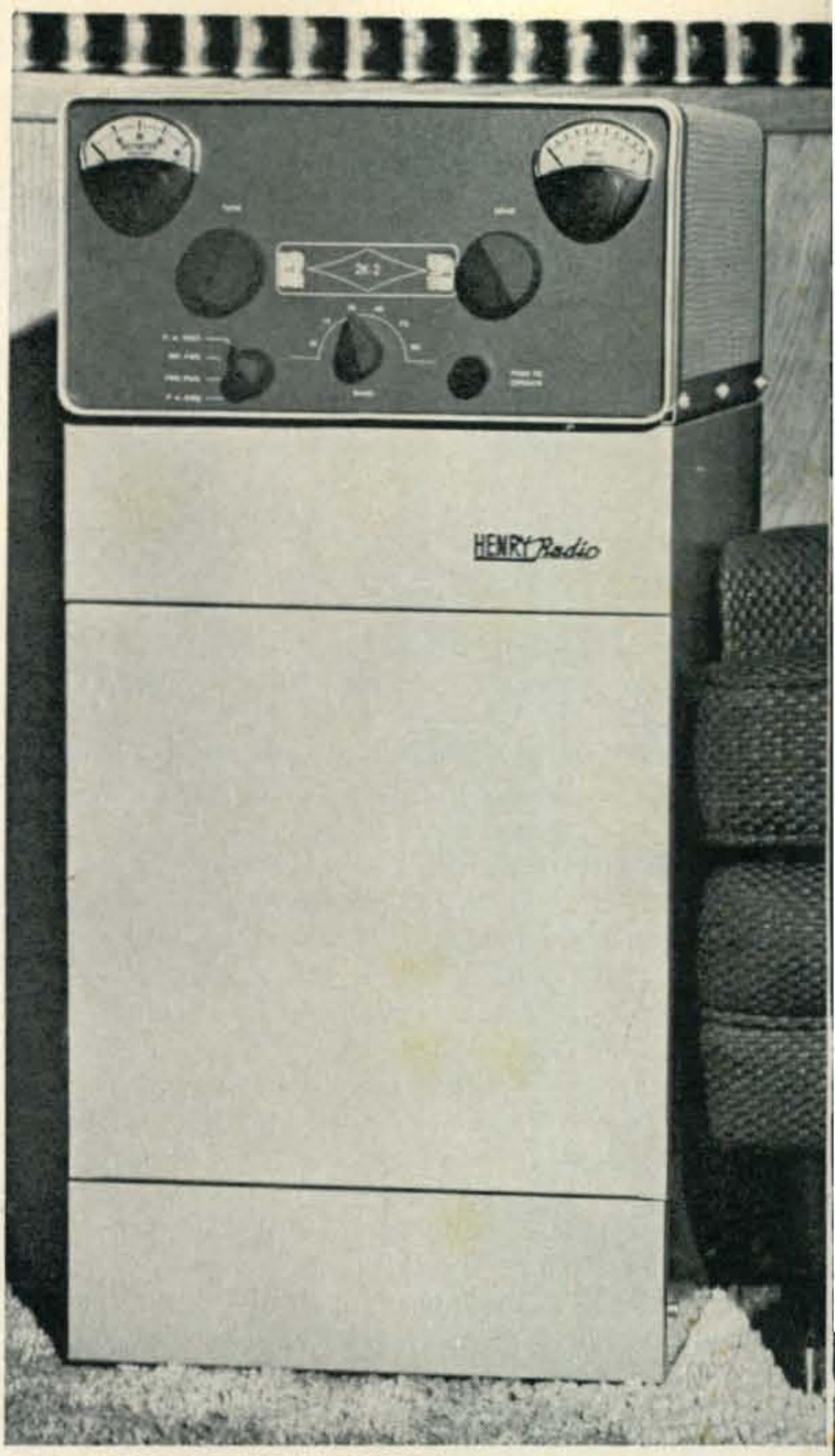
Look, you drop me a card and say which countries and prefixes you want the most. Maybe we'll pick the most popular ones and run some of them in these pages. In this manner you can take a pair of scissors and decorate your wall as well as the best of 'em, apply for awards, impress your friends.

You won't have to run 4 kw, you won't have TVI, won't have to shout down a bunch of lids just to exchange callsigns with some stuffy guy who can hardly speak English.

All in all, you'll be saving money, relieving band congestion, and (most of all) giving an opportunity to ham radio return to where it was before the QSL/Award mania set in. ■

Our message to the amateurs of the world is simple:

We believe the new 2K-2 is the finest linear amplifier ever made for the amateur service



2K-2 FLOOR CONSOLE $675.00

The new 2K-2, Floor Console, 2KD-2 Desk Model and 2KR-2 RF Deck are destined for greatness. Following the pattern of excellence established by the world famous 2-K, the new 2K-2 reaches previously unattainable levels of achievement. Its exceptional simplicity of design, extraordinary concern for reliability, superb linearity with attendant signal sharpness, remarkable power output and modern design all combine to make the 2K-2 the finest linear available to the amateur today.
Wouldn't you like to own the finest? Write today for full information. Note to commercial and military users: please ask about the new 4-K high power linear.

6% FINANCE CHARGE • 10% DOWN OR TRADE-IN DOWN • NO FINANCE CHARGE IF PAID IN 90 DAYS • GOOD RECONDITIONED APPARATUS • Nearly all makes & models. Our reconditioned equipment carries a 15 day trial, 90 day warranty and may be traded back within 90 days for full credit toward the purchase of NEW equipment. Write for bulletin.

TED HENRY (W6UOU) **BOB HENRY** (W0ARA) **WALT HENRY** (W6NRV)

Henry Radio Stores

CALL DIRECT . . . USE AREA CODE

Butler 1, Missouri, 64730	816 679-3127
11240 W. Olympic, Los Angeles, Calif., 90064	213 477-6701
931 N. Euclid, Anaheim, Calif., 92801	714 772-9200
6116 N. 27th Ave., Phoenix, Ariz., 85017	602 AM 4-3895

East Coast Rep.: Howard Laughrey, 2 Elizabeth St., Chappaqua, N.Y. 10514, (914) CE 8-3683

"Worlds Largest Distributors of Short Wave Receivers"

For further information, check number 8, on page 110

UNDERSTANDING TUBE TESTERS

BY GEORGE P. SCHLEICHER,*
W9NLT

THE amateur radio world has become a complicated one. It now includes highly sensitive receivers, balanced sideband generators, frequency synthesizers and many other gadgets that are equally sophisticated. Devices of such nature are not very tolerant of variations in electron tube performance. As a result it is becoming more and more desirable for an active amateur to have access to a tube tester for maintaining his station equipment.

A tube tester, more than any other item of test equipment, requires understanding and interpretation of the values indicated on its meter. The reasons why this is true will become evident as we look at the way a tube tester functions.

New tube testers of good quality now cost between $300 and $500. A variety of extra features is available on the higher priced models including pin straighteners for miniature tubes, illuminated charts and separate meters for grid bias and line voltage. Some of them also include circuits for testing transistor leakage and beta characteristics.

Since amateurs do not make daily use of tube testers, most of them can not justify spending a hundred dollars or more for one. For this reason most of the tube testers that amateurs have are used models that were acquired from service shops or surplus. Used equipment is often of good design and condition but may require modification in order to test modern tubes. An example of this is the popular surplus model I-177 and its commercial counterpart, the Hickock #531. Built in the late 1940s, these tube testers utilize the same basic test circuits that modern testers have. They are deficient in that they lack 9 pin tube sockets and they use an obsolete switching arrangement that is not adaptable for use with modern tubes. Modifications have been described[1] for modernizing these tube testers and need not be covered here.

*1535 Dartmouth Lane, Deerfield, Illinois 60015.

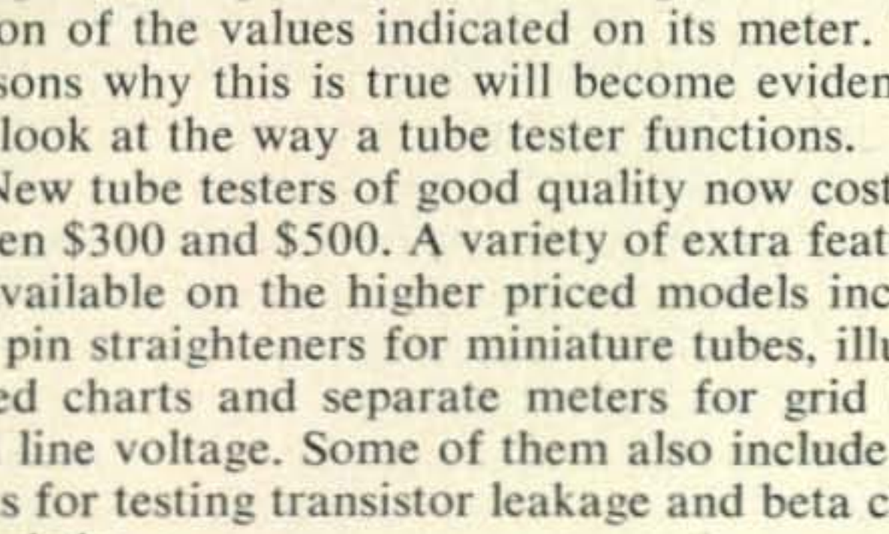


Fig. 1—Schematic of the short test used in a tube tester. The arrow terminals are switched to pairs of elements of the tube under test. If the neon lamp glows it indicates current flow due to a short or leakage.

Test Conditions

Most testers subject the tubes to test potentials of 200 volts or less. Modern testers are arranged to supply a selection of different voltages to the tube elements. These voltages are chosen by the manufacturers of the tube tester so as to be appropriate for the type of tube under test. Setting the controls on the tube tester in accordance with the roll-chart causes the correct voltage to be applied to the tube. The plate voltages commonly used are 75 and 150; screen voltage may be 56 or 130. The d.c. grid bias is continuously variable. The signal applied to the grid is 60 cycle a.c. and may be 0.25, 0.5, 1.25 or 2.5 volts. Older testers use a plate voltage of 170 volts, screen voltage of 160 volts and a fixed grid signal of between 4 and 5 volts.

It is interesting to note that while the plate and screen potentials are supplied by full wave rectifiers, the supplies are *not* filtered. As will be seen later, pulsating d.c. is completely adequate for testing purposes and this design eliminates the possibility that tube tester performance will be impaired by aging of filter capacitors.

Testing For Shorts

The circuit used by many tube testers for de-

[1]Throop, J. R., "Adapters For Surplus Tube Testers," *CQ*, May 1961, p. 47.
[2]Grayson, K. B., "I-177 Tube Tester Adapter," *CQ* (Surplus Column) September 1959, p. 62.
[3]Bradley, W. T., "Updating The I-177 Surplus Tube Tester," *QST*, November 1964, p. 21.

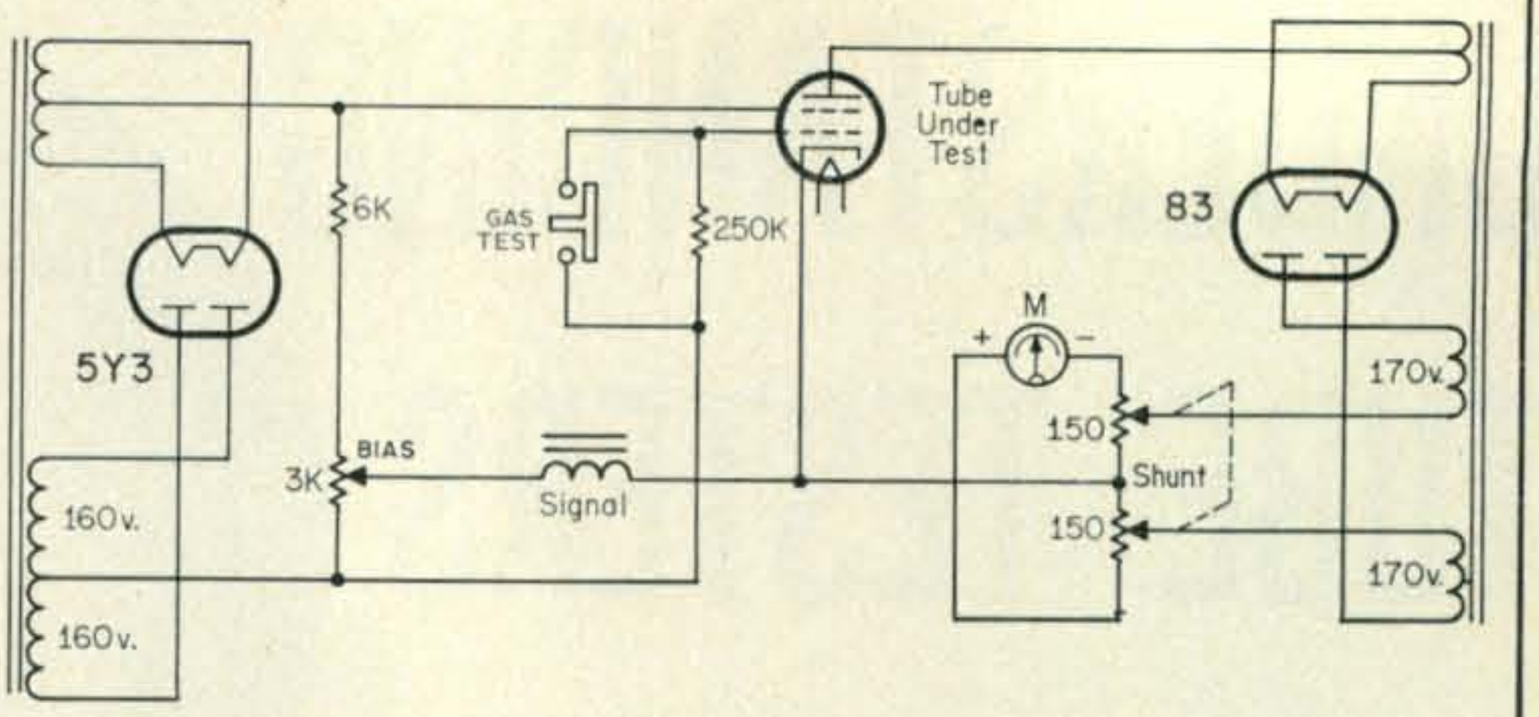


Fig. 2—Tube tester circuit arrangement for a transconductance test. Pentodes are tested with the suppressor grid connected to the cathode.

tecting shorted elements is shown in Fig. 1. An a.c. potential of 170 volts is applied to a switch through a series circuit that includes resistors, a capacitor and a neon lamp. Rotating the switch through its several positions causes the series circuit to be connected to different pairs of elements of the tube being tested. A short between any pair of elements completes the electrical path and causes the neon lamp to glow. The switching arrangement is such that the neon lamp may glow in more than one position. Reference must be made to a chart in the instruction manual to determine which elements are shorted if that information is wanted.

One of the modern testers uses a higher potential that is applied simultaneously to several neon lamps arranged in series. An electrode in each neon lamp is connected to an element of the tube under test. All tube elements are tested simultaneously without the aid of a switch. With this circuit the neon lamps all glow to indicate a normal tube; shorted elements cause one or more of the lamps to be extinguished.

If tubes are found to have shorted elements they should be discarded without further testing. This procedure is generally recommended to avoid damaging the tube tester.

Transconductance Test

The transconductance of an amplifying tube is measured at 60 cycles per second with a circuit of the kind shown in Fig. 2. The transformer windings shown are part of the main power transformer in the tester. The potentials for the control grid and the screen grid (if any) are supplied by one full wave rectifier while the plate potential is supplied by another. A mercury vapor rectifier tube is usually used as the plate rectifier to minimize voltage drop during the test. The a.c. grid signal is supplied by an independent winding on the power transformer. Grid bias is provided by returning the cathode circuit to a variable tap (bias control) in the resistance network that is across the screen supply.

The transformer windings that supply the plate circuit are carefully balanced. The neutral ends of these windings are connected to the arms of the "shunt" potentiometer and through it to the indicating meter and the cathode of the tube under test. If the tube being tested was conducting equally on each half-cycle of power from the transformer the currents through the meter would be equal and opposite, resulting in a meter reading of zero. As the plate potential pulsates at 120 cycles per second, the grid signal varies through both positive and negative values. This causes the conduction through the tube to be greater on one half of the power cycle than on the other. The meter responds by indicating a value (in units of micromhos) that is proportional to the transconductance of the tube under

View of a modified I-177 tube tester, a surplus unit found in many ham shacks today.

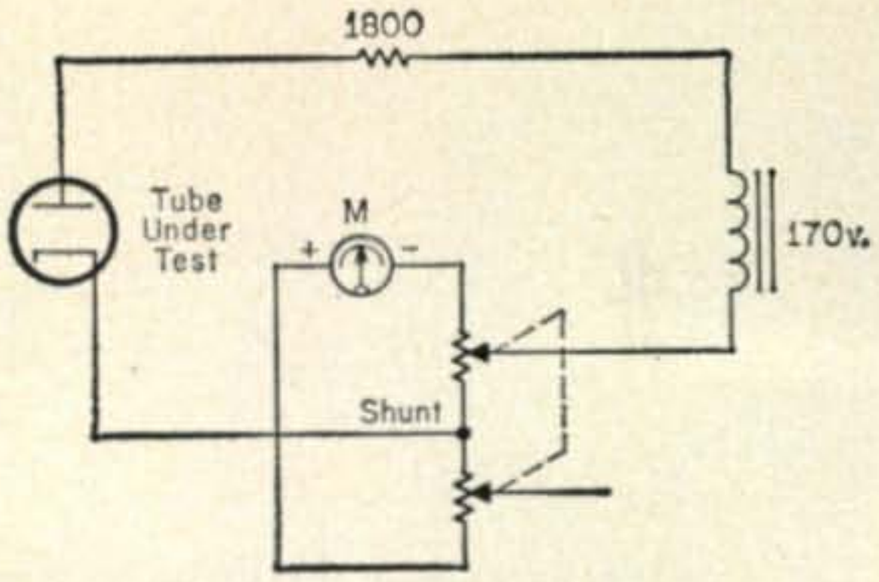


Fig. 3—Circuit used to test power rectifiers.

test. A few test conditions require that a reversing switch be provided in the meter circuit (older testers labeled it "117N7"). As a rule, testers are also supplied with a switch for changing the range of the meter.

Two other tests usually associated with the transconductance test are the "gas" test and a check of cathode activity. The gas test is made to determine if gas is present in the tube envelope. It is similar to the transconductance test but is made with bias increased nearly to the point of cutoff and with a quarter-megohm resistance in series with the grid.

The cathode activity test involves reducing the filament voltage by 10% and noting the decrease in transconductance. A reduction not exceeding 25% is considered normal for most tubes.

Rectifier and Diode Tests

Standard rectifiers are tested using the circuit shown in fig. 3. An a.c. potential of 170 volts in series with a resistance of 1800 ohms is applied to the tube which then supplies rectified current to the meter circuit. The "shunt" setting is selected for each type of tube so that a normal tube will cause the meter reading to be on the upper half of its scale. Diodes of the type used for signal detection are tested in a similar circuit as shown in fig. 4. In this test a tap on the transformer winding provides an a.c. potential of only 15 to 20 volts to the diode under test; a diode load of 1250 ohms is used.

Cold-cathode rectifiers are tested at a potential of about 340 volts using the circuit shown in fig. 5. With this arrangement the two power transformer plate windings are connected in series-aiding. As with other tests on rectifiers, a

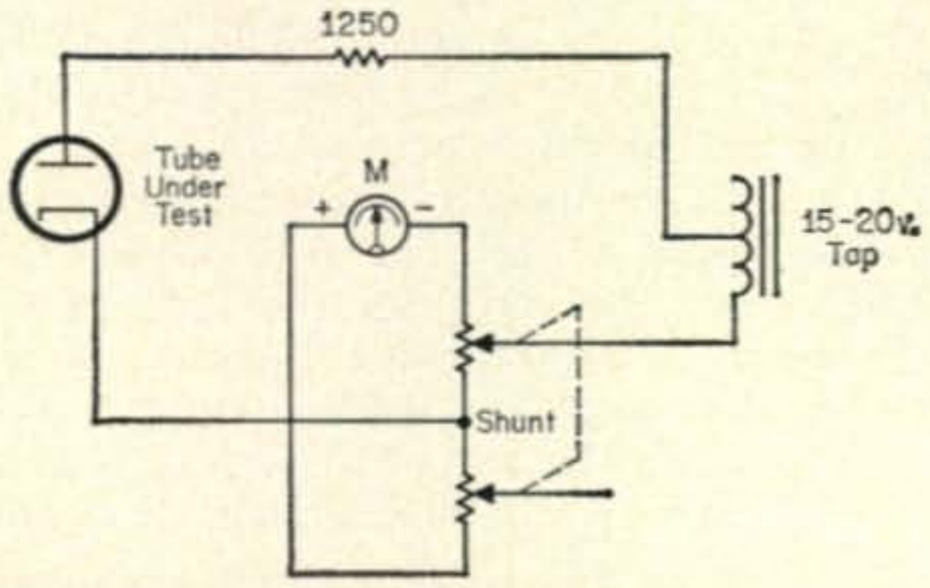


Fig. 4—Circuit used to test signal diodes.

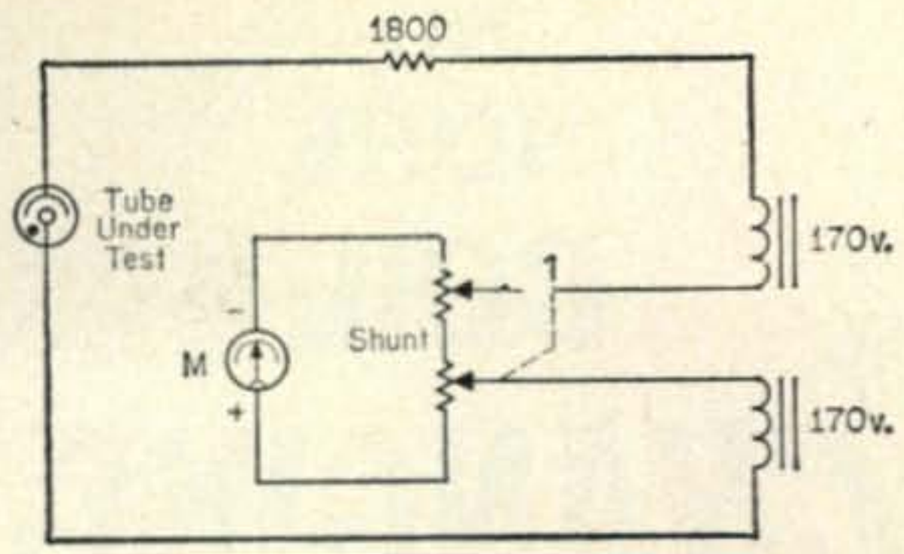


Fig. 5—Test arrangement for cold cathode rectifiers places both high voltage windings in series aiding.

current limiting resistor of 1800 ohms is part of the circuit.

Other Features

A circuit is included in the tester to permit testing tubes that have either directly or indirectly heated cathodes. This circuit includes a center-tapped resistor and a connection to the filament voltage selector switch. The resistor is connected across the filament leads whenever filament voltages of 12.6 or less are used. The center tap on the resistor is connected to the cathode circuit of the tube under test. The circuit is illustrated in fig. 6.

Transconductance readings are subject to direct variation with power line voltage. It is essential, therefore, that a line voltage correction be made for every tube test. Older models of tube test sets include a circuit similar to that shown in fig. 7. Series resistance in the power transformer primary circuit permits the adjustment of the line voltage to that value that is required by the primary winding, usually about 93 volts. Circuitry is provided to permit the "micromho" meter to function as a voltmeter in the plate potential supply circuit. Some of the more modern testers use a similar series rheostat for adjustment but provide a separate meter for the measurement.

Some tube testers include a "noise test" circuit. This permits the antenna and ground circuit of an external receiver to be connected to the tester to detect the generation of r.f. noise as the short test is made on the tube.

General Considerations

The commercially available tube test sets of the "Dynamic Mutual Conductance" variety do a creditable job. They cannot, however, test a tube under every possible circuit condition. They do not provide for tests at radio frequencies or

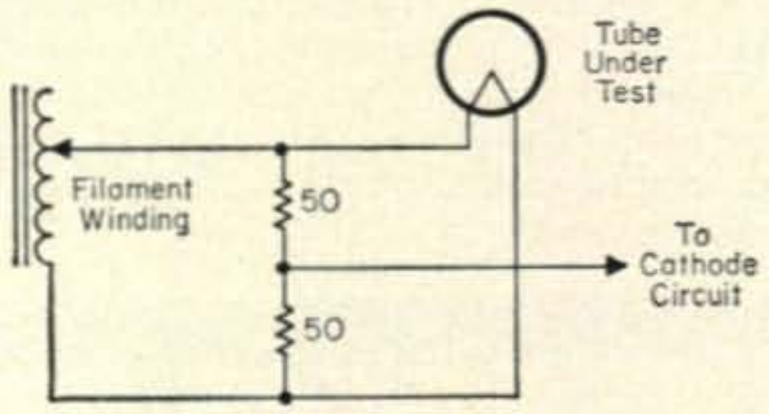


Fig. 6—For direct heated filaments the heater circuit midpoint is connected to the cathode circuit. This is done for filament voltages of 12.6 volts or less.

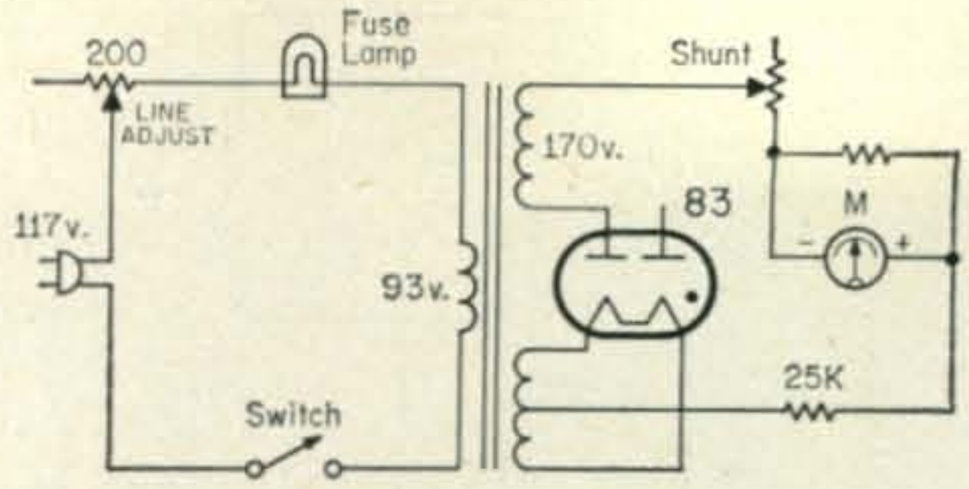


Fig. 7—Circuit above shows how the meter measures d.c. for line voltage adjustment.

under pulsed conditions. This accounts for some of the cases in which a tube will pass all tests on a test set but fail to work satisfactorily in a transmitter or a receiver.

Tube testers of different age or make may differ as to the conditions under which a tube is tested. While the meter readings are proportional to transconductance, the test does *not* constitute a rigorous measurement of transconductance. In the case of a 6AK5, for example, one tube handbook rates its transconductance at 5100 micromhos. Some tube testers call for an indicated reading of 4500 as an objective whereas others require the tube to reach an indicated value of 1500. About the only way to compare the readings of an individual tube on testers of different design would be to measure the tube on each tester and rate its indicated transconductance as a percentage of the figure called for on the tube tester chart. The percentage figures should be reasonably close.

Most of the above examples of tube tester circuitry have been taken from the I-177 because it is representative of the kind of equipment that is now available to most amateurs When using any tube tester, the manufacturers instructions should be carefully followed Failure to do so can result in damage to the tube being tested or to the tube tester itself. In addition, the user can be completely misled as to the quality of a tube if he does not follow instructions.

Do It Yourself Tube Testers

In recent years several makes of tube testers have been appearing in drug stores and supermarkets. These devices are necessarily limited to "go" or "no-go" tests. One make tests for shorts by using a circuit similar to that shown in fig. 1 but without any switching. One of the leads from the short test circuit is connected to the grid or grids of the tube under test; the other is connected to the plate (s) and cathode (s). Only grid-plate and grid-cathode shorts can be detected with such an arrangement.

The test for tube quality is an emission test only and is similar to the standard rectifier test described above. The grids of the tube being tested are connected to the plate; the meter indicates the total current flow through the tube. If the tube happens to be a dual triode (such as a 6SN7) only one of the triode sections is tested for emission. One thing can be said for this kind of tester—if it rejects a tube, the tube is *really* bad! ■

Let's Clear the Air About Rockall!

BY LAURIE MARGOLIS,* G3UML

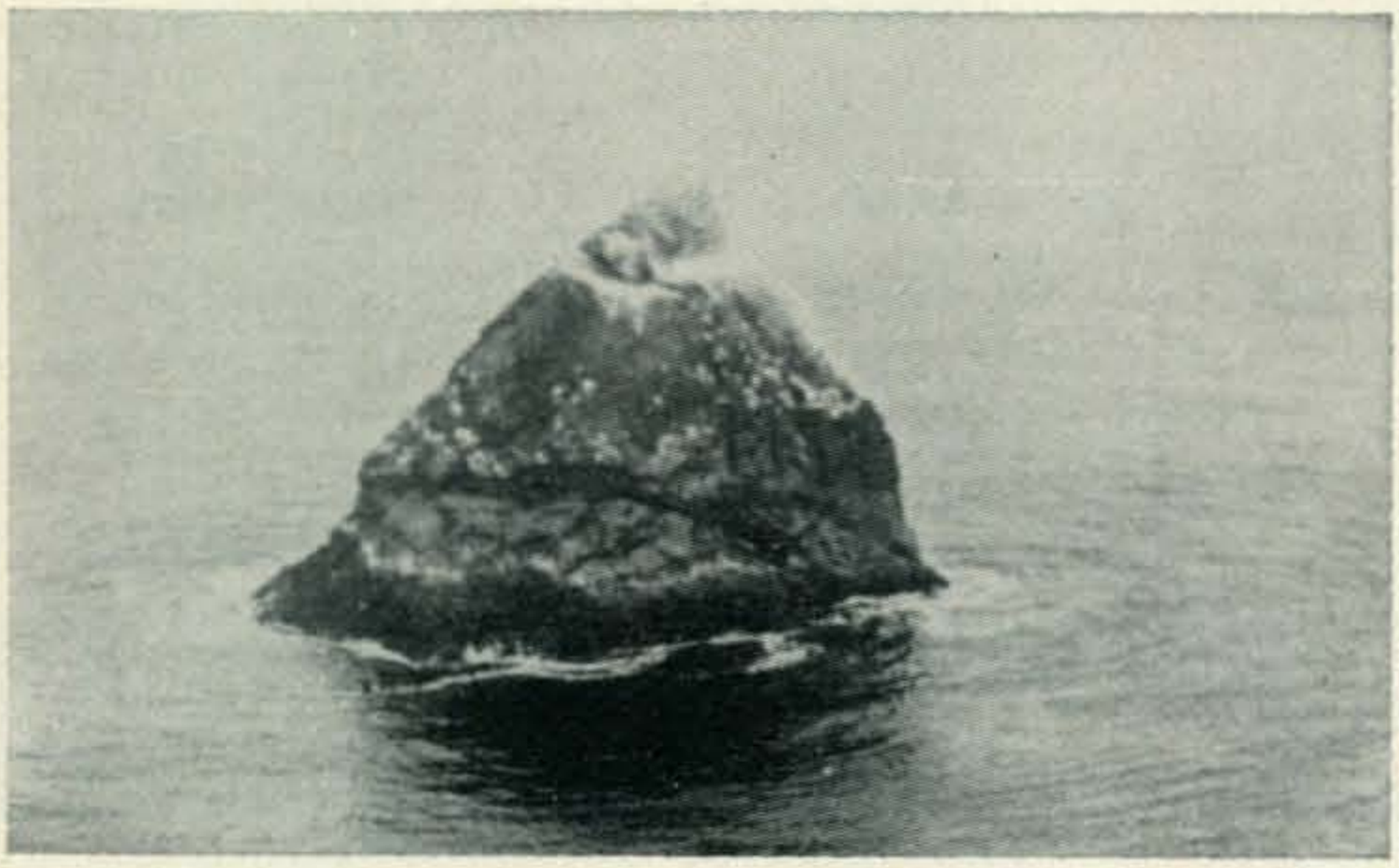
How many rare islands have you worked recently? With the help of various DX-peditions, you have probably got quite a few peculiar callsigns into your logbook. And no doubt names like Desventurados, Maria Theresa, Amirante and Manihiki roll off your tongue as easy as Fifth Avenue, the Golden Gate and Winston-Salem. "Sure, I know all about it. It's a thousand miles south of Tokyo and you QSL via W8XYZ." Yeah, and if someone told you that the natives had green hair, you'd know even more. But seriously, how much do you know about a fair number of the places you blithely QSO? The purpose of this article is to tell about one of these "countries," over which lately the rumors have been flowing thick and fast and the hot air has been vented in abundance. Incidentally, if you have this one already worked and confirmed, you must be a very remarkable person with a vivid imagination.

Rockall is an isolated rock in the north-eastern Atlantic Ocean. Its position is Lat. 57° 36′ N., Long. 13° 40′ W. It lies about 300 miles west of the most westerly Scottish mainland and has a similar distance north-west of the Irish coast. It is 65 feet high, 83 feet across and has a circumference of about 250 feet. It is geographically unusual because it is not part of any of the continents as we know them today. It is separated from the European Continental Shelf by a very deep trench and is one of the few remains of the ancient continent called Arctis. It is thought to have been formed around 40 million years ago. At this time an immense plateau was evolved through volcanic activity. This plateau is still in evidence as the Rockall Bank and lies about 100-200 fathoms below sea level, as opposed to the deeps, which are some 800 fathoms further down. Rockall is the remains of a mountain, now almost completely submerged. A few hundred yards north-east of it there is another submerged mountain, which rises about 3 feet above water and about 1½ miles further away in the same direction is situated a reef (the cause of several wrecks,) which only occasionally is visible above the surface. These are named Hasselwood Rock (after the master of the ship that found it in 1812) and Helen's Reef (after a large liner that sunk there in 1910.)

Rockall is composed principally of types of granite and also magnetite. The latter causes it to be highly magnetic and it appears to be the reason for a magnetic anomaly a little way from the rock. The granite, now known as Rockallite, is of interest to geologists because it contains unusually large amounts of sodium and other minerals. The built-in magnetism might possibly do interesting things to any r.f. emanating from there.

Those are the dry facts about Rockall. Now let's put it into slightly more human terms. 65 feet high—the chances are your beam is a lot higher. 250 feet circumference—a car doing 60

*95 Collinwood Gdns., Clayhall, Ilford, Essex, England.



From the west, on an exceptionally calm day.

would take under three seconds to cover that distance. Clearly this place will never challenge Texas for size. The only large thing about it is its distance from anywhere else—enough to earn it that magic "new country" status.

For such an insignificant spot on the map Rockall has quite an interesting history. Its earliest possible discovery date seems to be 545 A.D., although this story is surrounded in legend and lacks much definite detail. It seems that in 545 a gentleman named Brendan the Navigator set sail in a curragh from Kerry in Ireland, on a voyage which lasted 5 years. He is supposed to have gone to the Faroe, Shetland and Westmann Islands (Iceland) and also perhaps to have seen Rockall. Actually Brendan's second voyage, started in 551, is far more interesting. Then he was said to have gone to Newfoundland, the Bahamas and Florida. In Florida he found an Irish monk already living there! Obviously none of this need be taken too seriously.

Between the years 900 and 1500 various islands, large and small, appear where Rockall should be on contemporary maps. The cartographers of the time seem to have been obsessed by lands with exotic names, like Hy Brasil, Buss, Frieseland, Daithuli and others. These ideas were probably produced by rumours of the Americas and by misplacings of the existing islands of Faroe, Iceland, Flannan and St. Kilda. Vast lands are marked on maps to the west of the British Isles, positioned at what we now know to be the middle of the Atlantic Ocean. No really concrete information becomes evident until after the definite discovery of America, when Atlantic sailing became more common. Even then, it is not until 1606 that an island in Rockall's position and identified as such was correctly marked on a map, although there had been several near certainties in the preceding century. However, throughout the seventeenth century, Rockall appears on British, French, Dutch and Scandinavian maps fairly regularly. In those days it was known as Rokol or similar, and, by the eighteenth century, it was commonplace on all decent nautical charts.

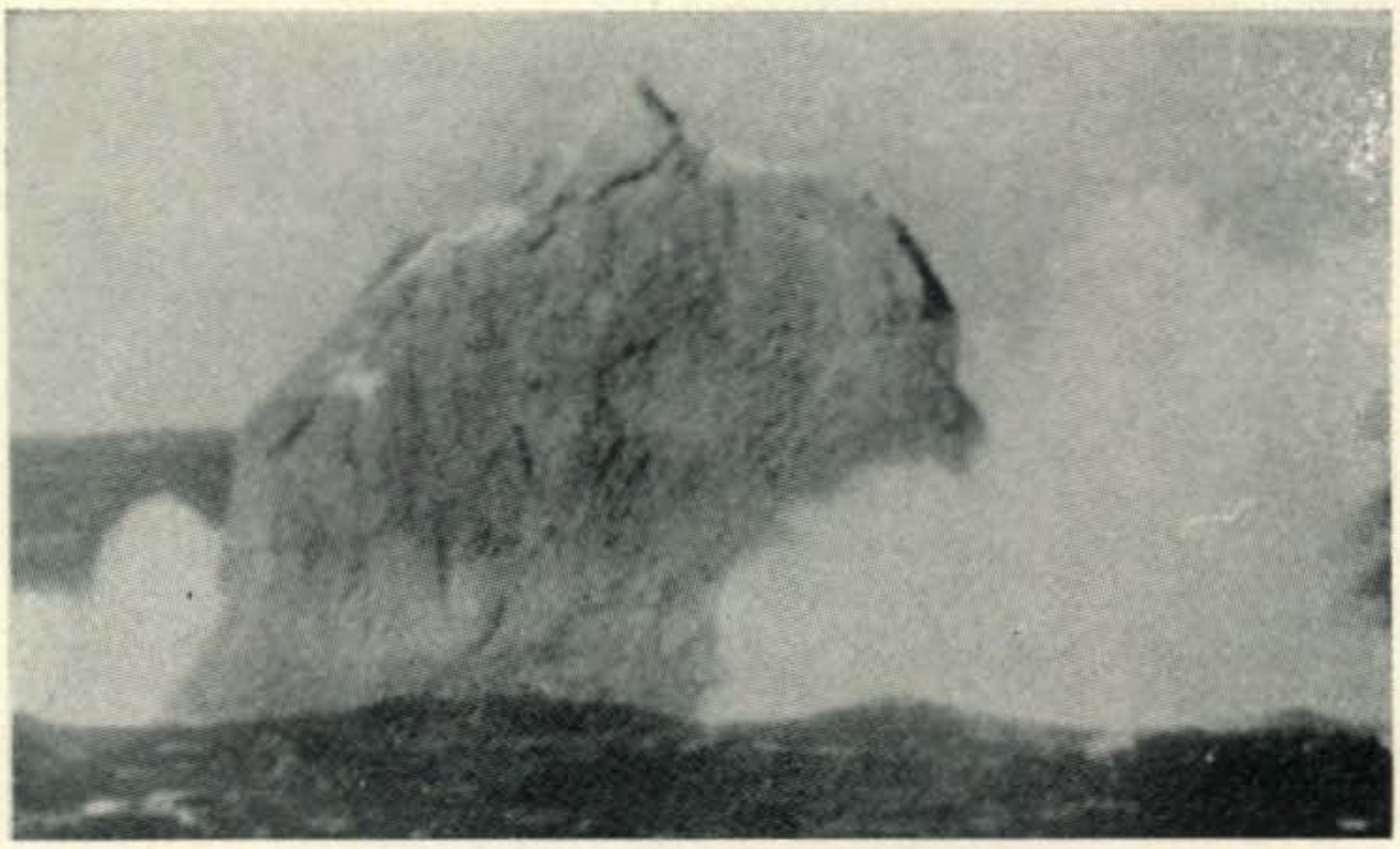
From about 1700 onward, Rockall was sighted fairly regularly, for, although it was, and still is, well away from any major shipping lanes, whalers, returning from Greenland, passed quite near to it, and it was the center of a rich fishing area. It was frequently mistaken for a ship and from a distance its resemblance to a vessel under full sail is remarkable.

In 1812, a party from the British frigate H.M.S. Endymion managed to land on the island. They were on rather longer than they intended, for a fog came down and the vessel drifted away and had some trouble returning. Regrettably, the bands were dead at the time.

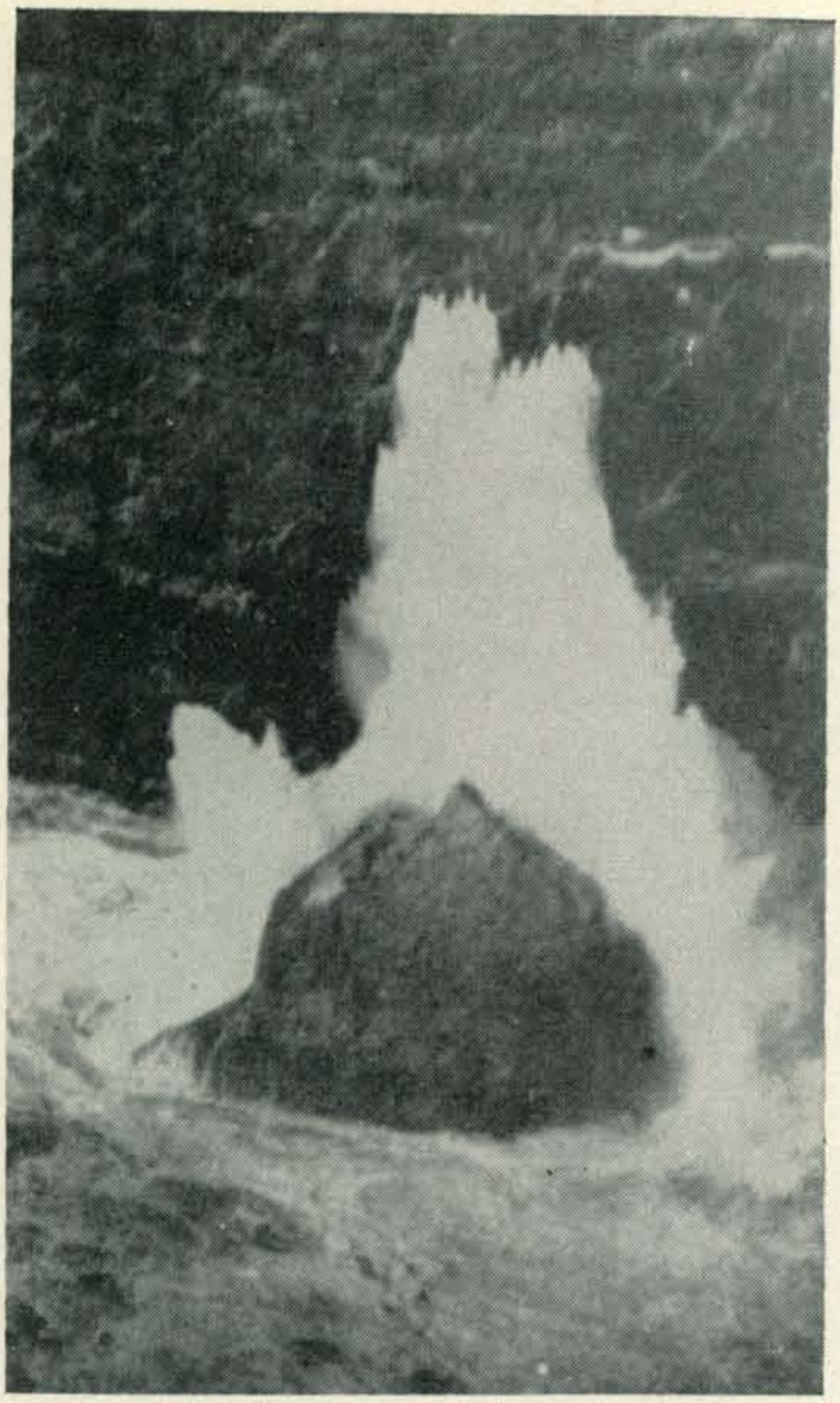
From then up to 1955 only about eight separate landings were made on Rockall. Most of these were scientific expeditions attempting to gain some more information about the structure, flora and fauna of the rock. Much more was discovered about the Rockall Bank, mentioned earlier. The bank was sounded and measured in 1831 by H.M.S. Pike. It was found to be an irregular oval about 280 miles from north-east to south-west. In common with other banks of this kind, the Rockall Bank was found to be an excellent fishing ground. It is not greatly popular with fishermen, however, due to the bad weather conditions that predominate in the area.

Few of these expeditions were successful, due to the near impossibility of landing on the rock from the sea. And, even if you got on, you had to get off again. Perhaps this point would be convenient to describe the rock a little more closely. The dimensions have been given. One side (east) is completely vertical and all the other sides are very steep. There are tiny promontories to the south and west and this is where the very few sea landings were made. After a mighty leap from your boarding vessel, it is apparently possible to get on to the rock and scramble up it without falling into the Atlantic Ocean. But it must be mentioned that on the calmest day ever known at Rockall, in 1947, when there was hardly a ripple on the water, the swell against the rock was three feet. For the unknowing, this means that, in relation to the rock, the sea was going up and down three feet—and this is an exceptionally calm day. On what is considered a reasonable day in the area, the sea goes up and down six to ten feet (that is before the waves have been taken into account), and during a storm the water goes clean over the top.

Let's view this practically. When one decides to jump from his boat to the rock, he may seem to be level with the rock and look forward to



Breakers on Rockall, from the east.



A 160 foot wave breaking over Rockall.

a nice smooth landing. By the time he takes off he could well be twice his own height above ground. When he is standing happily admiring the scenery, should one of the larger waves come along, it will take him right off.

Rockall looks very roughly like half a cone, the curved south-westerly side being to windward, as, unfortunately, is the ledge which is the only horizontal part of the rock. Consequently, the waves coming in are inclined to roll up the rock with quite amazing force. The spray from the waves often reaches well over 100 feet into the air. It has been photographed at 170 feet. Remember that the rock is 65 feet high and you will see that the explorers had some reason to be careful about their landings.

The most successful landing on Rockall by sea was the French one of 1921. They were able to bring back many specimens of the algae that live on the rock and also some chippings of Rockallite. After the Second World War it was realized with some surprise that Rockall did not actually belong to anyone. The 1812 expedition had not claimed it for England and neither had any other power taken possession of it. So in 1955 Great Britain committed a piece of blatant colonialist aggression. She officially annexed Rockall (and conferred upon it the prefix GR!).

There were several reasons for this. To start with, the nearest land to Rockall is Scoltand. The trawlers which used the Rockall Bank were almost exclusively British and we wanted to have some official rights. Also, there were plans for a missile sight on South Uist, in the Hebrides, that was to aim in that direction, and we did not want to risk bombing someone else's territory.

Under conditions of great secrecy the deed was done. H.M.S. Vidal, a crack new survey ship of the Royal Navy, was to land a party on Rockall and they were to raise the Union Jack flag and cement in a plaque announcing what had happened and do it all properly. The reasons for the security precautions were obvious; you do not make a proclamation about an annexation until after it has been done.

For the first time Rockall was approached from the air. Vidal stood about half a mile off and the landing party went in by helicopter. This was not as easy as it sounds, for they had to be winched in—a risky business, but not nearly as dangerous as a sea landing. The weather, although not fine, was sufficiently good to allow the operation to be carried out without incident and, on the 18th September, 1955, a tiny addition was made to the normally decreasing British Commonwealth!

There are two particular points of interest to radio amateurs in this landing. Firstly, the tripod on which the Union Flag was raised would, if still standing, make an excellent antenna support. Secondly, two highly trained commandoes attempted the climb from the top to the bottom of the rock. Apart from getting drenched with spray, they rated the climb "very difficult." So, if any prospective DXpeditioner has any ideas of nipping smartly up the rock with a transceiver, generator, etc. on his back, he'd better think again. The only way to get to Rockall with equipment is by air.

That brings the story to the present day. To the best of my knowledge, nobody has been to Rockall since the 1955 operation.

For those of us who love nature as well as DX, there are no plants or trees as such on the rock. The local foliage consists of about a dozen different kinds of algae, with long Latin names. There are also some dwarf species of lichen, and an alaria seaweed, that grows near the water line. As for animals, only six kinds have been found on the rock. They are a periwinkle, an amphipod, two kinds of mite, an orange rotifer and a trematode, none of which are likely to attack even if provoked. The most important natural thing about Rockall is its bird life, which, according to experts, is absolutely fascinating. There is some controversy as to whether birds have ever actually bred on the rock. There is a little evidence to support this theory, such as birds' having been seen in incubation attitudes on the ledges, but on the whole it seems unlikely that any birds have ever been hatched on Rockall. Any eggs laid there would almost certainly have been blown off or washed off by a big wave before they could hatch. The bird population of Rockall builds up through April to reach a peak in June. Then it drops off until, by October,

there are rarely any birds on the rock. Types seen in greatest profusion include petrels, shearwaters, gannets, skuas, gulls, fulmars, kittiwakes and guillemots. The last three are the most common and, if any birds should breed on Rockall, it will most likely be them.

Probably the topic most concerning our prospective DXpeditioner (and anyone else, for that matter), will be the weather. No records have ever been kept at Rockall itself, for obvious reasons, but there are some weather ships nearby. Thanks to the Meteorological Office at Bracknell, in Berkshire, England, I was able to study the statistics compiled at the Deutscher Wetterschiff, "I," located at 59° N. 19' W., which is near enough to Rockall to make little difference to any climate observations, I have tabulated some of the more important figures for clarity. I have considered only the months April through September, as the weather is too bad to be true during the winter!

Average Temperature

Month	Temp. in Degrees C	Temp. in Degrees F
April	8	46.4
May	8	46.4
June	10	50.0
July	12	53.6
Aug.	13	55.4
Sept.	12	53.6

Fluctuations from these figures are similar to those at any northern temperate location.

1.1% of the days in the year have less than force 2 wind. This means that on about 5 days each year there is less than a breeze! September is the calmest month, with up to 2 days of calm

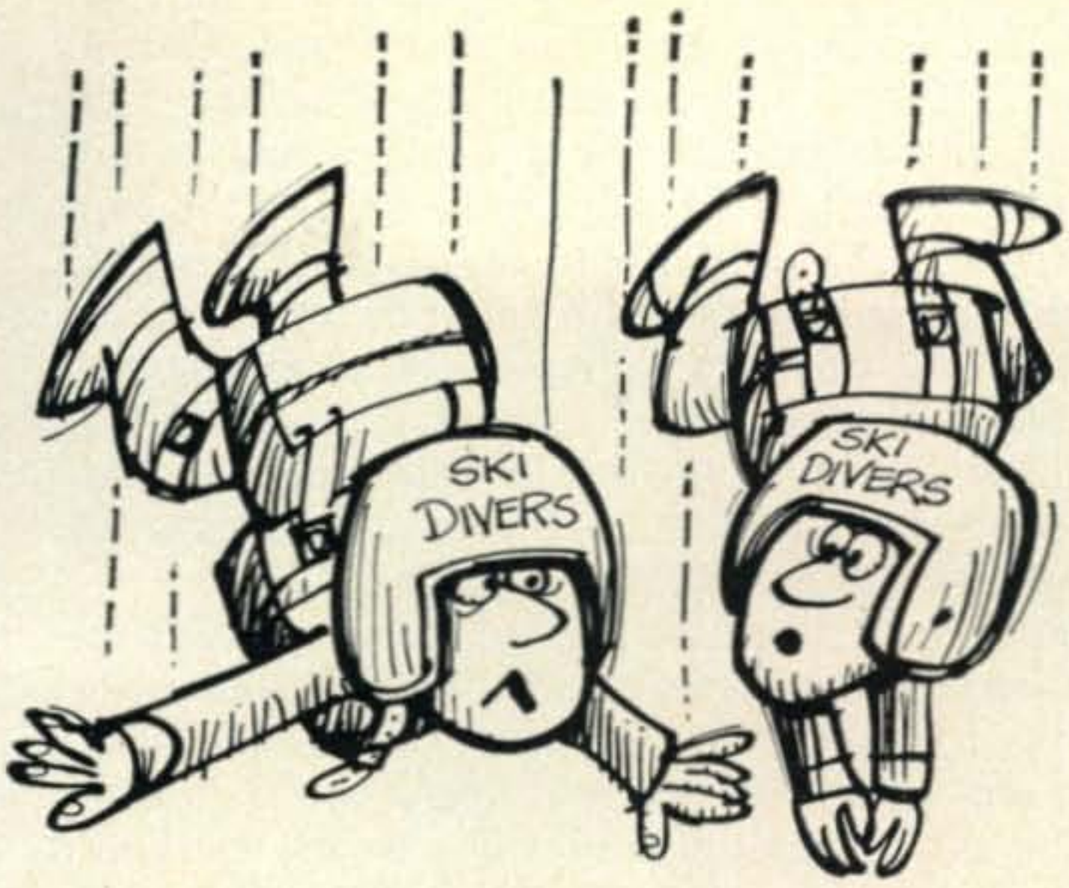
Average wind speed.	April	30 m.p.h.
	May	22 "
	June	21 "
	July	21 "
	Aug.	21 "
	Sept.	25 "

About 60 days of the 180 in question had winds greater than force 6. About 10 days had above force 8, which is roughly 55 m.p.h. and approaching hurricane force.

The average relative humidity is 82% and the most fogbound month is July, when up to 3 days are likely to be affected.

It is clear that the weather goes nowhere to helping the visitor to Rockall and this is in fact why nobody has ever been able to operate from the rock before. Admittedly, nobody has tried very hard. . .

So there you have it— the geography, geology, history, habitation and climate of Rockall. Now let's consider the problems facing our would-be intrepid Dxpeditioner, as he sits dreaming of the pile-up he will create with his new GR callsign.



"Wadd'ya mean you thought I was carrying the equipment?"

Do-It-Yourself Guide To DXpeditioning On Rockall (In Five Easy Parts)

When—April is cold and very windy. May is somewhat calmer, but still cool. June, July and August look good apart from the slight possibility of fog. September looks best of all on the weather charts, but I think that is stretching it a little far towards winter. I would say the second week in August is best.

How—Any landing by sea can be discounted for reasons given earlier. It would have to be in a vessel carrying a medium-sized helicopter. Consequently a fair sized military ship would be needed, with a pilot capable of maneuvering a man hanging from a winch cable onto a very small precarious space. Equipment would of course be brought the same way. As this is British territory it would probably have to be a British ship that is used. Incidentally, you can forget any ideas of lassoing a long wire around an island and saying that, as your aerial is in the country, it should count. The rig, power supplies and operator have to be in the country, as well as the operator, to earn a "credit."

Where—There is only one place on the rock where operation could take place from. That is Hall's Ledge. Basil Hall was one of the officers on the 1812 landing. This ledge wraps itself for 20 feet around the south-west (windward, unfortunately) corner of the rock. It is 12 feet below the peak, between 6 and 10 feet wide and liberally clothed in guano. On here, in 1955, the plaque was cemented in, declaring Rockall a British possession and a tripoidal structure was erected to support a flag. I do not know whether this is still standing.

Gear—Power supplies would be the greatest problem. Some sort of small, light but powerful generator would be needed. It would have to create a minimum of noise, electrical or mechanical, because it would be standing at the most about 20 feet from the operator. A transceiver with fairly high power and ample split frequency

provision would be needed. The best kind of antenna would be some sort of trapped vertical affair. If the support mentioned earlier still stands, mounting such an antenna would be no trouble. If not, some way of fixing it to the top of the rock would have to be devised. It might also be possible to erect a small beam upon the tripod, but this is a rather doubtful likelihood. Another idea is a wire carried by a gas filled balloon, but very calm weather conditions would be needed for this. All the gear would have to be well protected against moisture.

Operating—Rockall is located within easy skip distance of Europe and North America and most parts of those continents would be easily reachable on 20 and 40 meters. There will certainly be no night-time operation, due to the extreme difficulties of removing somebody from the rock in the dark. Bad weather forms very quickly in this area and it could be necessary to evacuate at a moment's notice. About the maximum operation that could be expected would be three stints on consecutive days, lasting about 12 hours each time. This means that the largest number of QSO's that could be made, averaging three a minute over long periods would be perhaps 4,000. Because of this QSO's would almost certainly have to be rationed to one per station, regardless of band or mode. There just will not be time to dispense multiband efforts. Logging would be another difficulty. The best way would be by means of a portable tape recorder. There should be no trouble getting out from Rockall, as the station would be located 50 feet above sea level, with salt water all around.

Two things could prevent good signals, apart from bad conditions. One is the magnetic effect mentioned earlier. The other is that, as Rockall is purely a lump of rock with no soil at all, a good earth system would be a near impossibility. The only thing I can think of is some kind of resonant counterpoise to throw over the side of the ledge, or else just a plain, long piece of wire going into the sea. Long distance DX might be hard to work from Rockall; nevertheless, it should be possible with economic use of 10 and 15 meters, should they be open at the time.

There is very little more to say about Rockall. In fact, considering what it is, it is remarkable that so much information exists about it. My facts were obtained from numerous sources, the principle one being an excellent book by Mr. James Fisher, the well-known ornithologist. Others include the Meteorological Office, the Admiralty, the Royal Air Force and various newspapers.

The difficulties surrounding a DXpedition to Rockall are immense, but I know that it will be done, and in the not too distant future. Nevertheless, there has been such a lot of deceit and double-dealing in the DX Game lately that it is best to watch any activity very carefully. Any operation outside of the beginning of April through the beginning of October will be bogus. Believe your beams—there will be no miracle long path openings to Rockall from the eastern U.S.A. or anything of that sort. I have attempted to make everything about Rockall crystal clear for everyone, so, when you break through the pile-up, you'll have an idea of what you're talking to.

Now, who's going to be the first to work from there? Get goin', boys, we're all waitin'! ■

WHERE ARE TOMORROWS HAMS COMING FROM?

From folks like these

The Westchester Amateur Radio Club is launching their campaign to attract young people into amateur radio. They are also helping those already licensed to improve their skills and upgrade their licenses. In the center of such a group is Walter, W2FWZ: standing l. to r. Nick, WB2TQC and Bill, WB2PUX and seated l. to r. Frank, WB2ZMK, Demi, WB2QKT.

Rudy Heath (center) at the mike during a demonstration of amateur radio communications before the Young Adults Study Group of the Hyde Park Community Church, Cincinnati. Hank, W8CHT, (right) spoke on "Amateur Radio: What It Means to Me." During the social hour that followed the meetng, W8CHT was assisted by Jim, W8OUU, (left) and Jim, WA8COA/WA9FEW (taking the picture).

Clever Quips!

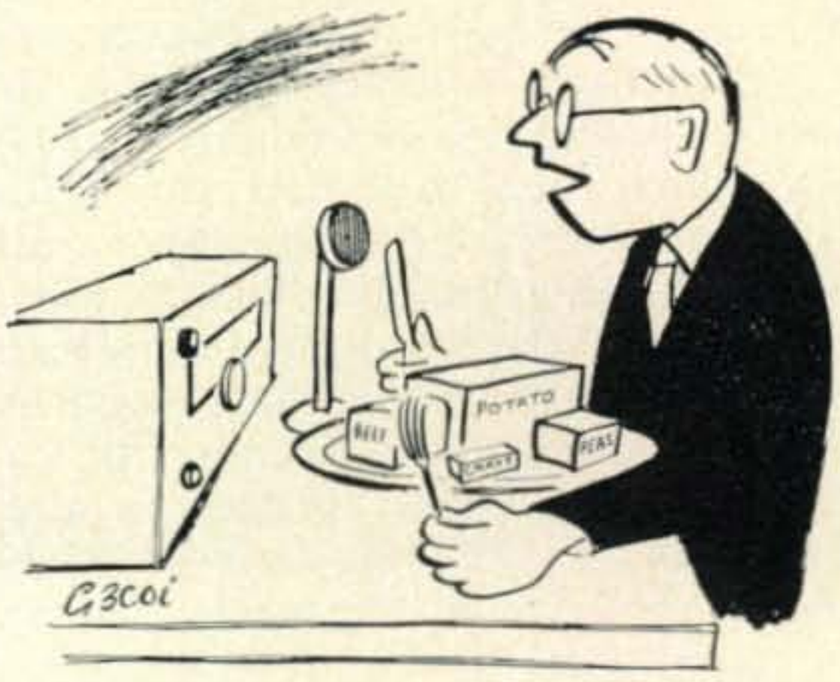
"We are using a temporary lash up here . . ."

"One of these days I'm going to fit a decent vernier to this v.f.o."

"The rotary beam here is quite unusual . . ."

"He wants to know if we have phone patch capability"

"QRZ the GW I think . . ."



"Everything here is in modules . . ."

DX

BY JOHN A. ATTAWAY,* K4IIF

WAZ & WPX

During the previous month the following amateurs have qualified for certificates:

WAZ-Phone: UR2KAA. **WAZ-SSB:** UR2KAA, K8YBU. **WAZ-Mixed:** UR2KAA, W6AJP, DL9EZ, VK5MS, DJ3GI, 9M2UF, UA2AC, UA4KPA, UB5ND, W9BGX, JA6AD, DL8FR.

WPX-CW: W8SH, DJ6EO, WA2LRK, UA3DI, UP2CT, UB5QA, UA3KLO. **WPX-Mixed:** VE3AAZ, W4HA. **WPX-SSB:** LA4DJ. **WPX-Phone:** VE3BSJ, W9ZTD. **WPX-Europe:** W9ZTD. **WPX-CW 350:** W9ZTD.

We regret that we are unable to number and issue the certificates until the transfer of the material from New Jersey to Florida is complete. Please bear with us until the many years of records and files are transferred from the QTH of the outgoing editor to that of the incoming editor. Soon we will have everything under one roof again and the schedule restored.

We hope that you enjoyed chasing prefixes during the SSB DX Contest and that many of you qualified for the specially endorsed certificates. Incidentally, when you apply for one of our awards send along a photo of yourself at the rig. We hope to use a lot of pictures in the future DX columns.

Novices, Novices, Novices

Remember that competition starts May 15, 1967 for the new **WPNX Award** which is for Novices only. We plan to make a big deal out of the first WPNX certificate earned so get off to a good early start. The rules will follow those of WPX except that Novices are only required to have 100 prefixes. After the award is fully established we probably won't require that QSL cards be sent in as proof of contact. However, in the early stages of the race with everyone competing for Certificate Number One it will be necessary to send the cards. An application should include the following: 1. a completed WPNX application blank containing the calls of your 100 stations clearly printed in alphabetical order, and 2. 100 QSL cards confirming your contacts which must be made *after zero hours* GMT *on May 16, 1967* (7 P.M., EST; 6 P.M., CST; 5 P.M. MST; and 4 P.M., PST on May 15, 1967). The application blanks may be obtained from this QTH, Box 205, Winter Haven, Fla., by sending a self-addressed stamped envelope. When you mail your application and cards be sure that the envelope is postmarked clearly because the winner will be determined by the earliest postmark.

As a reminder, there are many prefixes available just in the USA alone, as W4, K4, WA4, WB4, and WN4 all count as individual prefixes. However, roughly half will be DX prefixes so get up on 15 meters and get going. You'll be surprised at how easy it is to pick up DX prefixes with 21 mc open to Europe, S. America, and the Pacific.

Attention DX Stations: These novices are going to be looking for you so please give them a break. Tune up above 21.100, cut the speed back to about 10 words per minute, and see if you can stir up a pile. Let's show these newcomers what working DX is all about.

SSB DX Award

No new SSB DX Award certificates have been issued for the reasons outlined above. At the present time we are also doing some soul searching with regard to our countries list. In the past we have closely adhered to the ARRL DXCC list because this list has a long tradition and has always been zealously protected by the DXCC Awards Committee. However, we now feel that the ARRL list is in a bit of trouble. We do not intend to attack either DXCC or the ARRL because we belong to both and consider the gentlemen at headquarters to be our friends. As we see it the league has slightly overextended itself in recognizing new countries to prolong the Honor Roll competition. This is partly responsible for the present "Don Miller squabble." This writer feels that the time has come to formulate a stable country list. After all, there are fewer than 150 real countries in the world. We aren't trying to tell the League how to run its business because they've been doing it for a long time and don't need my advice. However, our SSB DX Award has a substantial following and we would like to hear from them with regard to the desirability of changes. Be assured that there will be no hasty or ill-considered changes, but over the next few months there will be changes if you advise me that you want them.

Guenther Joraschkewitz, HB9UD, explains amateur radio to African ITU delegates. *(Photo courtesy F8RU)*

*P.O. Box 205, Winterhaven, Fla., 33881.

As examples of some of the things we might consider, why not delete Bajo Nuevo, Serrana Bank, St. Peter and St. Paul's Rocks, and Malpelo? None of them is a fit place for human habitation, and if a place isn't capable of supporting even one solitary human being it is a far cry from being a country. Why not delete Navassa? Its nothing but a rock with an automatic light house and the Coast Guard won't allow anyone to go there. The U.N. Building in New York is not a "country" so why should the ITU building in Geneva be one? I've never had to show my passport when I went in and out the door.

On the other side of the coin there are possible additions. In that vast area we call UA9. UAØ—Siberia, there are a number of political subdivisions called Autonomous Soviet Socialistic Republics, abbreviated A.S.S.R. For example, the Tuva A.S.S.R. in Zone 23, the capital of which is Kyzyl; the Yakutsk A.S.S.R. in Zone 19, the capital of which is Yakutsk; and the Buryat A.S.S.R. in Zone 18. Perhaps these could qualify as countries, and perhaps you can think of others. Let us hear from you.

De Extra

Most of you are aware that on Feb. 20, 1967 the ARRL DXCC Awards Committee issued a position paper entiled DXpeditions and the ARRL DX Century Club. The subject of this paper was the recent series of DXpeditions by Don Miller, W9WNV. It's content has been so thoroughly discussed that it is unnecessary to repeat the entire nine pages and two letters. Consequently, De Extra will present only the highlights, make a short comment or two, and then turn the forum over to the readers who have sent us letters on the subject.

In summary, the committee concluded that Dr. Miller violated DXCC rule 12 regarding operating ethics, fair play, and good sportsmanship; that his operations have caused serious dissension among DXers and damaged the prestige of amateur radio and DXCC; and that his activities have caused strained relations with

This is the YV9AA group which has won the Multi-transmitter, Multi-operator category of the CQ WW DX Contest for three years in a row. Standing l. to r.: YV5AGD, YV5ANF, YV5CIY, YV5AIP, YV5BNW, YV5BPU, and the XYL of YV5BPU. Sitting l. to r. YV5BPJ and YV5BOA. *(Photo courtesy YV5AGD)*

Lou van de Nadort, PAØLOU, co-editor of Veron's *DXpress* and an active DX and contest operator.

an agency of the U.S. Government and possibly with at least three foreign governments. Specific references to support their conclusions included a letter from a Coast Guard Captain alleging that the operation from Navassa Island involved unauthorized trespassing on federal property, and a letter from an Indian amateur stating that the operation from the Laccadive Islands was in violation of Indian law and jeopardized the reciprocal operating agreement between the U.S. and India. As a result of these conclusions the committee suspended the membership of W9WNV in the DX Century Club, suspended credits for contacts with K1IMP/KC4 and VU2WNV until such time as it is satisfied that the operations were properly authorized, suspended credit for all contacts with the W9WNV operations from VQ9AA/A, VQ9AA/D, FR7ZP, and 1M4A, stated that no credits will be given for future contacts with W9WNV from DX locations until further notice, and stated that it would continue the investigation. The committee also requested cooperation from amateurs in possession of facts bearing on the case.

De Extra is devoting a large share of space to this issue because it is undoubtably the most critical "confrontation" the DX world has experienced in its entire history. Fundamental issues underlying the basic philosophy of DXpeditions must be resolved, and there is little doubt that the outcome will determine the shape of DX activities for some time to come. The struggle to prolong the DXCC Honor Roll competition is undoubtedly responsible for creating this situation. It put the DXCC Award's Committee in the position of holding a bear by the tail which they couldn't let go. However, the committee has now chosen to dig its heels into the ground and re-establish its authority. Undoubtably a set of guidelines for DXpedition financing will emerge, as well as a new concept of what can be called a country. De Extra may not agree with everything the committee plans to do, but it has our best wishes in resolving this knotty and complex problem.

The "Dynamic DX Duo" from Puerto Rico, KP4CK, Felix, and KP4CL, Alicia. These "his and hers" rigs have accounted for over 300 countries apiece.

The remainder of this month's De Extra consists of letters dealing with the W9WNV-DXCC Committee conflict. Although all the letters are from serious DXers, the opinions they express are far from unanimous. The majority take Don Miller's side, but there are respected spokesmen who side strongly with the ARRL Committee. Every letter received to date (March 10, 1967) is included, so no attempt has been made to stack the evidence in favor of one side or the other.

de Don Miller, W9WNV—"The Awards Committee acted without my knowledge and without consulting me or asking for my side of the story. . . ."

de KP4RK, Editor, The Puerto Rican DXer—"The conclusion that Dr. Miller's operations have jeopardized acceptance and support of amateur radio by agencies of the U.S. and foreign governments is odd. The Coast Guard admits they have consistently denied requests for permission to operate from Navassa Island, so how can you jeopardize acceptance and support that doesn't exist. The report mentions *agencies* of the U.S. government but only the Coast Guard's case is cited. In addition, no mention is made of any direct communication from any foreign government. . . . The conclusion that Don violated rule 12 of DXCC is irrelevant. His membership in DXCC has no bearing on the issue. . . . The conclusion that Navassa and Laccadive credits would only be *suspended* shows inconsistency. If the committee is satisfied with the proof they have why should they expect to be satisfied at some future time that the operations were properly auhorized. . . . Conclusion #4 is an injustice as ARRL is penalizing thousands of amateurs for a matter admittedly involving only one amateur. . . . Conclusion #5 regarding credits for future DXpeditions by Don Miller is drastic, but it is the committee's privilege. . . . Conclusion #6 that the investigation will continue is good as it leaves the door open for future discussion."

de DL3RK, editor of DARC's DX-MB—"I think it is incorrect to say Don is ruining the image of American amateurs in other countries. I must say *all* amateurs are ruining the image of hamming. Listen when a rare station is on. Everyone calls, no discipline, only elbow technique and rough manners. A lot of hams are not amateurs, but professionals. I have one question: why does Don make all the expeditions and why does he risk his life and health? Nobody can say for his own fun, for his operating technique with 5-10 QSOs per minute is hard work and is ruining his nerves. I think Don was sent out to make new ones so that some big-headed people get better places in the Honor Roll. I cannot understand such people. I am also in the Honor Roll and I am glad of each new country I work, but when I miss one I do not cry. None of the complaints about only QSLs for contributors is true. Everyone gets his QSO and QSL. It is right that the contributors got their cards faster, but what does it matter? Most important for me is to get the cards. Conclusion: much fuss over nothing."

de PAØLOU, co-editor of VERON's DX-PRESS—". . . our personal opinion is that we are not much in favor of the whole set-up, mainly because of the fact that things are driven too far. Asking for small contributions to defray cost of QSLing or equipment is OK with us. However, asking for $25.00, not just once but repeatedly, we think is too much. It sounds too much like buying your way into the Honor Roll. This, among European DX-circles has created quite some aversion to Don Miller's Expedition. For me personally it even meant that I gradually lost interest. I was only 3 countries away from the Honor Roll but I got disgusted and more or less gave up. I am still hunting for new ones but am no longer interested in waiting for Don to fire up from one or the other reef which might be under water during most of the year. When Gus was making his DXpedition around the world it was fun, with Don this is no longer so. . . . Don certainly is a fast operator, but he is far from a courteous one. Now he might say that he is being troubled by all kinds of poor operators, but what was he expecting? Gus had the same experience but he always kept his temper and made friends all over the world It was a pleasure just to hear him on the air. . . . I don't mind hunting 3 days or longer for a country. As a matter of fact working Don was usually too easy. Hunting for VR6TC took me much longer, several years in fact, and was more fun. For me it is not at all necessary to create new countries every other month, especially if those are countries which most likely will not be revisited in the next 100 years. It means that it no longer is a real competition for everybody. Once you missed out on say Geyser or Malpelo, or Serrana Bank or Minerva to name a few, you most likely will not catch up in this life. What is the use? Why not stick to real existing countries which are rare enough like Nauru, Heard, Tokelau, Niue, S. Georgia, Iraq, British Phoenix, Wallis, Clipperton etc. where real people do live, instead of inventing countries?"

de G3FKM, top Honor Roll DXer—"In my position at the head of the last two Honor Rolls I have had a considerable number of contacts with Don, and have discussed him with other DX-minded British amateurs. Everyone to whom I have spoken since the receipt of ARRL's communication has expressed surprise and resentment that the League has set out to scrape the bottom of the barrel for material to use against Dr. Miller. Possibly the most serious aspect of this affair is that a fellow amateur has been tried and sentenced in absentia—surely not what one would expect of American justice, and possibly more damaging to the image of American amateur radio than anything which one individual amateur is capable of doing.

"My personal opinion is that Don has done a very excellent job for the majority of DX'ers during the last few years, and that his high standard of operating has enhanced the reputation of American amateurs, by flatly refusing to give contacts to those who did not operate intelligently and politely. As far as we in Europe are concerned Don appears to have gone to great lengths to see that we were able to contact him. During the winter of 1965/66 when propagation was nonexistent on the h.f. bands between us and the Pacific he even arranged to go onto 40 metres to work us. No other DXpeditioner has ever taken so much trouble. I hasten to add that the individuals to whom he gave these contacts were at that time non contributors. I have yet to hear of anyone who has received a card for a contact he did not have. I strongly suspect that the gentleman quoted in the ARRL document as having been a substantial contributor who received cards for nonexistent contacts knows more than he cares to tell. I have yet to meet a person who would deliberately set out to destroy something which he had helped to finance.

"The section concerning priority frequencies and contacts fascinates me. It was the accepted fact in the days of *Yasme* that Danny Weil had special frequencies listed for *Yasme* members. This was never considered by ARRL to be a reason for disqualifying VP2VB's expedition. Presumably one is entitled to look upon those who have given some assistance to the trip, financial or otherwise, as friends, and therefore it is fair and logical to make special efforts to look for them when the rare places are reached. ARRL has no right to dictate to whom any amateur shall talk, as they admit in paragraph 1 on page 4 of their communication, and deny in paragraph 2 on page 2.

"The letter from the U.S. Coast Guard appears to me to require further explanation. I would be interested to know whether the writer was a licensed amateur or whether the wording was dictated to him by an amateur. Such expressions as 'rare country status for DXCC' do not sound like the words of a non-amateur. Assuming that the writer is an amateur I would like to know his standing and influence at ARRL Headquarters. The letter from India seems odd as the visit to the Laccadives was not kept secret. It seems strange that the Indian fraternity did nothing to prevent this taking place if it was all that illegal.

"I think that this is enough to let you see how the feeling is over here, as far as it has been made known to me. Many tens of thousands of contacts are being invalidated as a result of bitterness by a tiny percentage of DXers. Unfortunately they will never accept the fact that missing a QSO is not the end of the world, nor that this may be the result of lack of patience on their own behalf."

de W5IGJ, Editor of the West Gulf DX Club Bulletin—"On June 28, 1965 Don visited my home and we discussed his upcoming DXpedition at length. The subject of the discussion was Don's utter disgust with alleged 'Top' DXers who failed to follow his instructions and operated unethically. He left written information describing what he thought was good operating practice. This information was well disseminated over the air and through the bulletins so that only the true novice or non-DXer failed to get the message.

"On Aug. 1, 1965 Don started his operation from 5W1AD. Although W. Samoa was not very rare and wasn't needed by any of the top DXers, most of them were in the pileups and some continued their old habits of tailending and expecting to be recognized ahead of others. Don took note of this behavior and warned several times that it would not be tolerated. During subsequent operations at YJ8WW, XZ2TZ, and XW8AX he continued to warn the misbehavers.

"Finally Don reached /8F3 which everyone needed. In the meantime because he had ignored some of the misbehavers they had been loudly proclaiming uncomplimentary information to all who would listen. Don, of course, head over the air. Therefore, these few were put on Don's list of 'Persona non Grata' at that point, with the list growing substantially as friends of the offenders joined the chorus.

"When the Spratly Island operation opened most of the 'Hate Don'ers' sprouted wings. Records will show that the 'Hate Don Club' grew to the point where Don admitted there were about 25 DXers on his 'persona non grata' list and, in most cases, none of them were given QSO's. However, in the interim the dissidents grew more vociferous and their venom took a new turn. It is no coincidence that deliberate QRM and nasty remarks appeared on Don's transmitting frequencies regularly until K1IMP reported such activity to the FCC who acted. Now it seems the venom has taken still another turn, to League Headquarters, and that it influenced them in writing their directive.

"It is common knowledge among DXers that the Anti-Don group tried to prevent licensing of Don in several spots, and have dogged his trail vindictively since W9WNV/8F3. Most Pro-Don DXers are aware of the illegal-unethical action of several of the Anti-Don DXers who openly admitted using fictious call letters to secure QSOs. In at least one case it is known that the call letters of a silent key were used.

"In view of the foregoing one could hardly give credence to charges against Don without a full investigation."

de I1AMU, top Italian DXer—"I don't like polemics but I agree with the conclusions of the DXCC Award Committee.

"In effect I don't believe that the reputation of U.S. hams has been damaged at all. The sportsmanship and fair play of thousands and thousands of U.S. hams are well known all over the world. None may forget the successful DX-peditions of U.S. hams like Gus, W4BPD, and WØMLY, etc. I've also to mention the success of Don's activity before the contributions idea."

"Personally I don't like DX-peditions organized by private contributions in countries to be that are just reefs, rocks, or everything except real countries. For this reason I almost gave up my DX activity for more than a year and since the beginning of 1966 I haven't called Don even when he was operating from a new country. This is because I do not approve of the new systems of activity and operations of DX-peditions. I repeat that this is my personal opinion. I know many hams here in Europe who agree with me, but also many others who do not."

The beautiful QTH of KP4CK and KP4CL. The cubical quad towers above the house.

de K1IMP, editor of the Northeast DX Asso. Bulletin—I would like to offer some information which is pertinent to this whole affair:

"1. I have seen the license giving Don permission to operate his amateur radio station in India and the Laccadive Islands. The license also says that the call sign VU2WNV should be used in both the mainland of India and on Laccadives.

"2. I have in my possession a letter from a high Coast Guard official stating that our Radio Operation was apparently in accordance with FCC regulations and for this reason the U.S. Coast Guard does not want to discredit our radio operation. He also goes on to say that he hopes his letter will clear up this matter with our fellow amateurs and amateur organizations. He also says the Coast Guard does not contemplate any further action in the matter.

"In addition to this we have received a letter from the FCC stating that they are not taking any action either.

"3. Regarding the matter of the QSL cards, the facts concerning this problem cannot be brought out at this time. However, I can assure you that it did not happen as stated in the ARRL letter. I am sure that all of you will concur that the QSLs have been handled with all honesty and integrity by K4IKR, Bill, and his wonderful XYL, Nancy."

de F8RU, Secretary, International Amateur Radio Club—"With respect to the Don Miller vs. ARRL Awards Committee case, it is not for the IARC to take sides in this affair. However, what I can say is that, some time ago, I wrote to the ARRL warning them that the use of call-signs starting with the figure 1, as Don has started the fashion with 1M4A, 1G5A, etc., is expressly against international Radio Regulations. The table of Allocations of International Call Sign Series contains no series *starting* with the figure 1. Also, Resolution No. 8 of the same Regulations stipulates amongst other things that should the existing call sign series formed of 3 letters, or a figure and 2 letters, be exhausted, a new series should be introduced formed of a letter, a figure, and a letter; but in no case may the figure be Ø or 1.

"This made me wonder who was the telecommunications administration, if any, who issued Don with a license for these operations? My personal point of view is that ARRL is right in adhering to strict rules concerning DXCC. Otherwise, we would quickly be faced by abuse which can only discredit the amateur service. At the same time, I strongly feel that DX-peditioners of the class of Don, Gus, and the late Chuck must be given credit for spending so much time, pain, and effort, not to mention the danger which they face, to give their fellow amateurs an opportunity for working a new one. To my mind, the solution lies in honest collaboration between sponsors of DXpeditions and whoever

issues the awards. This would also avoid disappointing many who genuinely thought that they had worked a new country."

de KP4CL, one of the top Puerto Rican DXers–"One thing I can assure you is that we helped to support his DXpedition and we *never* received QSLs without working him, and we missed him in several places."

de GW3NWV, Big Gun Contester from Wales–"Why make an issue of Don Miller's operations? Don't you think in all things Americans are getting a little sensitive to world opinion [AMEN—DX Editor.] Surely it is better to get something done even if its wrong in the eyes of a few than to do nothing at all for fear of criticism.

"Locally the opinion here is—no damage to your reputation from this source. Personally I dislike 'Break, break,' 'Go, go,' and the ever increasing 'a clear frequency would be appreciated.' How many organizations are now using the ham bands for their own purposes?"

de W9GIL, author of the W9GIL Survey–"For the record I do not intend to carry on a personal vendetta with anyone as regards to ham radio and DX in particular. I have been enjoying the hobby for 38 years now and hope to do so for many more. The primary purpose of the survey was to determine for myself if there was any connection between Honor Roll members, New countries, and Contributions. Also to determine whether rule 12 of the ARRL DXCC rules was really being violated. Of course, the results of the survey did indicate the above was occurring, along with a possibility of 'Pecuniary Interest' violation. The survey also indicated a strong animosity toward DXCC by a number of foreign amateurs. . . . If you will check the DXCC Honor Roll listings for Dec. 1965, June 1966, and Jan. 1967, you can see how the standings have been really upset.

". . . You no doubt have read the '10 page letter' from the DXCC committee. I think the only point that really matters is violation of Rule 12 and the foreign image. The rest, although important points to consider, is immaterial. One last comment, although I do believe in contributions, I will not PAY TRIBUTE."

New Florida DX Club Report Editor

Congratulations go to Gene Sykes, W4BRB, of 6510 Carambola Circle, West Palm Beach, Fla. on becoming the new editor of the *Florida DX Report*.

The new officers of the Florida DX Club are W4PJG, President; W4FRO, Vice-President; W4HOS, Secretary; W4IKL, Treasurer; and W4LVV, Bulletin Publisher.

VK5XK/VK2 Lord Howe Island DXpedition

Arch J. Hewitt, VK5XK, (see photo) describes his trip to Lord Howe during the interval Nov. 23—Dec. 9, 1966:

John Scarvaci, W9GIL, author of the survey of Don Miller's operations published in the April CQ. John is a member of the ARRL Honor Roll, but seems to have been caught in this picture with the January issue of CQ. Good taste in literature!

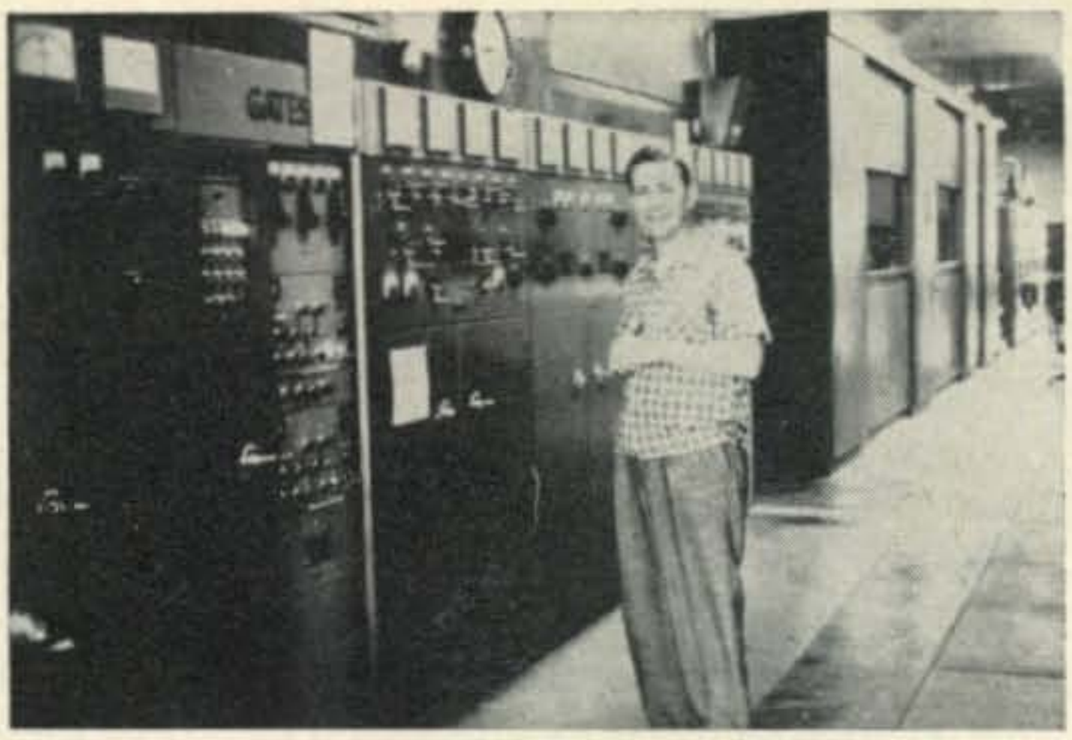
Arch Hewitt operating VK5XK/VK2 from Lord Howe Island. Arch did a wonderful job with low power and rather primitive equipment as described elsewhere in this column.

"After making only 144 contacts from Lord Howe on my 1962 trip because of the unfavorable sunspot cycle, I decided to return last year to see if I could contact more DX stations. In 1962 I only worked 15 USA stations, but this trip conditions were much improved and I made 547 QSOs including 407 with the states.

"The gear used on both trips was nearly identical, that is the same transmitter and power supply were used. Unfortunately my receiver was damaged in transit and could not be repaired on the island. Consequently, I was forced to use a 4 tube non-bandspread receiver which covered 3-16 mc in 3 bands. Two condenser dial divisions was the full coverage for each band 80, 40, and 20. These two divisions were a part of the 180 division dial. The transmitter was a 2 stage 3-16 mc job covering the same 3 amateur bands. It comprised one 6L6 PA final and one EL-32 oscillator. The power was 25 watts. The antenna was a half-wave dipole for 14 mc constructed of 300 ohm ribbon. A long wire for 80 and 40 meters proved to be no good except for JA, VK, and ZL QSOs.

"There were numerous 14 mc band openings to the USA, but only short openings to Europe which were marred by useless QRM. As expected using low power, the DX on 7 mc was nil. I also had my share of problems with the weather. At 12:10 A.M. on Dec. 6, just after I had finished QSOs with VK7JB and 9V1NT, a tropical storm broke and the pealamp antenna indicator lit up like a searchlight. I shot outside to find all wires down in the wind and rain. Little wonder WA5EFL didn't hear me, but I could hear him and 50 others calling before I went QRT. The antenna was erected again the next day and the pileups were on again. The last QSO was with W6OF at 4:15 A.M. Dec. 9, the day I departed for home.

"Thanks go to HB9EO, W2DXX, VK2YB, VK2HQ, W5UVR, W5LGG and other helpful friends. Special mention to Rick, VK4AP for assistance prior to and while at Lord Howe. Al, VK4SS, did the ground work with the pen, and Joe, W2MES, kindly forwarded a tape for me



John Moss, HS1WF, and ex-SVØWF. Unfortunately the final in the background cannot be legally used in the amateur bands. *(Photo courtesy W2PCJ)*

to find out how my sigs sounded in W-land.

"Although closer to 60 years than 50 years I enjoyed the trip and the opportunity to give so many a contact. All contacts will be QSLed from either W5LGG or direct from my home QTH.

"A little bit about Lord Howe; the island is about 7 miles long and ½ mile wide running in a north-south direction. The center portion is inhabited by about 250 people. The island depends on VK land for most everything as the tourist trade is the only source of income. The Dept. of Civil Aviation maintains a 24 hour continuous international air beacon and there is also a weather station. The climate is subtropical."

DX—Do You Need A QSL Manager?

The following is from a letter written by K7ZQZ: "I would like to offer my services as a DX QSL Manager for any DX station interested. My address is incorrect in even the latest callbook. It is K7ZQZ, Dick, 9975 N.W. Murlea Drive, Portland, Oregon 97229."

Niger Operation

Fred, W4KIL, writes the following from Niger: "Just a short note to let you know that I am on the air as 5U7AL. The QTH is B.P. 201, Niamey, Niger and I will QSL 100% direct if a SASE is sent, otherwise via the bureau. An American stamp is satisfactory as my mail can be sent by Diplomatic Pouch. My frequencies are 14,190 - 200, sometimes 21,300, and I will occasionally be on 80 meter phone listening in the American band.

"At present there are only 5U7AC, E. Anatole; 5U7AK, Dave; and myself on the air from Niger. I have licenses pending from Haute Volta, Dahomey, and Chad."

Lord Howe Island DXpedition Imminent

The following letter is from Arie Bles, VK2AVA: "I plan a DXpedition to Lord Howe Island tentatively for May 5-15, 1967. The operation will be on s.s.b. and c.w., using the call VK2AVA/2 for s.s.b. and VK2EX/2 for c.w. VK2EX is Alex Outrim. We will use all bands 80-10 meters with split frequency operations. Calls on our own frequencies are discouraged. An attempt will be made to work the maximum number of stations all over the world.

"I may appoint a QSL Manager for the USA, otherwise all contacts will be confirmed from my home QTH; P.O. Box 23, Springwood, N.S.W., Austraila."

A New Approach To QSLing

We don't normally print classified ads from other publications, but the following ad taken from the March, 1967 issue of Florida Skip seems timely:

> FOR SALE: QSLs from 5U4GT. 80 CW —$2.50, 75 SSB—3.50, 40 CW—2.00, 20 and 15—1.50 or 6 for 3.79, 2 CW 6.99 but add 5.00 if by moon. Standard report is 5/7/9. For 5/8/9 add 0.72, or for 5/9/9 add 1.19. KQQ-0007, QSL Mgr. Send cash, check, or Canadian money order, hurry.

No order has been sent from this QTH since no quotation was given for our favorite DX mode, 420 mc TV!

New Korean Station

Bill Baxter, ex-EP2BX writes from Seoul: "My call is now HL9KI. I will be on the air shortly with a TA-33 beam on 10, 15, and 20, exclusively s.s.b. My cards are already being printed up. The QTH will be c/o Hq. Kmag, APO SF, 96302."

Landmarks In DX History

Did you know that the first WPX Award was won by Loyd Colvin, W6KG, now one side of the famous Loyd and Iris DX team? This photo

Loyd Colvin, W6KG, as he looked ten years ago.

which first appeared in the December, 1957 issue of *CQ* shows Loyd as he appeared at the time he won WPX No. One.

Loyd was so enthusiastic about his WPX that he took a non-stop airplane ride from San Francisco to New York and hand carried his proof of WPX to the editor of *CQ*.

WPX incidentally was the brainstorm of long-time *CQ* DX Editor, Dick Spenceley, KV4AA, who has given many thousands of KV4 contacts to DXers all over the world.

QSL Manager Of The Month

An occasional feature of this column will be the QSL Manager of the Month. Entries will be appreciated and should include a photograph and a history of QSL Managing Activities.

From The DX Bulletins

We're a little short of info this month because of the great amount of time spent on the Don Miller—ARRL Awards Committee hassle. Incidentally, since there is a 6 week time lag between my writing and it's publication, I advise you to subscribe to the weekly or bimonthly DX bulletin which best serves your area. The information which you receive from your bulletin will be more timely.

EA9 Rio de Oro–EA9EJ now has a 10 meter beam and is QRV between 1530 and 1630 GMT, then he goes to 15 meters QRV the states 1830-1930 GMT. *(Tnx The DXers Magazine—W4BPD).*

FB8 Crozet–FB8WW has been active on 14142 kc s.s.b. at 1720 GMT. New operators are now there. *(Tnx DX News-Sheet, Geoff Watts).*

FB8 Amsterdam–FB8ZZ is QRV 14135-45 kc a.m. 1700-1900 GMT. He copies s.s.b. 100%. *(Tnx DX News-Sheet, Geoff Watts).*

FH8 Comoro–Two stations are now active, FH8CD and FH8CE. However, FH8CE speaks only French. *(Tnx. The DXers Magazine—W4BPD).*

FO8 French Oceania–FO8AA is active almost daily from 1400-1500 GMT, mainly c.w. on 14043 kc. *(Tnx LIDXA Bulletin, WA2EFN).*

GD3 Isle of Man–GD3AIM operated by G3AIM 3/19/67 to 4/28/67. *(Tnx DX-MB, DL3RK).*

HKØ Malpelo–A trip is soon to be made by K4CAH and WA4WIP. *(Tnx DX-MB, DL3RK).*

K6KA DXpedition—Bill and his XYL WA6EVJ have begun an around-the-world tour and will operate from as many countries as possible where rigs and permission can be obtained. Their frequencies on c.w. will be 7004, 14004, 14044, and 21044. On phone they will use 7094, 7194, 14104, 14194, 21344, 21404, and 28544. *(Tnx DX News-Sheet, Geoff Watts).*

KC6 E. Carolines–KC6BW active on 14230 kc and 14280 kc s.s.b. *(Tnx DX News-Sheet, Geoff Watts).*

TA2 Turkey–TA2AC is active weekdays between 1430 & 1530 GMT on 14020 kc. He also uses 21030 and 28040 kc occasionally between 1200 and 1600 GMT. *(Tnx West Gulf DX Club Bulletin, W5IGJ).*

TU2 Ivory Coast–TU2AY, Charles, is active on 10, 15, and 20 meter s.s.b. *(Tnx DX-MB, DL3RK).*

VK9 Papua–VK9DJ reported on 21345, 21360, 28625, & 28635 kc. *(Tnx DX News-Sheet, Geoff Watts).*

VP8 So. Georgia Island–VP8IE is active nightly 0200-0400 GMT near 14204. *(Tnx LIDXA Bulletin, WA2EFN).*

VR1 Ellice Island–VR1C has been heard on 14149 kc s.s.b. *(Tnx DX News-Sheet, Geoff Watts).*

VR4 Soloman Islands–VR4CR, Arthur, is active on 14021 kc c.w. around 1100 GMT. He should be there until 1969. *(Tnx DX News-Sheet, Geoff Watts).*

VS5 Brunei–VS5BS is active on 14 mc c.w. around 1200 GMT. *(Tnx Florida DX Report, W4BRB).*

VS9 Kamaran–The VS9KRV expedition by VS9ARV has been cancelled. *(Tnx DX News-Sheet, Geoff Watts).*

YA5 Afghanistan–Wolf, YA5RG, has been active on 14213 kc s.s.b. at 0330 GMT. *(Tnx LIDXA Bulletin, WA2EFN).*

YK1 Syria–According to YK1AA the new station YK1AM is definitely legit. *(Tnx The DXers Magazine, W4BPD).*

ZL1 Kermadecs–Noel, ZL1AI, should be there for one year. *(Tnx The DXers Magazine, W4BPD).*

ZS2 Marion Island–ZS2MI is active 14170-190 kc a.m. and s.w. occasionally. *(Tnx LIDXA Bulletin).*

3A2 Monaco–3A2MJC is a club station now active. *(Tnx The DXers Magazine, W4BPD).*

9L1 Sierra Leone–9L1JM is active on c.w. and a.m. in the 40, 20, and 15 meter bands. *(Tnx The West Gulf DX Club Bulletin).*

QSL Information

AP5NO–Via DJ3KM
ET3RF–Via W2JBZ
FR7ZL/T–Box 4, Saint Clothilde, Reunion Island
FY7YL–Box 267, Cayenne, Fr. Guiana
G5AAB–to Capt. E. E. Worrell, 1928 Comm. Sq., AFCS, MacDill AFB, Fla. 33608
GB2USA–Box 461, APO, New York 09125
HK1QQ/TJ8–Via W4DQS
HS1WF–Via W2PCJ
I2FRC–Via I1JT
KG6SL–Via W4FRO
MP4TBO–Via VE1AKZ
ST2SA–Box 144, Port Sudan
TF3AP–Box 1243, Reykjavik, Iceland
TU2AY–Box 20164, Abidjan, Ivory Coast
TU2BD–Via CR6GO
TU2BK–Via F3ZU
VK2BRJ/VK9–Via W4ECI
VK3AHI/VK9–Via VK3ACW
VK9AG–Via W2CTN
VP2AA–Via VE3ACD
VR1C–Via ZL2NS
WA2DIJ/3V8–Via WA2DIJ
YA5RG–Via DL6ME
YJ8BW–c/o Post Office, Vila, New Hebrides
YV3KX–Via YV3KV
ZB2AP–Via WA8QJK
ZB2BA–Via G3RFH
ZD3F & ZD3H–Both via W2CTN
ZS2MI–Via W2GHK
1A6SBO–Via WA6SBO
6W8CD–Via YASME
7Q7LZ–Via G3LZZ
9L1JM–Via 9L1SL

73, John K4IIF

Use Your Zip Code

CQ BOOK MART

ANTENNA ROUNDUP Vol. II

Cat. #119-2. Here's your chance to get a copy of one of the most comphensive books on antennas ever offered to the Amateur. Ten big theory articles backed up by 82 detailed and illustrated construction projects for VHF on into microwave, from long-wires to 17 element beams and Sterba Curtain arrays.

THE NEW RTTY HANDBOOK

Cat. #116. A treasury of vital and "hard to get" information. Loaded with equipment schematics, adjustment procedures, etc. A valuable asset to both the beginning and the experienced RTTY'er. Special section on getting started, written by Byron Kretzman, a well known authority in the field.

CQ ANTHOLOGY I

Cat. #102-1. We've looked back through the years 1945-1952 and assembled all in one place the articles that have made a lasting stir. The issues containing most of these articles have long ago been sold out and are unavailable.

SURPLUS SCHEMATICS

Cat. #117. This is a book literally loaded with schematics for all the currently popular pieces of surplus gear. Most amateurs are well aware of the problems encountered in purchasing seemingly inexpensive surplus units, only to find that no schematic diagram is available.

VHF FOR THE RADIO AMATEUR

Cat. #115. If you are, or are planning to be a VHF operator you can't afford to be without this dynamic new handbook written especially for you. Filled from cover to cover with all new and original construction material presented so you can understand it.

ANTENNA ROUNDUP Vol. I

Cat. #119. A common denominator for all ham stations is the antenna. Here at last is the cream of antenna information packed into a 160 page book. Forty-seven information-packed articles that will dispel much of the mystery surrounding antennas.

SIDEBAND HANDBOOK

Cat. #103. One full year in the preparation of this terrific volume. This is *not a technical* book. It explains sideband, showing you how to get along with it . . . how to keep your rig working right . . . how to know when it isn't . . . and lots of how to build-it stuff, gadgets, receiving adaptors, exciters, amplifiers.

SURPLUS CONVERSION HANDBOOK

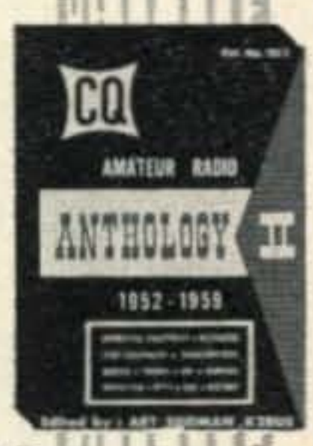
Cat. #122. Contains 192 pages of conversion articles including the famous Command Set's plus a whole slew of the most popular military surplus gear including such gems as: SCR-522, ART-13, BC603, BC659, ARC 1, ARC 3, etc. Actually, it covers almost every piece of surplus gear worth the effort to convert for ham use.

ELECTRONIC CIRCUITS HANDBOOK

Cat. #121. Describes and discusses in detail 150 of the most often needed circuits around the shack. Novices and old-timers alike will find many valuable circuits here ideal for construction projects. Eleven great chapters cover a multitude of circuits for all.

SHOP & SHACK SHORTCUTS

Cat. #120. Here is a collection of hundreds of hints, kinks and short cuts which should be part of the library of every experimenter ham and CB'er. A veritable gold mine that will help save time, improve their shop techniques, dress up their shacks, and increase the efficiency of their equipment.



CQ ANTHOLOGY II

Cat. #102-2. Top favorite CQ articles from 1952 to 1959 . . . including some you may have missed . . . compiled into one new information-packed book! No more need to try to locate sold out back copies of CQ. This Anthology includes past articles of lasting interest to every amateur radio enthusiast. Over 250 pages of text.

ELECTRONIC CIRCUITS HANDBOOK VOL. II

Cat. #121-2. Tom Kneitel, K2AES, does it again with this sequel to his best selling Volume I. This time it's 159 additional circuits which will appeal to all Every shack will have a spot for this book. All circuits fully described in text with complete detailed construction steps plus schematics.

NAME _____

ADDRESS _____

CITY _____

STATE _____

Zip Code _____

Cat. No.	Name	Price	Order	Cat. No.	Name	Price	Order
99	TVI Handbook	1.75		115	VHF for the Radio Amateur	3.50	
102-1	CQ Anthology vol. 1	2.00		116	The New RTTY Handbook	3.95	
102-2	CQ Anthology vol. 2	3.00		117	Surplus Schematics	2.50	
103	New Sideband Handbook	3.00		119-1	Antenna Roundup vol. 1	3.00	
105	New Mobile Handbook	2.95		119-2	Antenna Roundup vol. 2	4.00	
109	Ham's Interpreter	1.50		120	Shop & Shack Shortcuts	3.95	
112-A	Reg. Ham Log Sheets, per C	1.00		121-1	Electronic Circuits Handbook vol. 1	3.00	
112-B	SSB Ham Log Sheets, per C	1.00		121-2	Electronic Circuits Handbook vol. 2	3.00	
113	CQ Binders (Indicate year)	4.00		122	Surplus Conversion Handbook	3.00	

New York City and State residents must add sales tax applicable to your area.

COWAN PUBLISHING CORP. Book Div. • 14 Vanderventer Avenue • Port Washington, L.I., N.Y. 11050

Propagation

BY GEORGE JACOBS,* W3ASK

As the sun rises higher in the northern skies, optimum frequencies for long-distance propagation are *lower* during most of the daylight hours, and somewhat *higher* during the late afternoon, early evening and nighttime hours, than during the winter months. Static levels also increase during May, and signals may be somewhat weaker on DX openings during the daylight hours.

The following is an overall picture of h.f. amateur band openings forecast for May, 1967. For specific times of DX openings, refer to the DX Propagation Charts which appeared in last month's column. This month's column contains Short-Skip Propagation Charts for May and June, as well as Charts centered on Hawaii and Alaska. The Short-Skip Charts contain propagation forecasts for circuits varying in length between distances of 50 and 2300 miles. For day-to-day propagation conditions expected during the month, see the "Last Minute Forecast," which appears at the beginning of this column.

10 Meters: A seasonal decrease is expected in DX conditions on this band. While fewer openings are forecast, some fairly good ones should be possible to some tropical and southern areas during the daylight hours. Frequent short-skip openings, between distances of approximately 750 and 1400 miles, are forecast for May.

15 Meters: Expected to remain the best band for DX propagation conditions during much of the late morning and early afternoon hours. Excellent DX openings are forecast to many areas of the world from shortly after sunrise, through the early evening hours, and into the hours of darkness on some circuits. Numerous short-skip openings, between approximately 600 and 2300 miles are also predicted for May.

20 Meters: This band is expected to remain open to one DX area or another practically around-the-clock. It will be the best band for DX openings during the early evening hours, the hours of darkness and the sunrise period. Exceptionally high signal levels are expected during many of the 20 meter openings forecast for May. Numerous short-skip openings should be possible on this band between distances of approximately 350 and 2300 miles. Quite often, especially during the late afternoon hours, optimum conditions will exist for openings as short as a few hundred miles and as long as several thousand miles. This is expected to result in an exceptionally high level of interference as long and short-skip stations will be received at the same time.

40 Meters: With higher static levels and fewer hours of darkness, 40 meter DX propagation conditions are expected to decline during may. Some fairly good openings, however, are predicted to some areas of the world during the hours of darkness and the sunset and sunrise periods. Excellent daytime short-skip openings are forecast for distances between approximately 150 and 750 miles, with nighttime openings ex-

*11307 Clara Street, Silver Spring, Md. 20902.

LAST MINUTE FORECAST

Day-to-Day Conditions and Quality for May

	Forecast Rating & Quality			
Days	(4)	(3)	(2)	(1)
Above Normal: **1, 5, 15, 20, 22, 28**	A	A-B	B	B-C
Normal: **2, 4, 6-8, 10-11, 13-14, 16-17, 19, 21, 23-25, 27, 29-31**	A-B	B	C	D
Below Normal: **3, 9, 12, 18, 26**	B-C	C-D	D	E
Disturbed: None	C-D	D-E	E	E

How To Use These Charts

The following is an explanation of the symbols shown above, and instructions for the use of the *CQ* propagation predictions:

1—Enter Propagation Charts on following pages under appropriate band and distance or geographical area columns. Read predicted times of band openings at intersection of both columns.

2—Following each predicted time of band opening is a forecast rating which indicates the relative number of days the band is expected to open during each month of the forecast period. The higher the rating, the more frequent the opening, as follows: (4) band open more than 22 days each month; (3) between 14 and 22 days; (2) between 8 and 13 days; (1) less than 7 days.

On the "Short-Skip" Chart, where two numerals are shown within a single set of parenthesis, the first applies to the shorter distance for which the forecast is made, and the second to the greater distance. Note the forecast rating for later use.

3—With the forecast rating noted above, start with the numbers in parentheses at the top of the "Last Minute Forecast" appearing above. Read down the table for a day-to-day forecast of propagation conditions in terms of Above Normal (WWV rating higher than 6); Normal (WWV rating 5-6); Below Normal (WWV rating 4); Disturbed (WWV rating less than 4). The letter symbols (A-E) describe reception conditions (signal quality, noise and fading levels) expected for each day of the month and have the following meanings: A—excellent opening with strong, steady signals; B—good opening, moderately strong signals, little fading and noise; C—fair opening, signals fluctuating between moderately strong and weak; D—poor opening, signals generally weak with considerable fading and noise; E—poor opening, or none at all.

4—This month's Propagation Charts are based upon a transmitter power of 75 watts c.w.; 150 watts s.s.b., or 300 watts d.s.b., into a dipole antenna one quarter-wave above ground on 160, 80 and 40 meters and a half-wave above ground on 20, 15 and 10 meters. For each 10 db increase above these reference levels, reception quality shown in the "Last Minute Forecast" will improve by one level; for each 10 db loss, reception will become poorer by one level.

5—Local Standard Time for these predictions is based on the 24-hour system.

6—These Propagation Charts are valid through June 30, 1967. These Charts are prepared from basic propagation, data published monthly by the Institute For Telecommunication Sciences And Aeronomy of the U.S. Dept. of Commerce, Boulder, Colorado.

tending up to the short-skip limit of approximately 2300 miles.

80 Meters: High static levels and fewer hours of darkness will restrict DX openings on this band during the month, but a few fairly good openings are expected to occur to some areas of the world during the hours of darkness. Excellent short-skip openings are forecast during the daylight hours over distances ranging between approximately 50 and 250 miles. During the hours of darkness, the short-skip range is expected to extend up to approximately 2300 miles.

160 Meters: There is little chance for more than a very occasional DX opening on this band during May. What few openings may occur will take place during the hours of darkness and the sunrise period. Short-skip openings beyond the groundwave range of approximately 50 miles are also very unlikely during the dayilght hours. As the sun sets, short-skip openings should be possible up to a distance of approximately 1000 miles. Occasional openings beyond this range may be possible on some nights when static levels are low.

V.h.f. Ionospheric Openings

A considerable seasonal increase in sporadic-E ionization is expected during May. This should result in some fairly good 6 meter short-skip openings between distances of approximately 1000 and 1400 miles. Openings of this type are most likely to occur between 9 A.M. and 1 P.M., and between 5 P.M. and 9 P.M. local standard time. There's also a good chance for some 6 meter trans-equatorial scatter openings to take place during the month. The optimum time for these openings are the early evening hours, and the optimum direction is due south, towards Latin America.

The *Aquarids*, a major meteor shower, is expected to take place during the first week of May. Fairly frequent meteor-type ionospheric openings are expected on 10, 6 and 2 meters as a result of the ionization which will be caused by the millions of meteors expected to enter the earth's atmosphere during this period.

While auroral activity is generally at a low level during May, some displays may occur during periods of below normal or disturbed ionospheric conditions. During such periods, openings are likely to occur on 10, 6 and 2 meters for distances up to approximately 1200 miles, as a result of reflection or scatter from ionized patches produced by the auroral displays. Check the "Last Minute Forecast" at the beginning of this column for periods during May that are expected to be below normal or disturbed.

Sunspot Cycle

The Federal Solar Observatory at Zurich, Switzerland reports a monthly sunspot number of 92 for February, 1967. This results in a 12-month smoothed sunspot number of 57, centered on August, 1966, as the sunspot cycle continues to rise. This month's propagation predictions are based upon a predicted smooth sunspot number of 84, centered on May, 1967.

CQ Short-Skip Propagation Chart

MAY & JUNE, 1967

LOCAL STANDARD TIME AT PATH MID-POINT

(24-HOUR TIME SYSTEM)

Band (Meters)	*50-250 Miles*	*250-750 Miles*	*750-1300 Miles*	*1300-2300 Miles*
10	*Nil*	07-09 (0-1) 09-13 (0-2) 13-17 (0-1) 17-21 (0-2) 21-23 (0-1)	07-09 (1) 09-13 (3) 13-17 (1-2) 17-21 (2) 21-07 (1)	07-09 (1-0) 09-11 (3-0) 11-13 (3-1) 13-21 (2-1) 21-07 (1-0)
15	*Nil*	06-09 (0-2) 09-13 (0-3) 13-17 (0-2) 17-19 (0-3) 19-23 (0-2) 23-06 (0-1)	06-09 (2) 09-13 (3) 13-17 (2-4) 17-19 (3) 19-21 (2-3) 21-23 (2) 23-06 (1)	06-09 (2-1) 09-13 (3) 13-17 (4) 17-19 (3-4) 19-21 (3-2) 21-23 (2) 23-06 (1)
20	09-20 (0-1)	06-09 (0-2) 09-12 (1-3) 12-18 (1-4) 18-20 (1-3) 20-23 (0-2) 23-06 (0-1)	06-09 (2-3) 09-12 (3-4) 12-18 (4) 18-20 (3-4) 20-23 (2-3) 23-06 (1-2)	06-09 (3) 09-15 (4-3) 15-20 (4) 20-23 (3-4) 23-01 (2-3) 01-06 (2)
40	07-09 (1-2) 09-11 (2-4) 11-19 (34) 19-21 (1-3) 21-23 (1-2) 23-07 (0-1)	07-09 (2-4) 09-15 (4-2) 15-17 (4-3) 17-19 (4) 19-21 (2-4) 21-23 (2-3) 23-07 (1-3)	07-09 (4-3) 09-15 (2-1) 15-17 (3-1) 17-19 (4-2) 19-21 (4) 21-02 (3-4) 02-07 (3)	07-09 (3-1) 09-17 (1-0) 17-19 (2-1) 19-21 (4-3) 21-02 (4) 02-06 (3-4) 06-07 (3)
80	07-10 (4) 10-18 (4-3) 18-22 (4) 22-07 (3-4)	07-10 (4-1) 10-16 (3-0) 16-18 (3-1) 18-20 (4-2) 20-05 (4) 05-07 (4-3)	07-08 (1) 08-10 (1-0) 10-16 (0) 16-18 (1-0) 18-20 (2-1) 20-22 (4-3) 22-05 (4) 05-07 (3-2)	07-08 (1-0) 08-18 (0) 18-20 (1-0) 20-22 (3-2) 22-05 (4-3) 05-07 (2-1)
160	05-08 (4-1) 08-09 (3-0) 09-18 (2-0) 18-20 (3-1) 20-22 (4-2) 22-05 (4-3)	05-08 (1) 08-18 (0) 18-20 (1-0) 20-22 (2-1) 22-00 (3-2) 00-03 (3) 03-05 (3-2)	07-08 (1-0) 08-20 (0) 20-22 (1) 22-00 (2-1) 00-03 (3-2) 03-05 (2) 05-07 (1)	07-20 (0) 20-00 (1) 00-03 (2) 03-05 (2-1) 05-06 (1) 06-07 (1-0)

HAWAII

Openings Given In Hawaiian Standard Time†

To:	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Eastern USA	15-17 (1)	07-12 (1) 12-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	07-15 (1) 15-18 (2) 18-20 (4) 20-22 (3) 22-02 (2) 02-04 (3) 04-07 (2)	19-20 (1) 20-23 (3) 23-02 (1) 20-21 (1)‡ 21-23 (2)‡ 23-01 (1)‡
Central USA	14-18 (1)	07-12 (1) 12-14 (2) 14-18 (3) 18-20 (2) 20-22 (1)	08-12 (1) 12-16 (2) 16-21 (4) 21-23 (3) 23-03 (2) 03-06 (3) 06-08 (2)	19-20 (1) 20-21 (2) 21-01 (4) 01-02 (2) 02-04 (1) 20-21 (1)‡ 21-00 (2)‡ 00-03 (1)‡

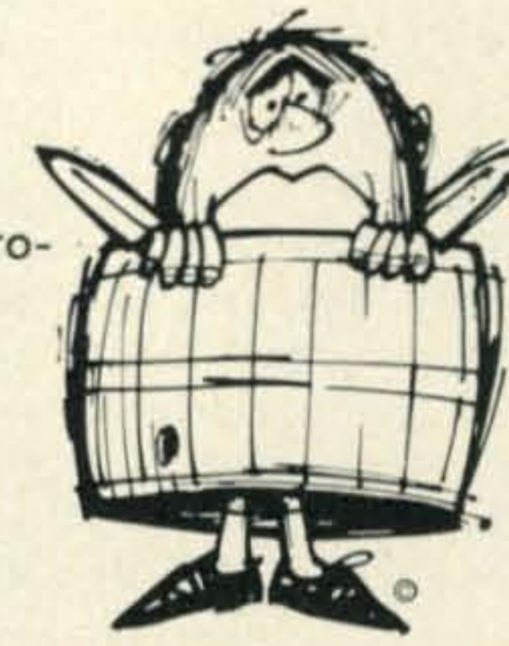
†Hawaiian Standard Time is 5 hours *behind* EST; 4 hours *behind* CST; 3 hours *behind* MST; 2 hours *behind* PST and 10 hours *behind* GMT or Z Time. For example, when it is Noon in Honolulu, it is 17 or 5 P.M. in N.Y.C. EST.
*To convert to Local Standard Time in Alaska, *subtract* 8 hours in the Pacific Standard Time Zone; 9 hours in the Yukon Zone and 10 hours in the Alaskan Standard Time Zone, from the GMT times shown in the Chart. GMT is 5 hours *ahead* of EST; 6 hours *ahead* of CST; 7 hours *ahead* of MST and 8 hours *ahead* of PST. For example, when it is 18 GMT, it is 13 or 1 P.M. EST in N.Y.C.
‡Indicates predicted 80 Meter openings. Openings on 160 Meters are also likely to occur during those times when 80 Meters openings are shown with a forecast rating of (2) or higher.

[*Continued on page 102*]

For months we've been looking for ways to get thousands of NEW CQ subscribers!

Spent sleepless nights

We've torn our hair



Tried a few wild promotional schemes

Hired detectives

And even attempted careful self-analysis

BONANZA!!!

Finally, we just didn't know which way to turn

And then, one magic day the answer came to us

and here it is!!!

SPRING BONANZA
CQ's Giant Subscription Giveaway

These BONUS gifts are yours absolutely free with a CQ subscription received by us between March 1st and June 15th. With a one year sub you choose one free bonus prize; with a two-year sub, choose two bonus items, and with a three-year sub, any three prizes of your choice. Bonus items are all valued at a dollar or more, so you reap GIANT cash savings.

And remember, CQ subscribers still get up to twelve months of classified ads absolutely free! What ham magazine ever offered a better package than this? So don't wait. Send in your sub order today. We're giving away everything but the printing presses.

Incidentally, present subscribers may review existing subs and cash in on the giveaway.

1

W1DBM's FAMOUS "TVI" HANDBOOK
$1.50 VALUE
FREE
WITH BONANZA SUBSCRIPTION

2

W9IOP's FAMOUS "Second Op"
$1.00 VALUE
DX Operating Aid
FREE WITH BONANZA SUBSCRIPTION

3

CALL LETTER BADGE
K2MGA 1" x 3"
Handsomely Engraved With Your Call
$1.50 VALUE
FREE
WITH BONANZA SUBSCRIPTION

4

100 UNIVERSAL QSL CARDS
Handsomely Printed in 2 Colors on fine quality stock
$2.00 VALUE
FREE WITH BONANZA SUBSCRIPTION

5

TEPABCO *package of*
3 *plastic* **QSL** *Holders*
Each Holds 20 cards
Fine for WAZ or WAS displays.
$1.00 VALUE
FREE WITH BONANZA SUBSCRIPTION

CQ MAGAZINE,
14 Vanderventer Ave.
Port Washington, L. I., N. Y. 11050

Rates: 1 Year....$5 ☐ 2 Years....$9 ☐ 3 Years....$13 ☐
Pan-American and Foreign Add $1.00 Per Year Postage.

Please enter my subscription to CQ for_____year(s). Enclosed is $_____. Please start with the _____ issue.

☐ New ☐ Renewal

Please Print

NAME_____

ADDRESS_____

CITY_____

STATE_____ ZIP_____

CALL_____

CHECK ONE BONANZA BONUS ITEM FOR EACH YEAR OF SUBSCRIPTION

1	2	3	4	5
☐	☐	☐	☐	☐

Contest Calendar

BY FRANK ANZALONE,* W1WY

Calendar of Events		
May	**6-7**	**CQ Spring VHF**
May	6-7	Derby City Party
May	6-7	U.S.S.R. DX
May	13-14	Hawaii QSO Party
May	13-15	Georgia QSO Party
May	20-21	YL Int. SSBers Contest
June	2-5	CHC/FHC/HTH QSO Party
June	3-4	National Field Day
June	10-11	ARRL VHF Party
June	10-11	New York State QSO Party
June	25-26	ARRL Field Day
July	1-2	Venezuelan Contest
July	3-4	FEARL-M Contest
July	22-23	Colombian Contest
August	12-13	WAE CW DX Contest
August	19-20	QRP QSO Party
September	9-10	WAE Phone DX Contest

CQ Spring VHF

Starts: 9:00 A.M. local time Saturday, May 6
Ends: 9:00 P.M. the same day

Bob Brown told you all about it on page 36 of last month's issue.

Derby City Party

Starts: 0000 GMT Saturday, May 6
Ends: 2359 GMT Sunday, May 7

In order to publicize the 90th annual running of the Kentucky Derby, the Kentuckiana Radio Club announces the Derby City award.

You will find Louisville/Jefferson county stations who will identify themselves on the following frequencies: c.w.—3550, 7050, 14050, 21050, 28050. s.s.b.—3960, 7250, 14345, 21350, 25600 and 50.7 (a.m.)

You can earn this handsome award by contacting 5 different stations on any or all bands.

Send your application to Station K4CSS, 1355 S. Third Street, Louisville, Ky. 40203.

Georgia QSO Party

Starts: 2300 GMT Saturday, May 13
Ends: 0500 GMT Monday, May 15

The sixth annual Georgia QSO Party sponsored by the Columbus ARC was covered in last month's CALENDAR.

Mailing deadline for logs is June 15th. Columbus ARC, Att. John T. Laney III, K4BAI, 3500 14th Ave., Columbus, Georgia 31904.

YL Int. SSBers Contest

Starts: 2300 GMT Friday, May 19
Ends: 0600 GMT Monday, May 22

The YL International SSBers contest is more that a membership s.s.b. activity, c.w. will also be used and non-members are invited to participate in both modes.

Rules are a bit complicated and there are several categories, therefore a knowledge of the rules is essential. See last month's CALENDAR or write to WA6MWG for information.

Logs must be post marked no later than 30 days after the contest and go to: Pete Billon, WA6MWG, 4040 Via Opata, Palos Verdes Estates, Calif. 90274

CHC/FHC/HTH Party

Starts: 2300 GMT Friday, June 2
Ends: 0600 GMT Monday, June 5

This one has a lot going for it, with the Certificate Hunters Club, the Flying Hams Club, Hunt the Hunters and Novices all shooting for an award, it gets a bit involved.

Exchange: CHCers and FHCers: QSO number, RS/RST, name, CHC/FHC number, state and county. (DX stations DOK, LAAN, Province and etc.) HTHers send same as above less membership nr.

Scoring: CHCers: CHC to CHC 1 point, CHC to HTH 2 points, YL and FHC contacts 3 points. HTHers: HTH to CHC 3 points, FHC counts 4 points and YL CHCers 5 points. (HTH to HTH no value.) The same station can be worked on a different band and mode for contact point credit. (s.s.b. and a.m. different modes.)

S.w.l.s. can also submit a log of stations heard in this activity for s.w.l. awards. They use the same scoring system as the HTHers.

When you're Number One this kind of service is expected. "Bobbie" not only typed the certificates but personally delivered this one to Manuel Castillo, W5HWR/VP9 for the Multi Transmitter operation of the VP9EU team in our last World Wide Contest.

*14 Sherwood Road, Stamford, Conn. 06905.

Some 1966 Contest Results

HELVETIA 22

U.S.A.

W1TX	**7626**
K4BYN	**6612**
WB2CKS	**4935**
W8VSK	**3840**
W5WZQ	**2691**
W2QKJ	2232
W4HOS	1932
W1DYE	1620
W1BHV	1482
WA2DIG	1428
W8NAN	1368
K4BAI	1224
W2ZV	1200
W3QQL	1080
W3UVH	1071
W1AYK	1014
W2NFP	816
W1WY	756
WA2UWA	714
W7LVI	**504**
W2HAE	126
W3CBF	48

No. Amer.

HI8XAL	**6156**
KP4CKX	**2016**
VO1AW	**663**
VE1AE	126
HP1AC	**48**
VE2AFC	36

OZ CCA

U.S.A.

W2ZV	**8436**
WB2TFK	5427
W3CBF	**105**
W4OMW	**16068**
W4HOS	5544
WA5JMK	**9309**
W6PQW	**3078**
W8VSK	**7998**
W9KXK	**2142**

Canada

VO1AW	**3366**
VE2IL	**660**
VE4SC	**1680**

USSR DX

U.S.A. Winners

KH6EPW	9720
W9IOP	7233
W3MSR	4064
W2KIT	4022
WA6SBO	3753

Multi-Op

K3EST/3	10854
W4FRO	6444
K8UDJ	4202

Multiplier: Add the number of different continents, countries, VE provinces, US states worked. Your own state/country can be claimed as a multiplier. KH and KL count both as a state and DX. Sum total of above is your multiplier.

Final Score: Multiply your total QSO points by the total of your multiplier.

Awards: 1st, 2nd and 3rd place certificates for the world, each continent, country, US state and VE province. Plus special Trophies for many different categories of CHC, HTH and s.w.l.

Frequencies: c.w.—3575, 7030, 14075, 21090, 28090. a.m.—3810, 7235, 14230, 21330, 28800. (DX 3675, 7075) s.s.b.–3990, 7210, 14340, 21440, 28690. (DX 3775, 7090) v.h.f. 50.3 Novice—3710, 7160, 21140.

A detailed and acurate log and summary sheet is requested. Inaccuracy in the scoring will be deemed sufficient cause for disqualification.

Besides contest awards your log can also be used for the many awards in the CHC program. Application for these awards can be made with your contest entry. It is highly recommended however that you write K6BX (s.a.s.e.) for official forms so that you may get the most credits for your efforts.

Logs must be submitted no later than July 5th and they go to: Clif Evans, K6BX, Box 385, Bonita, Calif. 92002

National Field Day

Starts: 1700 GMT Saturday, June 3
Ends: 1700 GMT Sunday, June 4

This is really a R.S.G.B. organized activity but you will find other European portables that are anxious to work you. Overseas stations are invited to work these low powered portables.

There is an award to the overseas station whose log shows that he contributed the most points to the competitors. (Would suggest that the Committee be a bit more liberal with this overseas award.)

Send your report no later than June 19th to: RSGB H.F. Contest Committee, 28 Little Russell Street, London WC1, England.

U.S.S.R. DX

Starts: 2100 GMT Saturday, May 6
Ends: 2100 GMT Sunday, May 7

Rules were received much too late to give in details. However they are basically the same as in previous years, as given in the May 1966 issue. With one exception, contacts with stations in the same continent count 1 point, but *3 points* if with a station on a different continent.

And don't forget, you are allowed only 12 continuous hours out of the 24 hour contest period for scoring purposes.

Mailing deadline is June 1st and logs go to: Central Radio Club, Box 88, Moscow, U.S.S.R.

Hawaii QSO Party

Starts: 0000 GMT Saturday, May 13
Ends: 2400 GMT Sunday, May 14

Simple rules for this one. Exchange, call and signal report only. Each KH6 contact counts 1 point and the same station can be worked once per band. Multiply total QSO points by number of bands KH6 stations were worked.

Logs go to: Hawaii QSO Party, P.O. Box 101, Aiea, Hawaii 96701.

Editor's Notes

If you were wondering what was going on the week-end of April 15/16 it was the annual OZ-CCA contest. Unfortunately this announcement was received much too late to make the April issue. What a pity since this year's dates are in the clear and no conflict with any other major event is anticipated.

Rules were the same as last year and they appeared in the April 1966 issue. You can still figure out your score and send it to the EDR as the deadline is June 15th. Address: E.D.R. Contest Committee, Post Box 335, Aalborg, Denmark.

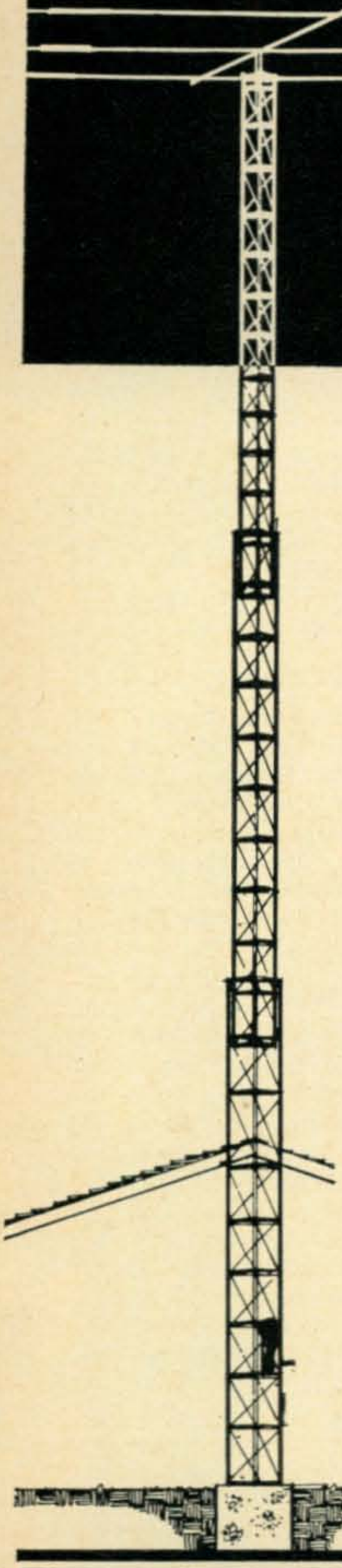
Which brings up a point, we also have a deadline to meet, the WW Phone results in the next issue, so we can't waste any more time on the problems of others.

73 for now, Frank, W1WY

PLEASE include your ZIP code number on all correspondence.

Henry Radio presents

An Exciting New Beam Antenna Program!



For the average amateur located on a small city lot, the problem of an adequate low-cost beam antenna system has never been properly solved. Now Henry Radio has exercised its unique experience and buying capacity to break the antenna barrier. Here is a complete antenna program pre-engineered, pre-matched and pre-packaged to suit the average QTH and the average pocket-book.

Package No. HR-1
Tristao CZ337 New concept 40 ft. crank-up tower
100 ft. RG-58U Coax
CDR TR-44 Rotator
Hornet TB-500-B Three element tri-band beam
100 ft. control cable
The perfect answer for the station using a transceiver barefoot. Regularly $325 plus approx. $15 freight, a $340 value. Our package price **$290.00** (freight prepaid to your door).

Package No. HR-2
Tristao CZ454 New concept crank-up tower
CDR TR-44 Rotator
Hornet TB-500-B Three element tri-band beam
100 ft. RG-58U Coax
100 ft. control cable
For the medium power DX'er who wants to work them barefoot. Regularly $500 plus approx. $25 freight, a $525 value. Our package price **$425.00** (freight prepaid to your door).

Package No. HR-3 ▪ **Tristao CZ 454 New concept 60 ft. crank-up tower ▪ 100 ft. RG-8U Coax ▪ CDR Ham-M Heavy duty rotator ▪ Hornet TB-1000-4 Four element tri-band beam ▪ 100 ft. control cable** ▪ Here is our masterpiece. The right combination of antenna and tower for full legal power and extreme DX. Regularly $600 plus approx. $30 freight, a $630 value. Our package price $495.00 (freight prepaid to your door).

Remember! You can buy on time. You can trade your used transmitter or receiver. You can rely on Henry Radio to supply the finest equipment and the best value.

Henry Radio Stores

CALL DIRECT . . . USE AREA CODE

Butler 1, Missouri, 64730	816 679-3127
11240 W. Olympic, Los Angeles, Calif., 90064	213 477-6701
931 N. Euclid, Anaheim, Calif., 92801	714 772-9200
6116 N. 27th Ave., Phoenix, Ariz., 85017	602 AM 4-3895

"Worlds Largest Distributors of Short Wave Receivers"

For further information, check number 45, on page 110

Simon Says...

BY BERT SIMON,* W2UUN

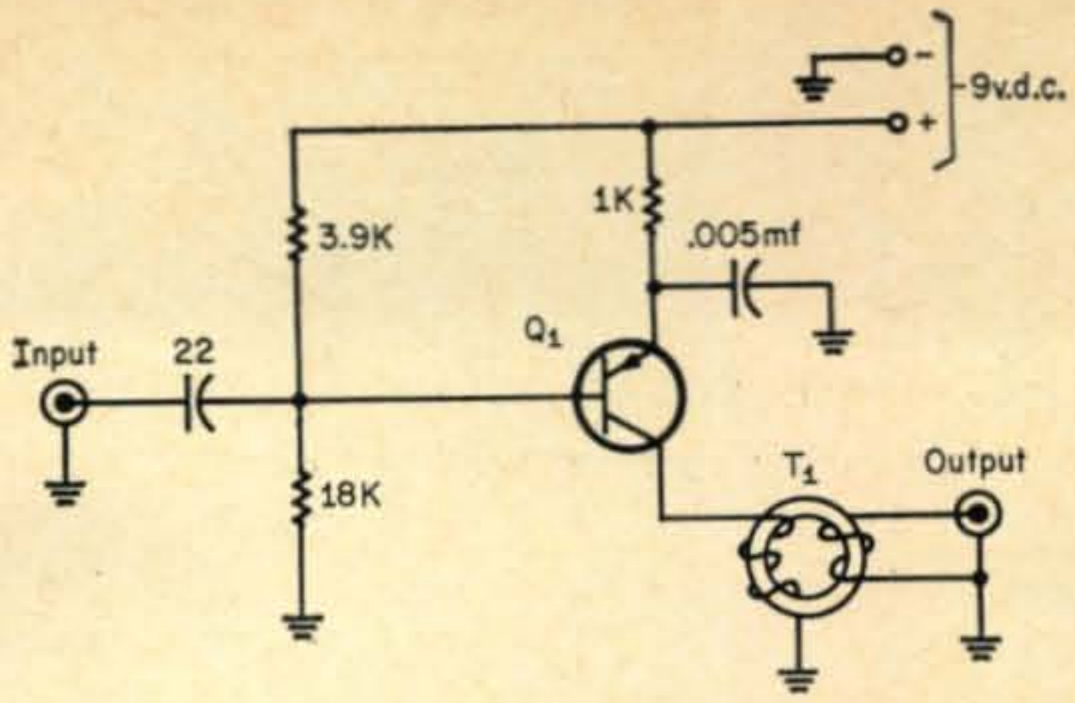


Fig. 2—An untuned broad-band pre-amp.

Design For Me A Radio

OK, here's a radio (fig. 1).

Perhaps you're saying that's a silly answer to a silly question. Well you're right, but it's only 3 db worse than, "How do I stop drift in my Brand X transmitter" or "Have you got a design for 250TH transmitter." The point is you've got to be specific. In the case of frequency drift it's how much drift in what period of time. The design of a transmitter involves specific parameters such as how much drive is available, what spurious rejection are you seeking, what impedance loads must be matched, how much power do you wish to run and, of course, how much are you willing to spend doing all this. Obviously the choices are many and don't forget some tubes, capacitors, output circuits, regulation, etc. cost more than others.

Questions

Harvey Wells R9-A Receiver: "Recently I purchased a Harvey Wells R9-A receiver. Upon perusing the instruction book I found that the schematic had been removed. I wrote to Harvey Wells for a schematic and found three things:

"1. Harvey Wells has been out of business since 1960.

"2. No schematics are available.

"3. Oscillator stability is a problem.

"P.S.: Whitan Machine Works, Whittinsville, Mass. 01588 answers Harvey-Wells mail. Also I plan to stabilize and remodel the receiver for c.w. and s.s.b. work."

First off, if any one of the ten readers of this column has a R9-A schematic and will send it to me, I'll be happy to reproduce it, return same to sender and see that our friend gets a copy.

*Holland Mountain Rd., Oak Ridge, N.J.

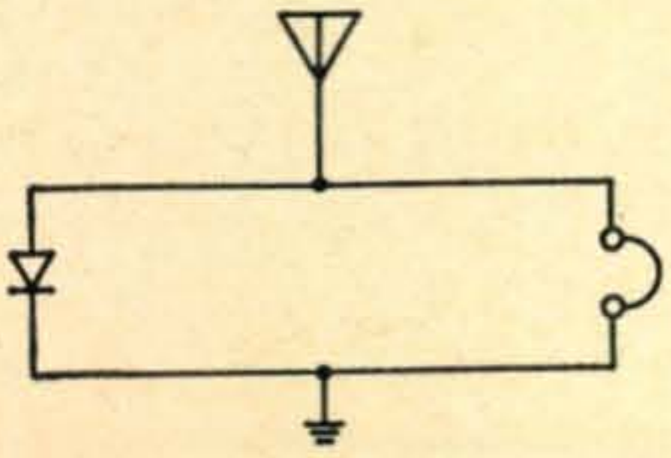


Fig. 1—A self contained radio already.

As far as modifying this receiver to make it into a capable s.s.b. device I suggest you start first by removing all components and then dip the chassis and cabinet into a concentrated sulphuric acid solution to remove the paint. The next step is to paint whatever is left an appropriate color and purchase a Davco DR-30 receiver which will fit handsomely into the existing case. The resulting stability would truly amaze your friends and relatives.

TVI: "I'm rather new to ham radio. Please answer the following questions:

"1. Will s.s.b. cause less TVI on 6 meters than a.m. If so, how much? (Interested in Channels 5, 8, and 13).

"2. I have a Clegg Thor 6 using 8 mc crystals, could I use 25 mc crystals and have less TVI?

"3. What TVI could I expect on 144 mc if any in channels 5, 8, and 13?"

TVI is caused by unwanted spurious radiation of signals other than the one you are trying to feed into the antenna. The fact that you are f.m., s.s.b., RTTY, etc. makes no difference to the unwanted spurious radiation. Certain modes of transmission can be such that the TV viewer may not understand what you are saying and in that way you may possibly avoid ultimate contact with the viewer. As a general rule, the less one has to multiply to obtain the desired frequency the less chance of unwanted spuriouses (or is it spuriousi?). Channel 5 is 76-82 mc, channel 8 is 180-186 mc, and channel 13 is 210-216 mc, so if you are doubling somewhere in your 2 meter transmitter to reach 144-148 mc then there's a stage operating in the 72-74 mc range. This is close to channel 5 and it could give you trouble.

RF Breakdown: "Can you tell me where I can find some information on antenna tuners? I am using an inverted vee about 132 feet long fed with open wire TV line. Feeders are about 50 feet long. I'm using the tuner described in July 1965 *QST*. The antenna coil in the tuner is of smaller diameter than the other coil and the lead comes out between the turns of the outer coil. With glass tubing over the wire for insulation where it goes between the turns of the outer coil, the output from a National NCX-3 will punch neat holes in the glass tubing just like they

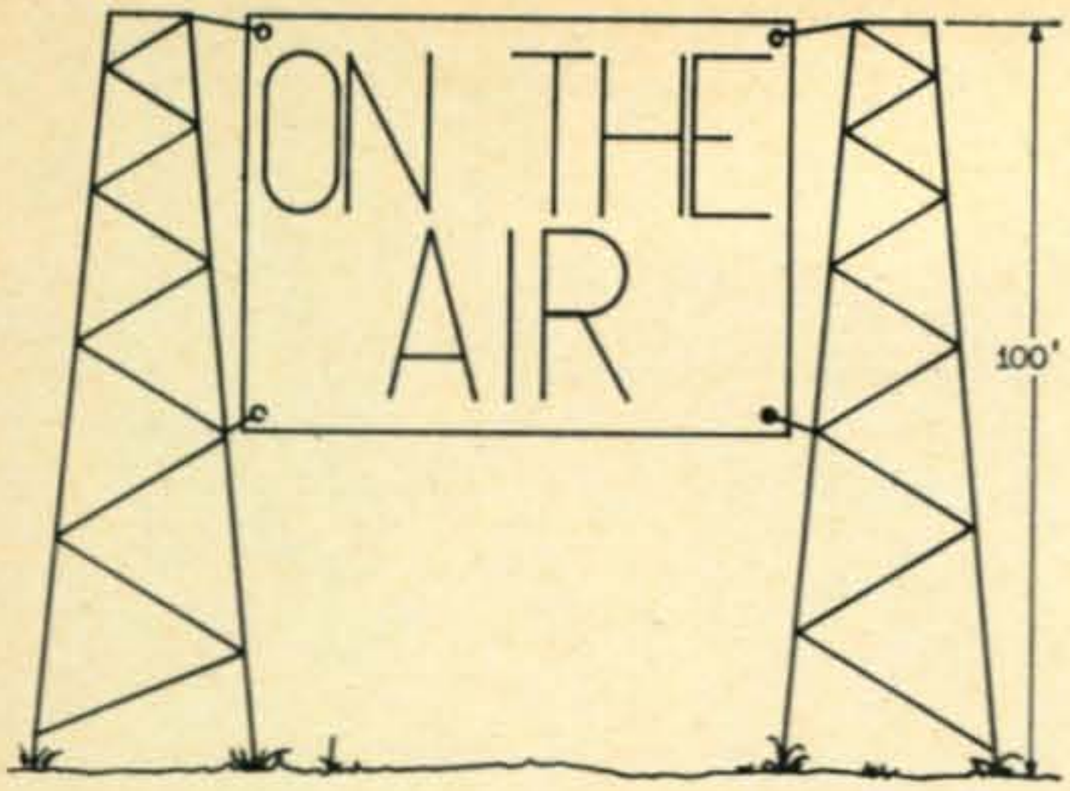


Fig. 3—It pays to advertise.

had been drilled through. It is supposed to handle a kw but I hate to think what would happen at that output in light of what is happenning with not over 125 watts."

First, the *Antenna Handbook* (Vol. 1) by Ken Glanzer (published by Cowan Publishing Corp.) has a section on antenna tuners that you might find informative. Second, as I understand your problem, you have a r.f. burn-through between the coupling coil and the tuned circuit (larger coil). The insulation you are using is okay for the voltage developed between the 'link' turns but can not be used to provide insulation between the link and tuned circuit. You will have to rely on air spacing for that. Leave at least ½ inch spacing between the larger coil (tuned circuit) and any wire in it's vicinity.

Directional Wattmeter 100 mh chokes: "Where can I get 100 mh chokes for the Directional Wattmeter described by W5ZG in the Dec. 1966 *CQ*?"

You can get 100 mh chokes from Allied Electronics, Chicago, Ill. It's called Dec-Ductor and is carried as Stock No. 60Z180 at 76 cents. There's nothing very critical about this part and a National, Ohmite, Nytronics, etc. choke would serve just as well.

Silicon or Germanium: "How can I tell the difference between silicon and germanium transistors?"

Plant them in 3 inches of moist soil, if germaniums come up you know what kind it is. [Oooh, the pain!—Ed.]

Broad-Band Pre-Amp: "Have you a circuit for an untuned r.f. preamplifier using a ferrite loop?"

Yep, it just so happens . . . here's one that originally appeared in Electronic Design. It was used as a pre-amplifier for the f.m. band (88-108 mc) providing about 16 db gain at the low end and about 13 db gain at the high end (fig. 2).

Super ON THE AIR sign: Can you advise me where to obtain a larger than normal "ON THE AIR" sign. The ones I've seen seem too small.

Well, I don't know where you can buy one larger than about one foot letters, but let's not be sluggish about this. Why not go all the way? Would you believe a sign with 20 foot letters suspended between two 100 foot towers? See figure 3 for the details, I'm sure that you will be the hit (literally) of the neighborhood.

Oscillator Feed Through on 6 Meter Transmitting Converter: I recently constructed a transmitting converter so that I could feed my HX-500 into on 20 meters and get a s.s.b. signal out on 6 meters. Checking on my receiver I notice that a substantial 36 mc signal is present, what can you advise?

Well I can advise you to correct it before the Friendly Candy Company finds out about it. You'll need a filter between the mixer and amplifier. I think you should shoot for an overall attenuation of 60 db with respect to the 36 mc signal. In designing a suitable filter I'll assume your amplifier has a loaded Q of about 10 so that you could expect 15 db attenuation of the 36 mc signal due to that tuned circuit. This is derived by the use of the formula:

$$BW_{(\text{overall})} = BW_{(3\text{ db})} \sqrt{10^{\left(\frac{\text{db}}{20} \cdot \frac{2}{\mu}\right)} - 1}$$

Where:

$BW_{(\text{overall})}$ . . . is the bandwidth of the tuned circuit at the specified number of db attenuation.

$BW_{(3\text{ db})}$ . . . . . is the half power bandwidth of the tuned circuit. $BW_{(3\text{ db})}$ equals the operating frequency divided by the loaded Q of the circuit.

db . . . . . is the desired attenuation figure.

μ . . . . . is the number of tuned circuits.

Since we assume a symetrical tuned circuit, and 36 mc is 14 mc away from 50 mc, then $BW_{(\text{overall})} = 2 \times 14$ mc, or 28 mc. Since the loaded Q is 10, and the operating frequency is 50 mc, then $BW_{(3\text{ db})} = 50\text{ mc} \div 10$, or 5 mc. The number of tuned circuits is one. Plugging these figures into the formula:

$$28\text{ mc} = 5\text{ mc} \sqrt{10^{\left(\frac{\text{db}}{20} \cdot \frac{2}{1}\right)} - 1}$$

$$\left(\frac{28}{5}\right)^2 + 1 = 10^{\left(\frac{\text{db}}{10}\right)}$$

$$32.3 = 10^{\left(\frac{\text{db}}{10}\right)}$$

$$\frac{\text{db}}{10} = 1.51$$

$$\text{db} = 15.1$$

Since our goal is 60 db attenuation, we'll need an additional 45 db attenuation, and that's what

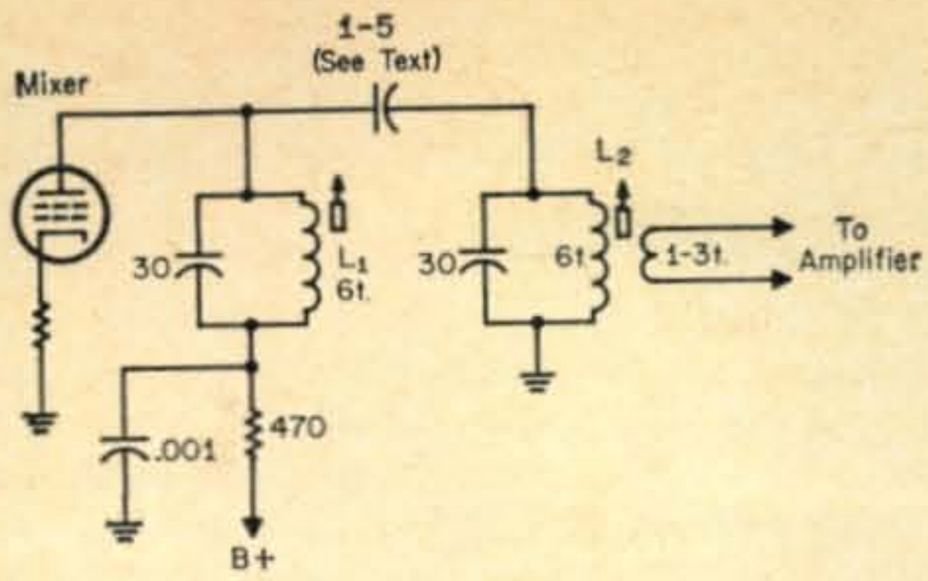


Fig. 4—Filter circuit.

our filter circuit will have to provide. The filter shown in fig. 4 is suitable, and uses two sections.

Going back to the formula we can determine the necessary loaded Q as follows:

$$BW_{(45\ db)} = 28\ mc$$

$$28\ mc = BW_{(3\ db)} \sqrt{10^{\left(\frac{45}{20} \cdot \frac{2}{2}\right)} - 1}$$

$$28\ mc = \frac{50\ mc}{Q_L} \cdot \sqrt{179}$$

$$Q_L = 24$$

Now let's figure how much loss will be entailed by adding this filter (insertion loss). The unloaded Q of the circuits shown is about 90. Plugging into this new formula:

$$IL = 10 \log \left(1 - \frac{Q_L}{Q_{UN}}\right)$$

where: IL . . . is the insertion loss in db.
Q_L . . . is the circuit's loaded Q (24 in this case).
Q_{UN} . . . is the circuit's unloaded Q (about 90 in this case).

Therefore: $IL = 1.35$ db per circuit

There are two circuits used, giving a total insertion loss of 2.7 db which is okay if you have enough signal to spare from the mixer. The degree of coupling will depend on exactly what bandwidth you want, and what load the amplifier will present to the filter. Experiment with coupling values from 1-5 mmf to give flat response from say 50-51 mc.

Stability Factor: I wish I had a nickel for each time I've heard some industrious ham say, "I'm going to modify my Brand X transmitter/receiver so that it's stable and can be used for s.s.b. purposes. It's a noble wish but, unfortunately, wishing won't make it so. To coin a phrase let's use Stability Factor *(SF)* and define it as the degree of frequency drift with respect to the operating frequency due to the various compounded effects of voltage change, temperature

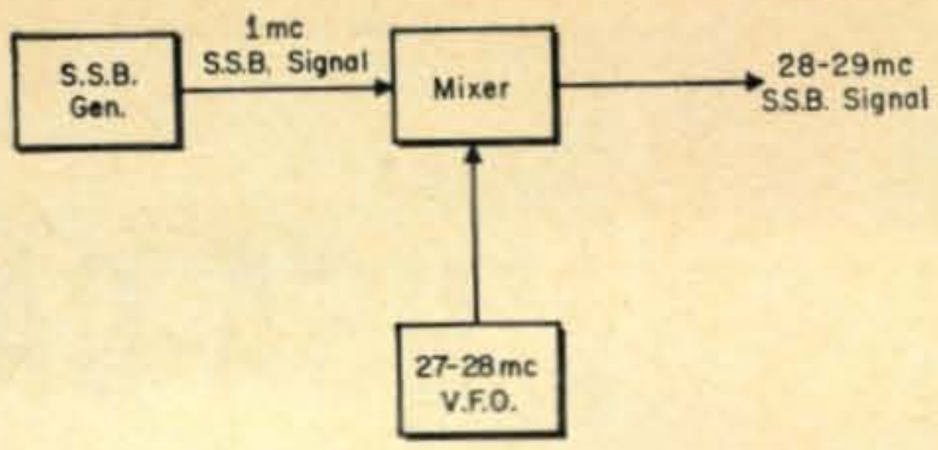


Fig. 5—Stability factor, method A.

change, mechanical vibration, etc. Of course it is possible for a "state of the art" v.f.o. to be in the order of ten times better then that listed in the SF list but this would not be found to be the usual case of home constructed equipment.

Osc. Type	*Stability Factor (SF)*
Variable	1 part in 10,000 (10^{-4})
Xtal	1 part in 100,000 (10^{-5})
Stabilized Xtal	1 part in 1,000,000 (10^{-6})

We'll make another assumption and say that all s.s.b. rigs should contain their drift within 600 c.p.s. If it was desired to construct a s.s.b. device for 28 mc operation one could go about doing it in two ways. See fig. 5 for Method A.

Further assuming, for the purposes of simplification, that the 1 mc s.s.b. signal was perfectly stable, we could apply the *SF* of 10^{-4} to the 27 mc oscillator and find out that the drift to be expected was:

$$F_{osc} \times SF = Drift\ (c.p.s.)$$
$$27\ mc \times 10^{-4} = 2700\ c.p.s.\ drift$$

As you can see this is much higher than the desired 600 c.p.s. drift, so on to Method B (See fig. 6).

Here we find the total drift as follows:

Drift due to 2-3 mc v.f.o. =
$3\ mc \times 10^{-4} = 300$ c.p.s.
Drift due to 25 mc Xtal =
$25\ mc \times 10^{-5} = 250$ c.p.s.
Total Drift: 550 c.p.s.

The total drift of 550 c.p.s. is in the order of 5 times better than that of Method A and falls within our design criterion of 600 c.p.s. drift.

Thought For Today

Don't undertake vast programs with half-vast ideas.

73, Bert, W2UUN

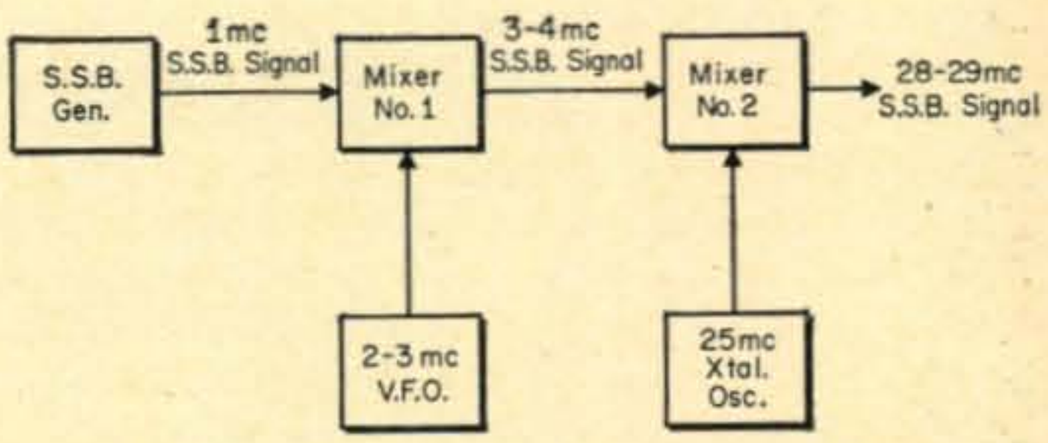


Fig. 6—Stability factor, method B.

the USA-CA PROGRAM

BY ED HOPPER,* W2GT

THE "Story of The Month" is:

Bertha Farr Eggert, WA4BMC

Born, Bertha Wallace Farr in Wenonah, N.J. (15 miles from Camden, N.J./Philly, Pa.) she graduated Friends (Quaker) Select School in Philly in 1935 and that same year married John A. Benjamin of Haddenfield, N.J. They were blessed with two children, Jean Maurie and John, Jr. Bertha became a widow in 1949 when her husband died at the age of 32. In late 1952 she married R. W. (Slim) Eggert, who was divorced and had 4 children, and Bertha went to live in Lake Worth, Florida, and up to that time she had never heard of amateur radio.

In September 1960, Hurricane Donna, ripped through the Florida Keys and Bertha heard the hams in Miami and Marathon passing emergency traffic on her transistor radio, and decided *that* was for her. Starting with no knowledge of code nor electronics, a Novice ticket was obtained in May 1961, followed by Tech ticket Dec. 1961 and a General ticket, Nov. 1962. Her main interest in amateur radio remains traffic and emergency work and a BPL certificate has been obtained for each month in amateur radio, but 3. Although c.w. is liked very much, a mental block has prevented her from taking traffic on c.w., but rag chewing is something else. After traffic and emergency work, do I have to say that her great love is County Hunting with a present score of over 2000 confirmed.

I could make a serial story of all her pet interests and affiliations and have sufficient material for my columns for the rest of the year, but to name some: Participation with the Independent County Hunter Net on 14.336 each afternoon. One of the Directors of The Atlantic Coast Emergency Mobile Net (ACME) on 7.225. Clubs and other affiliations: ARRL, YLRL (Sunshine Chairman YLRL), IOAR, ISSB #31, OGS, FLORIDORA, NAHC & Penna. Chapter, South Jersey Radio Association, Gloucester County ARC of N.J., Grandmothers Club, West Palm Beach ARC, Professional Loafers Club, Moonwatchers, Junkhunter, Slave, Florida Cowbelle, Royal Order of Whootowls, Screwball, Met. Rag Chewers Club of Michigan, Confederate Rebel, West Coast DX Club, Florida DX Club, Florida Sidebanders Assoc., Florida RTTY Society, Knights of Kilocycle (the oldest phone net in amateur radio) VHF-PAM East Florida, ORS (RTTY & CW), ARNS, OPS, OBS, OES, BPL, CP, A-1 Op Club, ARPSC RACES, Asst. EC Palm Beach county, Fla., member of 11 traffic nets and she writes a monthly column about v.h.f. for *Florida Skip* Magazine. As you can read, Bertha is a great one on statistics and as I pried this information from her she said she has had 6457 QSOs and by the time you read this I am sure the figure will be close to 7,000. Her husband, Slim, manages Lafayette Electronics in West Palm Beach and his call is WA4AZZ. Unfortunately, due to circumstances beyond her control, Bertha, at present, is unable to receive company in her ham shack, but she loves to talk to all on the air and help in any way possible. I have been unable to figure when she can find time to sleep. Look at those photos of the ham shack.

*103 Whitman St., Rochelle Park, N.J. 07662.

Letters

Tom, WØIUB, writes: "Thanks for publicizing the United Nations Award in *CQ*, March 1966. The membership is constantly changing but I will gladly send an up-to-date list to anyone. I have some IRCs which I sell for 10¢ each."

Chas., W3AYS, writes: "Please let the USA-CA gang know that I will be glad to QSL for Wyoming county for Sept. 17-19, 1966, no s.a.s.e. required. Only 40 takers out of 284 QSOs in Penna. QSO Party.

"Also, those interested in a leg on that tough Worked All Ontario Counties Award, I'm still ready to supply QSLs for Monitoulin Island county (no resident ham that I know of) for 1966 VE/W contest."

Chas., WA8PVN, writes: "The CHN nets on 7035 kc c.w. are absolutely great. I am available for skeds on Saturdays for the rather rare Hancock county. Write: Charles Collingwood, WA8PVN, 823 South Main, Findlay, Ohio 45840."

Cliff, WAØKXJ and John, WAØWYK, write: "We are the co-sponsors of the Zero District QSO Party and we had great fun setting up transmitters in Orilla, Iowa at a point on the Polk/Warren county line. We got full and wonderful cooperation from the townspeople and we

The shack of WA4BMC.

Centennial Certificate (Canada)

The Gashouse Gang

WAVO Award

Indiana County, Pa. Certificate

made 271 QSOs. Other such operations are planned during the Iowa QSO Party and during some trips through Ø, 4 and 5th districts. For QSLs write Cliff Davidson, WAØKXJ, 5200 Shriver Ave., Des Moines, Iowa 50312." *(Sorry fellows, your letter great, but I had to cut it).*

Ike, W3AZR, writes: "Just a short note to tell you and your readers about Les Voyageurs Amateur Radio Operators. This is a newly formed club with but 7 members, but we own a 23 foot travel trailer, and are planning visiting the rarest counties in Pennsylvania, Delaware and West Virginia. Present plans call for operation on 80 to 10 meters, c.w. and s.s.b. We plan to obtain gear for 6-2 meters soon, and eventually 220 and 432.

"We plan to make one county expedition per month, 12 months per year. We will start our activities officially with Field Day 1967. We made a trip to Delaware for the *CQ* WW 160 contest (and did very well) but it will be June until we have all our gear ready to go in a big way.

"We would be interested in hearing from the gang of what counties are needed in Penna. After getting some idea of what is needed, we will send along a calendar of our operations with times and frequencies. Write to: W3AZR, RD #1, Box 228A, East Greenville, Pa. 18041."

Paul, W8CXS, (One of our *busy* mobilers) writes: "I will be active from the following Michigan counties during "Michigan Week"—May 13, Luce; May 14, Chippewa; May 20, Oceana; May 21, Newaygo and June 3-4 from Mason. Hours of operation—1600-2100 GMT on 7030 and 2100-2230 GMT on 14075 both c.w."

Awards

Indiana County, Pennsylvania Certificate: This could also be called "The Christmas Tree Award," and the reason it is mentioned in May is that the Annual Christmas Tree Festival is held on the third week-end in May at Indiana, Pa. The Indiana County Amateur Radio Club, Inc. participates in this festival by setting up amateur transmitters in the main exhibit hall, using the club call W3BMD. A certificate is mailed to each operator contacted during the festival week-end. Certificates are also issued to operators who work four (4) Indiana County stations during the year. Also, members of the club, working from their own stations, send out certificates for each contact made on Christmas Day. On Christmas Day, most bands are kept busy with c.w. and s.s.b. signals who call "CQ from the Christmas Tree Capital," the c.w. operators call "CQ CTC." The club address is, 634 Grant St., Indiana, Pennsylvania 15701. No charge for this award.

More of WA4BMC's shack.

Centennial Certificate: The Ottawa Amateur Radio Club and the City of Ottawa in conjunction with the Ottawa Centennial Committee, announce a new award, the first of its kind for Ottawa and probably for Canada as well. Work ten (10) members of the Ottawa Amateur Radio Club and send a copy of your log to Jack Barlow, VE3CEB, 191-A Clare Ave., Ottawa, Ontario, Canada. All stations submitting logs will receive a certificate from the City of Ottawa. Each month a draw will be made of certificate holders and the winner will receive free hotel accommodation and meals (for two) for a week-end in Ottawa, compliments of the City Government and the OARC. (Transportation NOT included). To help their American Cousins, a group of members will be operating every Mon., Tues., Wed., Fri., and Saturday at 8 PM EST on approximately 3810 kc.

WAVO Award: The WAVO (Worked All VO) award is available to any amateur who can show proof of the required number of two-way contacts with stations operating fixed, portable or mobile in the province of Newfoundland, which includes Labrador. Amateurs in VO1/VO2 (3B1/3B2) need 40 contacts; all others need 20 contacts. All contacts must be made on or after June 1, 1946 and the special calls for the Centennial year (1967) will count, of course, but only once: for example VO1AW *OR* 3B1AW count but not both. All authorized amateur bands may be used and crossband contacts will be permitted. Minimum allowable report shall be "readability 3," special endorsements may be

[*Continued on page 102*]

SURPLUS sidelights

BY GORDON ELIOT WHITE*

THE discussion of model 28 Teletype equipment in January seemed to get quite a bit of response, particularly from the large number of military people who work with Teletype every day. For some reason the Bell System Teletype people seldom take their interest in RTTY home with them, the way many of the military do.

I was also interested in the number of letters from people who tinker with RTTY, yet are not amateurs. These must be the most technically serious s.w.l.'s, as many have built their own converters and some have quite elaborate switching setups, receivers, antennas, etc.

This month I want to describe some of the Model 28 Tape equipment, which is now becoming available in fairly large quantities. These sets are taken from the semi-automatic military and civilian switching centers that replaced the old model 14 torn tape relay points, about ten years ago. The semi-automatic equipment is itself giving way to solid-state switching centers that use very few machines. The functions are handled in the computer-like electronics, with only monitoring by a small number of printers. The result is the junking of mechanical tape equipment.

*5716 N. King's Highway, Alexandria, Virginia 22303.

The tape gear was used to receive, store, and retransmit messages, like any central office. Scheduling of circuit use and priority, plus encryption requirements made the military centers more complex than the commercial relay points, but both had the requirement for speed conversion: the acceptance of a 75 word per minute transmission and the re-transmission at, say, 100 w.p.m.

Most of the Western Union Plan 55 centers operated basically at 100 w.p.m., some using 7.00 unit code rather than the amateur standard of 7.42 units. These centers, most of which are now gone, contained the LPR model 28 typing reperforator, the LBXD model 28 transmitter-distributor, the LARP model 28 parallel-line perforator, and some special tape readers made for Western Union by its own manufacturers. There were tons of stepping relays and other electronics, all using tubes, in these centers. As far as I can determine, the special Western Union equipment is not readily convertible to amateur use.

The Teletype units, the LPR and LBXD, however, are good model 28 sets. The LARP is difficult to apply to amateur use because it is fed from a multi-wire circuit. It cannot, without additional equipment, receive the common neutral pulse signals. I understand that the addition of a distributor would allow normal loop reception, but the complication is not generally worth the trouble.

In the Bell System centers, such as the 82B1 Navy type, a great deal of speed-changing is required. Speeds used included 60, 75 and 100 w.p.m., with some cross-office circuits operating at 200 wpm. To handle these conversions, mechanically, the Teletype receive-transmit (R-T) tape set was used. The Bell System also installed three-headed tape sets, and used a model 28 ASR with the LCXD transmitter-distributor that mounts both fixed and climbing heads alongside the printer.

The R-T set is the gem of the lot. As shown in fig. 1, it sits atop a tape reel holder, with fresh tape, and used tape takeup, plus a storage bin for the tape loop between the reperforator and the transmitter head.

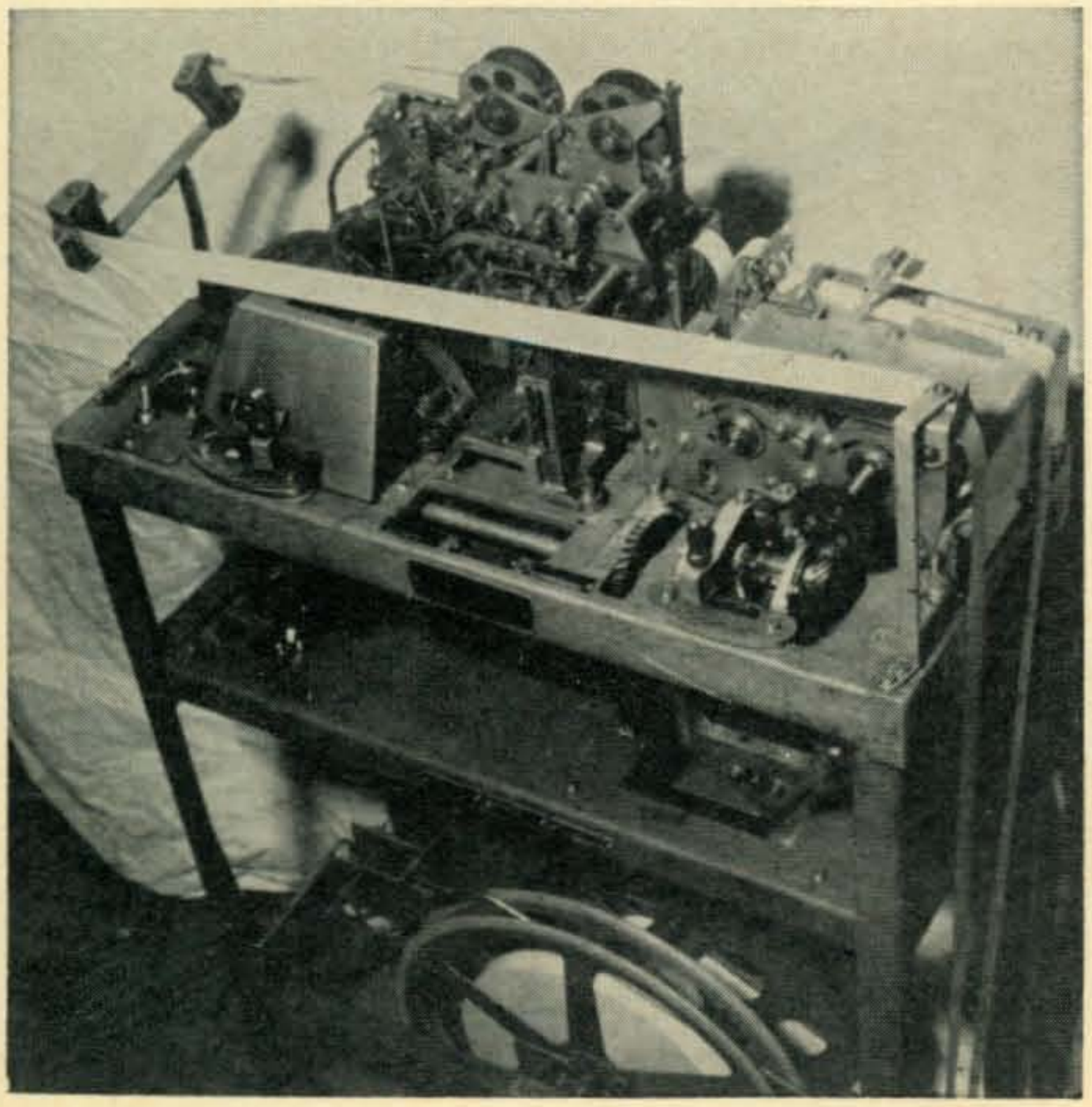


Fig. 1—Teletype Corp. model 28 R-T set, showing the LPR typing reperforator on the left and the LAXD transmitter-distributor on the right. Note the gearshifts and the climbing head tape reader. The transmitter and distributor magnets in the LAXD require 160 ma d.c. each at from 45 to 120 volts.

SURPLUS CORNER

BIG CATALOG

World's "BEST BUYS" in GOV'T. SURPLUS Electronic Equipment

BC-603 RECEIVER

F. M. 20—27.9 MC Continuous tuning and 10 preset push button channel selector. With sensitivity squelch & volume controls, 2 watt output to self contained speaker, one microvolt sensitivity, 2.65 KC I.F. Ten Tubes: 3/6AC7, 1/6J5, 2/12SG7, 2/6SL7, 1/6H6, & 1/6V6GT. Voltage required 12/24 volts for filaments, 220 VDC @ 80 MA for high volt. Size: 11½ x 6¾ x 12½". Wt.: 35 lbs. . . . Used: **$32.95**

BC-603 RECEIVER, CONVERTED to 30—45 MC .....Used: **$44.95**
AC POWER SUPPLY for BC-603: Wired **$14.95** Kit of Parts **$10.00**
DM-34 DYNAMOTOR for 12 Volt DC operation .....New: **$ 4.95**
DM-36 DYNAMOTOR for 24 Volt DC operation .....New: **4.95**
Prices F.O.B. Lima, O.—25% Deposit on CODs—Minimum Order $5.00. BIG CATALOG—Send 25c, Receive 50c credit on your Order. Dept. CQ.

FAIR RADIO SALES
P.O. Box 1105 • LIMA, OHIO • 45802

LARGEST SELECTION IN UNITED STATES AT LOWEST PRICES — 48 HR. DELIVERY

JAN CRYSTALS

Thousands of frequencies in stock. Types include HC6/U, HC18/U, FT-241, FT-243, FT-171, etc.

Send 10¢ for catalog with oscillator circuits. Refunded on first order.

24u0A Crystal Dr., Fort Myers, Fla. 33901

WANTED!

ANY QUANTITY

TED U.H.F. XMTRS
URR-13 U.H.F. REC
R-484/APR-14 REC
APR-9, 13, 17, REC

ALSO

ID-18 and IP-68/CPN-2, R-15/APN-3 REC I.F. STRIPS, ID-17/APN-3, ALL TYPES OF RADAR, RADIO, TEST EQUIPMENT

TECHNICAL SYSTEMS CORPORATION
42 WEST 15th STREET, NEW YORK, N. Y. 10011

LIBERTY ELECTRONICS WANTS TO BUY FOR CASH

Electron tubes and semiconductors

Most any type or quantity
Receiving, transmitting, special purpose, magnetrons, klystrons
We will make you an immediate offer in cash.

Special sale

SP-600 Receiver	$295.00
4CX1000A—New	120.00

Surplus communication and test equipment

AN/GRC-3, 4, 5, 6, 7, 8, 10, 19, 26, 27, 46, VRC-12
AN/PRC-8, 9, 10, 25
Test equipment with ARM, SG, URM, UPM, USM, and TS prefixes
Communications: AN/TRC-1, 24, 35, 36
Receivers: AN/APR-9, 13, 14, R-388A, R-274, R-390A, R-391, R-392, etc.
Indicators: ID-250, 251, 387, 257A, etc.
Aircraft: AN/ARC-27, 34, 38, 44, 52, 55, 57, 73, 84
AN/ARN-14, 59, 67, 70
AN/APS-42, 81
AN/APN-3, AN/CPN-2A, AN/APN-84
Also: Tektronix, Hewlett Packard, Boonton, and General Radio equipment, etc.

Liberty Electronics, Inc.

548 Broadway, New York, New York 10012, Phone 212 - 925 - 6000

For further information, check number 29, on page 110

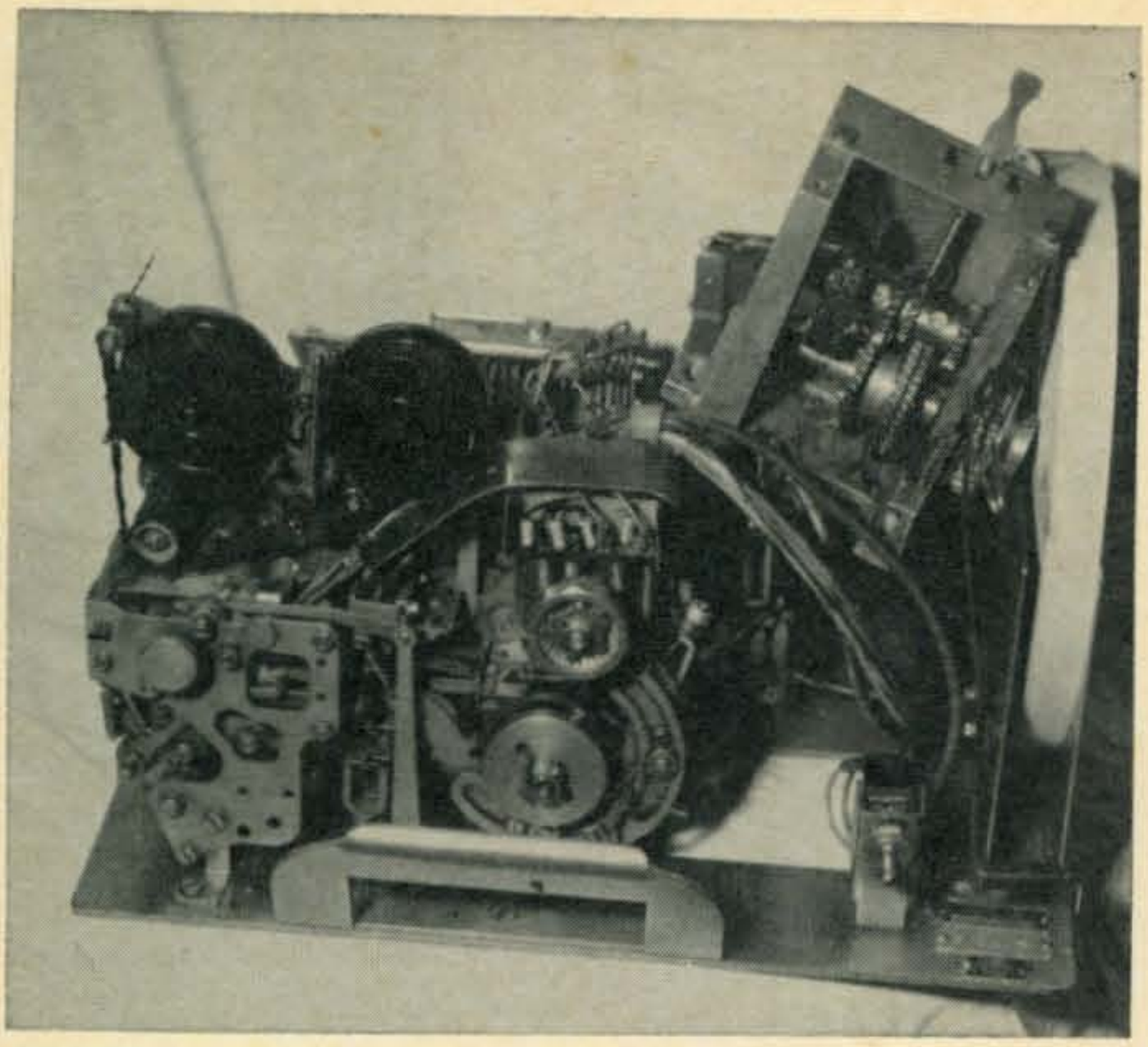


Fig. 2—Model 28 LPR typing reperforator on separate base, with, at rear, the 60-75-100 w.p.m. gear shift mechanism removed from the base. This, like the LPR in the R-T set, types on the tape.

Many of these sets had quick-change gear shifts on both the receiving end and the transmitter, allowing 60-75-100 w.p.m. speeds, 67-71-107 w.p.m., for 7.50 unit code, or possibly some 7.00 code speeds. Since the model 28 LAXD transmitter was used, the last character punched could be read, without a lot of spacing-out of tape. These features allow the R-T set, used with any of the Teletype KSR printers—15, 26, 28, or 32—(keyboard and page printer only) to give virtually all the functions available with the most complete, and costly, model 28 ASR set.

For straight amateur use, at 60 w.p.m., the reperforator can be used to punch tape off-line while an incoming message is received on the page printer. When transmitting, the tape loop can be run through the LAXD transmitter-distributor and sent over the air while making hard copy if you like on the page printer.

It is even possible to start sending from the beginning of the tape while finishing up the end of your transmission as the prepunched tape loop runs through the TD. There is no need to switch the R-T set out on transmit at any time, because of the reads-the-last-character provision. Limit switches and tape-out switches automatically stop the TD on tight tape or when the end of the tape runs through the reader.

The tape takeup also provides a convenient log and keeps tape from piling up on the floor.

For those who like to listen around in the commercial and military bands, which are going more and more to higher speeds, the gear-shift provision on the R-T set allows reception of high-speed RTTY, and the conversion of it to 60 w.p.m. to print page copy on a conventional printer. Finally, the gear-shift on the TD can provide a source of test signals at higher speeds if one has any interest in looking at converter or machine performance at those rates.

I cannot suggest specific sources of these sets, but I have seen one center, at Cheltenham, Maryland, dismantled, and there was a second, at Norfolk, Virginia, taken down this past winter. There are undoubtedly others that have gone or will go.

The policy of the Bell System, which leases these centers to the Navy, is an enigma to me. I attempted to have the Cheltenham station handled so as to make its fine equipment made available to interested hobbyists at a nominal cost, but American Telephone and Telegraph Co., Long Lines Department, turned down my written request.

AT&T had ordered the center junked, and although I made my plea before a scrap contract had been signed, the powers that be in New York ruled that I probably could not guarantee that the equipment would not be used in commercial competition with Bell. I stuck my neck out to offer a bond, handle it strictly non-commercially (non-profit) and did everything else I could, but AT&T sent the wrecking crew out with sledge hammers, then told me it had been scrapped.

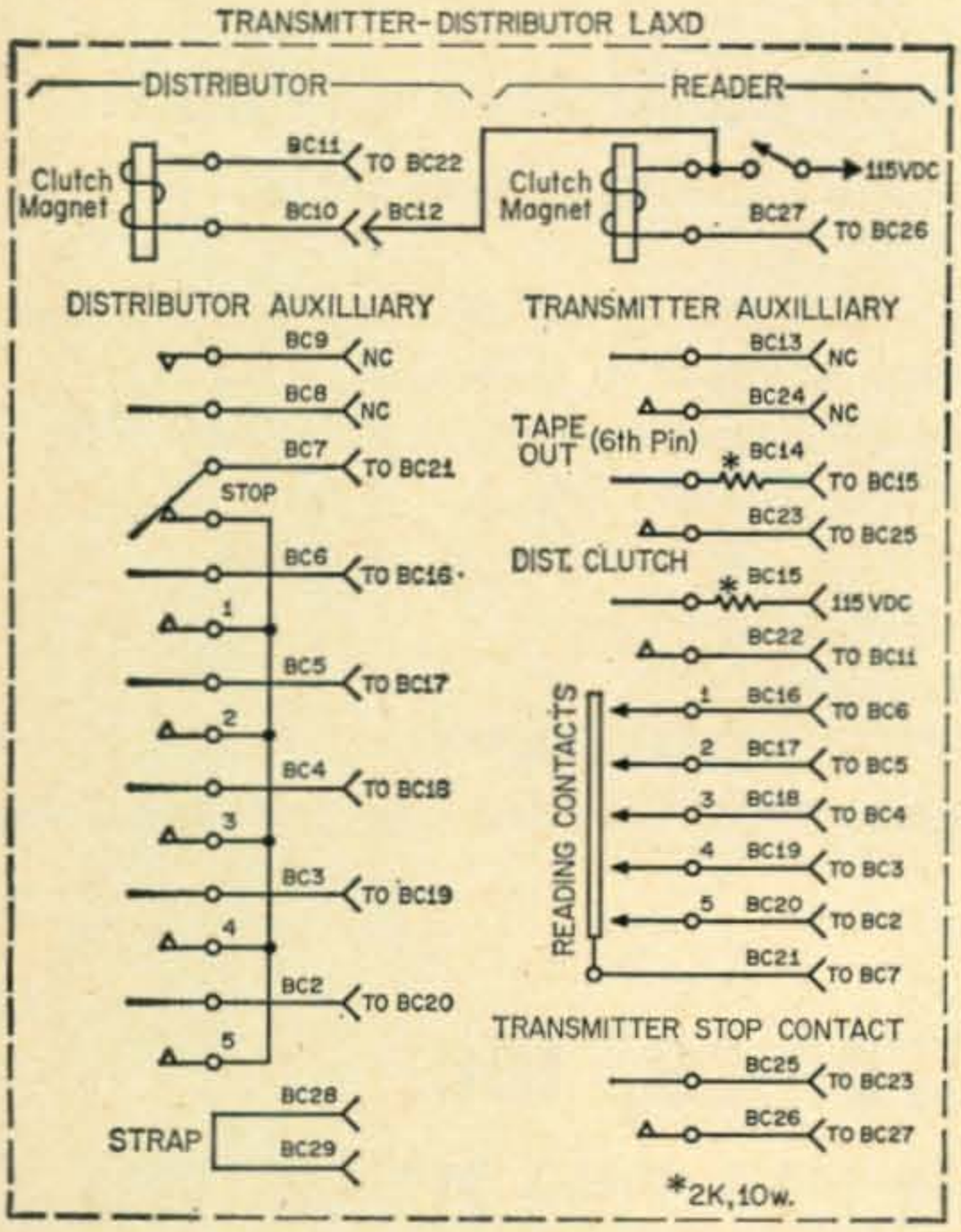


Fig. 3—Schematic of the LAXD Model 28 TD, with wiring connections. The loop connects to BC-7 and BC-21.

Spring Specials

TEST EQUIPMENT
Guaranteed good condition

Freq. Meter, BC-221-T with orig. calib. book and 115 v. supply **$59.00**
Freq. Meter, BC-221-M, same as above except mounted on rack panel **$59.00**
Freq. Meter, Navy LM type, (Sim. to BC-221), orig. calib. book **$49.00**
Power supply for LM Freq. Meter, 115v. **$10.00**
Signal Generator URM-25C, 10 kc-50 mc, with access. & book **$275.00**
Scope—5 inch, Dumont model 274 ..... **$35.00**
Scope—5 inch Dumont 241 ..... **$45.00**
V.T.V.M., Hewlett-Packard 400-A **$35.00**
V.T.V.M., Ballantine model 300 ..... **$35.00**
S.W.R. Meter, Hewlett-Packard 415-A **$25.00**
R. F. Signal Generator & TV/FM marker. 160 kc 240 mc, Paco G-30 ..... **$24.00**
Sweep Generator, Jerrold 220, 50-220 mc (10 mc bandwidth center freq.) 2-170 mc (bandwidth center freq. 135 mc.) **$50.00**
Precision Osc., Marconi 148-017, 2-4 mc **$45.00**
Amprobe Chart Recorder 95-130 v. a.c., 190-260 v. a.c., with 115 v. a.c. motor **$39.00**
Amplifier, 35 watt, Bogen CHB-35A **$49.00**
Tube Tester, TV-10 D/U .. **$95.00;** TV-10 B/U .. **$80.00**
TV-3 B/U .. **$65.00**

TRANSMITTERS & RECEIVERS
Guaranteed good condition

Gonset 6 m. Transceiver, Comm. IV 110v. or 12v. **$169.00**
Viking Challenger, 80-6 m., 70 w.ph., 120w. c.w. . **$59.00**
Elmac AF-68 Transciter, v.f.o. or xtal, 80-6 m. 60 w. Brand new **$145.00**
Sonar Mod. 30 Marine Transceiver, 35 w. New . **$145.00**
Hallicrafters HT-40, c.w.-a.m., 80-6; 75 w. **$65.00**
Hallicrafters HT-37, s.s.b. xmitter, output s.s.b. (PEP) 70-100 w. 80-10 m. **$250.00**
Eico 720, c.w., 80-10 m., 90 w., v.f.o. or xtal. **$65.00**
Elmac AF-67, 60 watt, 160 thru 10 M. **$59.00**
Viking Navigator, c.w. xmitter, 40 w., 160-10 m. . **$65.00**
TA-12 Xmitter, 90w., 160-80-40-20 m. 115v. Sply. . **$49.00**
Heath DX-20, 50 w., 80-10 m. **$24.00**
VFO—Hallicrafter HA-5, 80-2 M. **$49.00**
Gonset 6 m. 500 w. r.f. power amplifier **$145.00**
Sonar CFC, v.f.o. Exciter, 80 & 40 m. **$18.00**
Linear Amplifier, 1 kw. PEP Commercial rating 2-3 mc continuous tuning, in 6 ft. cabinet, prototype. Local only—cannot ship **$200.00**
Ant. Coupler, CU-362/FRT, 1 kw 2-30 mc, continuous tuning, 50 ohm coax to balanced line, for above linear Amp. **$50.00**
Hallicrafters S-85 receiver, .54-34 mc **$65.00**
Hallicrafters S-108 receiver, .54-34 mc **$69.00**
Hammarlund HQ-170AC, 160-6 m. s.s.b. **$195.00**
Hallicrafter SX-101-A, s.s.b. receiver, 80-10 m. .. **$175.00**
Converters, 6 m. Ameco 6B-6W., display models . **$18.00**

NEW PARTS

Johnson 226-1 1kw, tuning inductor 22.5 μh **$29.00**
Blower, Rotron, series 320 AS ..... **$ 8.00**
Fil. Trans., 5.63 v. c.t., 14.5 a. and 5.35 v. c.t. 13 a. ..... **$ 4.50**
Fil. Trans., 6.4 v., 6 a. & 6.1 v., 3.5 a. ..... **$ 3.50**
Dual Choke 5.03 hy, 600 ma & 3.48 hy., 600 ma. .. **$ 4.50**
Trans., Pri. 230 v., 6200 v. c.t., 500 ma., 5250 v. c.t., 600 ma., 4200 v. c.t., 400 ma. Approx. 100# **$35.00**
Variable Capacitor, 400/400/800 mmf 1500 v. .. **$ 4.50**
Variable Capacitor, 600 mmf, 3000 Volts ..... **$ 3.50**
Variac, 400 cycle, 7 Amp. ..... **$ 5.00**
Cabinet Drawer Slides, 22½" when closed; extends 25" externally, heavy duty, Pair ..... **$ 3.00**
National 4 gang var. cond., min. 15 mmf, max. 225 mmf, with P.W. drive & dial **$12.00**

POWER SUPPLIES

Ameco PS-3,600 v., 150 ma; 300v., 100 ma. 12 v., 3 a. or 6.3v., 4 a. **$19.00**
RCA 10-D/3501, 500 v., 400 ma, 420 v. 240 ma, 180 v. 240 ma, 180v. 60 ma & 12 v. Brand new in crates; Approx. 100# Close-out price **$30.00**
Power supply, 3000 v. c.t., 300 ma **$15.00**
RA-87 Teletype supply, 115v. a.c. to 115 v. d.c. .. **$ 9.00**
Jackson 607, Regulated, 150-300 v. 100 ma. **$39.00**
Minneapolis-Honeywell, 250v. 200 ma, 500 v. 300 ma, Brand new **$42.00**
TCS 12 v. Dynamotor 400 v. 180 ma, 220 v., 100 ma ..... **$ 9.00**
Lambda PS-33 Regulated, 100-200v.-300 ma, 6 v. c.t., 5 a. **$20.00**
Supply Chassis, 600 v. & 400 v. 200 ma. ..... **$ 9.00**
P.E.-103 Dynamotor, 6 & 12 v. d.c., 500 v., 160 ma **$ 9.00**
Leece-Neville, Alternator, 6 or 12 v. **$18.00**

MISCELLANEOUS

F.M. Police & Fire bands, crystal type, 115v. a.c., 40-50 mc & 150-160 mc, 115v. a.c. Specify exact freq. **$35.00**
QJB echo ranging equip, receiver 10-30 kc **$25.00;** osc. 10-30 kc, **$20.00;** Driver Amplifier 22-28 kc, **$20.00.** Brand New, All three for **$50.00**
ARC-5 Receivers 3-6 mc & 190-550 kc **$12.00**
ARC-5 Transmitters, 4-5.3 mc & 5.3-7 mc ..... **$ 6.00**
RAK Receiver 15-600 kc **$39.00**
Panadaptor 456 kc i.f. **$40.00**
ART-13 Transmitter, 200 w. **$25.00**
Power Supply for ART-13, 115v. a.c. **$15.00**
RAL Receiver, 300 kc—23 mc **$35.00**
USM—50 Scope **$125.00**
FSK—2-4 mc oven cont. osc., Mars Mod. FS-303 . **$75.00**
G.R. 561-D Vacuum Tube Bridge **$25.00**
Signal Gen. LAD, 2700-2900 mc **$35.00**
Tube Checker, Precise 116 ..... **$40.00**
Signal Gen., I-208, 1.9-4.5 mc & 19-45 mc **$29.00**
Signal Gen., 78B, 15-25 mc & 190-230 mc **$30.00**
HRO Receiver, military, 3 coils & 115v. supply .. **$35.00**
TCS Xmitter, 1.5—12 mc **$29.00**
Modulator RCA. MI 22565, 345-385 watt **$30.00**
TBS Xmitter 100 w. or Receiver 60-80 mc. Ea. **$25.00**
OAP, Wavemeter, Osc., 150—230 mc **$15.00**
BC-620, FM Xmitter—Receiver, 20-27 mc **$15.00**

WANTED—Popular Amateur Equipment, test equipment and Citizen band. Give make, condition and price for trade-in or cash.

All merchandise guaranteed to be as represented. Prices are based on good value for quick sale. When ordering, give second and third choice if possible in case of stock shortages. 25% requested with COD orders. To avoid delay send sufficient postage, balance will be returned. FOB Hempstead.

ALGERADIO

Electronics Co.
37 Greenwich Street
Hempstead, N.Y. 11550
Phone: 516 IV 9-0808

For further information, check number 35, on page 110

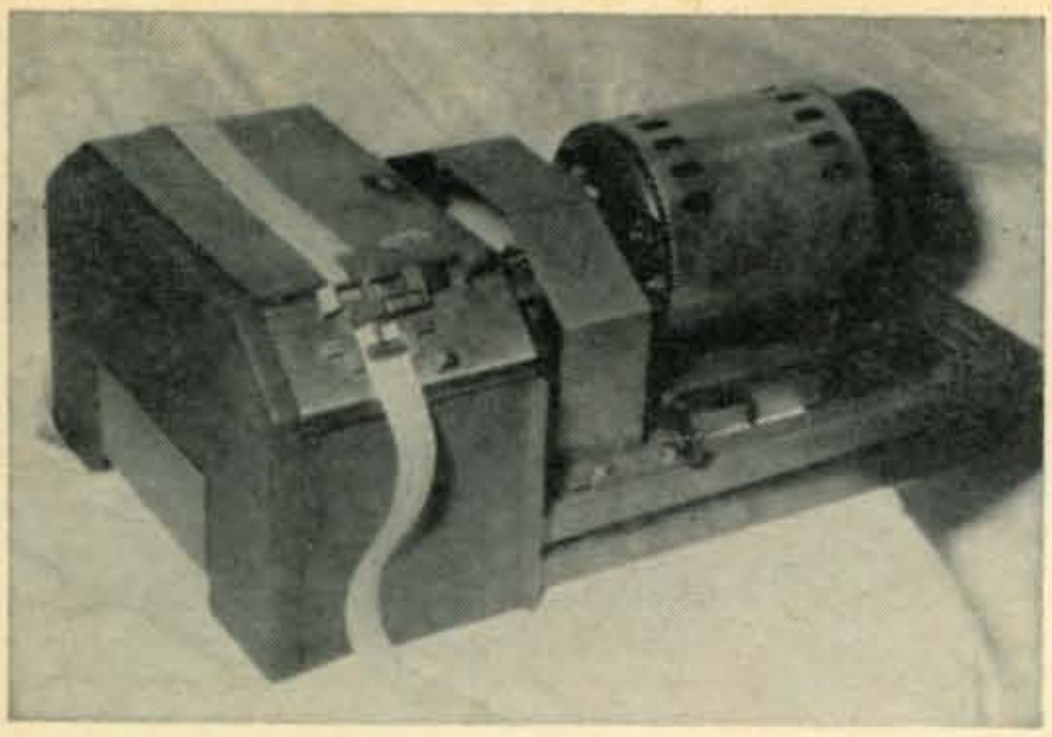


Fig. 4—An LBXD Model 28 TD from a Western Union communications center.

The Quixotic thing about the AT&T decision, was that only about a quarter of the equipment was put out of commission, and much of the rest was left salvageable. It was then sold to a junk dealer who immediately resold a large part of the equipment to commercial teleprinter companies in New York, who sell to Bell System competitors!

Although the official Bell policy today is to recondition model 28 material, I see Teletype equipment by the ton, smashed, and junked, for a penny a pound. Recently model 35—the latest—Teletype printers have been smashed at a number of places on the east coast, rather than recondition or modify them.

The best of the Western Union material, which is not smashed, but is sold on a "non-competition with Western Union" basis, is now being sold by Alltronics Howard Telecommunications Co., of Boston. I am not sure how Tom Howard prices these sets to amateurs, but he has the largest stock of this material on the east coast, and should be a good source.

The Model 28 LPR (fig. 2) is the best of the lot from Western Union. This set, as disposed-of, was geared for 100 w.p.m., but can easily be set up for 60 w.p.m. by a simple gear change. (Some of these were canabalized for motors. Be sure to check that point in buying these machines)

The LPR's will receive normal 7.42 RTTY code. They come with a lot of unnecessary wiring, and usually are mounted in a huge cabinet, thus do not have individual covers. The best part of the LPR is its easy adaptability to the 60-75-100 w.p.m. gearshift, which can be readily mounted in place of the single-speed gears. These shift units can be bought in many places, or ordered from Teletype Corp. The LPR of course perforates standard RTTY tape and prints the message on the tape at the same time. The Western Union LPR's had metering devices to feed out a predetermined amount of tape without interfering with a message that might start to come in during the feedout operation. This is intriguing to watch, but I am not certain of its value to most hobbyists.

The Western Union LBXD is a self-contained model 28 TD, somewhat like the old model 14 TD that most amateurs use. It has end-of-tape switches and a stop-start-run control. The LBXD, unlike the 14 TD, requires d.c. current to operate the start-magnets in the transmitter and the distributor, and the wiring of each contact is brought out to Amphenol connectors. It would thus require some wiring to hook it into the usual loop, but this is not as complex as it appears.

The LBXD can be taken off its base and with some adapters, be put into the model 28 ASR cabinet, incidentally. So can the LAXD TD on the R-T set, but it would require a new main shaft because of a length difference in the R-T application.

To assist in wiring up the LAXD, fig. 3 shows the schematic of this TD, with indicated connections for loop operation.

Finally, Fig. 4 shows the LBXD and the LARP sets.

Figure 5 is a photograph of a mystery: a 60 and 100 w.p.m. gear shift unit for the Model 28 ASR (printer, perforator, TD) set. This very solidly built shift unit lists in the $200 range from Teletype, is shown in the parts and maintenance books, but is still considered an enigma by the boys at Teletype's Skokie plant. The shift drives the transmitter and perforator from the shaft shown at the left (p/n 176780) through a pair of gears, to the rear bearing bracket on the keyboard base.

Despite a great deal of work, Teletype cannot find any record of those two gears. They say that the job was a special one, for the Boeing Company, or maybe it was for the National Aeronautics and Space Administration. At any rate, they seem lost.

There are a number of amateurs who have these shifts, and who would like to buy the left-side gears. If anyone reading this knows of the proper parts to operate this ASR shift, he could be of great assistance by contacting me, or Ralph Leland, of the Michigan Amateur RTTY Society, 118 Cambridge, Pleasant Ridge, Michigan.

[*Continued on page 102*]

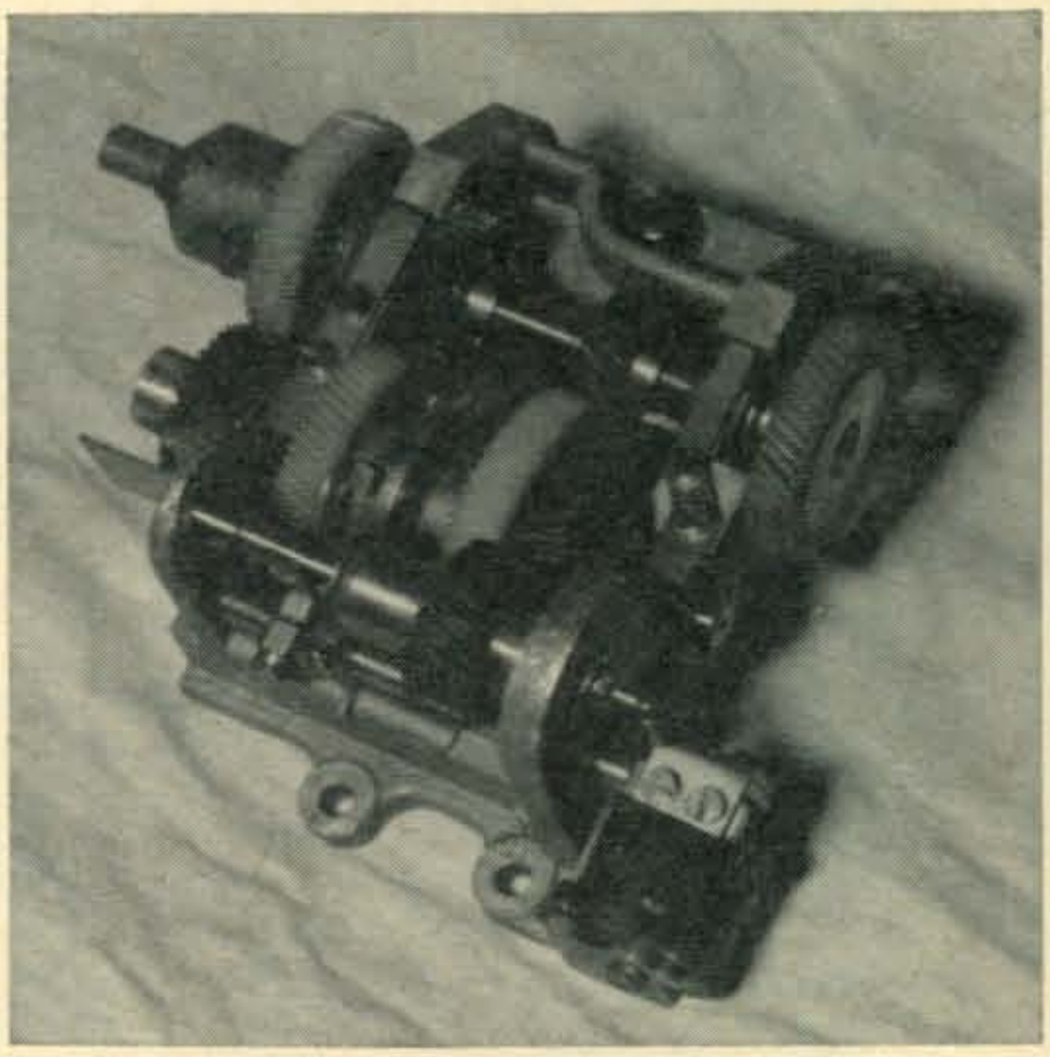


Fig. 5—Model 28 ASR gear shift unit for 60-100 w.p.m.

HOOKED ON SKY HOOKS?

Here's your chance to get an early copy of the latest addition to CQ's famous ANTENNA ROUNDUP series. Volume II covers antennas spanning frequencies between 10 cps and 2450 mc.

CHECK THESE FEATURES

- 10 BIG theory features!
- 10 WILD low band verticals to build!
- 20 DB MAKING low band horizontals and beams to build!
- 20 SMASHINGLY GOOD antennas to build for VHF!
- 9 CUNNINGLY CLEVER features on tower construction, coax, switching, etc.!
- 23 OTHER construction projects covering antennas for CB base and mobile use, for use on the shortwave broadcasting bands, etc.
- 92 ARTICLES in all, covering longwires and dipoles right up to 17 element supergiants and Sterba Curtain arrays!

You can have this information for less than 4.348¢ per feature!

YES—THE ANTENNA ROUNDUP, Volume II, is now available. Copies are being shipped on a rush basis! You can have your dream antenna in a few days. Get your copy by sending $4 for your postpaid copy—DO IT NOW!

COWAN PUBLISHING CORP., BOOK DIVISION
14 Vanderventer Avenue
Port Washington, L.I., N.Y. 11050

Gentlemen: Enclosed is $_____ for _____ copy(ies) of the brand new ANTENNA ROUNDUP, Volume II. Please rush me one of the first copies hot off the press!

***New York City and State residents must add sales tax applicable to your area.**

Name_____, Call_____

Address_____

City_____ State_____ Zip_____

PRICE: $4.00*

SEND YOUR ORDER NOW!

SUDDENLY YOU'RE WORKING MORE STATIONS...

***PULLING IN THE WEAK ONES** that demand the sensitivity of DAVCO's exclusive Field-Effect front end . . .*

***KNIFING THROUGH THE QRM** by choosing the optimum selectivity for conditions—a razor-sharp CW filter, a near-perfect SSB Mechanical filter, or a fine AM filter . . .*

***BLANKING OUT NOISE** from power lines and ignition with the no-extra-cost noise-blanker that lets you extract a Q5 signal you couldn't know existed without it . . . or nulling an offending carrier with the T-notch. The DR-30 communications receiver covers all the ham bands from 80 meters through 50.550 Mc in the 6-meter band. It has a built-in crystal calibrator, full AGC, Teflon wiring and plug-in modules for all active circuitry. It is the most versatile receiver ever produced, and it can be operated from an AC pack or from batteries in fixed, mobile, and portable operations.*

FREQUENCY COVERAGE: 10 550 kc segments covering the entire 80, 40, 20, 15, 10 m. ham bands plus 50.0-50.55 on 6 m. and 9.5-10.05 WWV. Provision for two extra ranges.

SENSITIVITY: Better than 0.6 μ for 10db s/n.

SELECTIVITY: SSB: 2.1 kc Collins mechanical filter. AM: 5 kc ceramic/transformer filter. CW: 200 cycle crystal filter.

STABILITY: Negligible warm-up; less than 100 cps per hour; less than 25 cps for 20% power supply variation. Extreme resistance to shock and vibration.

DETECTORS: Separate AM and SSB/CW product detectors; crystal-controlled BFO.

NOISE LIMITER: True blanking action preceding selectivity; has separate ANL amplifiers and detector; front panel threshold control.

RF STAGE: Low noise premium FET RF amp. and first mixer; tuned circuits employ high-Q toroidal inductors.

SEMICONDUCTOR COMPLEMENT: 23 bi-polar transistors, 2 Field-Effect transistors, 10 signal diodes, 1 power diode, 2 zener diodes.

SIZE: 4" h., 7⅛" w., 6" d. Weight: 7 lbs.

POWER REQUIREMENTS: 12 v. DC @ 300 ma. max.

PRICE: from factory **$389.50**

DR-30-s: Complete regulated power supply for operation of DR-30 from 110/230 v. 50/60 cps, plus battery holder for 9 D-size cells for portable operation; speaker, earphone jack (illustrated above) **$39.50**

The DR-30 is fully compatible with any transmitter. At a cost equivalent to an accessory PTO, the DR-30 gives the transceiver-equipped station an unequalled receiving capability. It is the appropriate nucleus for any amateur station.

Send us your card for an information package containing evaluations of the DR-30 by the staffs of CQ (December 1966), QST (January 1967) and 73 (May 1965), an 8 page technical brochure and a complete schematic. DAVCO products are available direct from the factory.

DAVCO receivers for telemetry, radio astronomy, WWV, SWL's and other special applications are available from stock or can be provided to your specifications. Your inquiry, detailing your requirements, is invited.

DAVCO ELECTRONICS, INC. P. O. Box 2677
2024 S. Monroe St. Tallahassee, Fla. 32304

For further information, check number 38, on page 110

Letters [*from page 8*]

are all but closed to radio astronomy by overwhelming man-made radio interference."

H. H. Wood, VE2JD
St. Hilaire, Quebec, Canada

Sylvia

Editor, *CQ:*

Up with Ethel R. Johnson; down with Sylvia Margolis! After reading a few paragraphs of "Pussy Cat, Pussy Cat, Where Have You Been?" I was hit by a lack of intestinal fortitude (a phrase used a few pages back).

Thanks to "My Quarter of a Million Friends," I was revived.

Thank you also for the return of Scratchi. Good work, OM.

John B. Henderson
Tuscaloosa, Alabama

Editor, *CQ:*

In the March 1967 issue of *CQ* la Sylvia, after painting a picture—preposterous though it be—of a single operator casually knocking off QSO's at the rate of 200 per hour during the late *CQ* c.w. contest, with her next breath refers to 'phone, paradoxically enough, as a "less primitive" means of communication than c.w.

When one ponders over the fact that the making of a proficient c.w. operator requires a certain measure of talent, long training, and skill, and the no less obvious fact that *any* blathering idiot who has not suffered a loss of voice can yak away endlessly into a microphone (and a great many do!) one is led to wonder just which of the two modes represents the "primitive" means of communication.

Rupert A. Lloyd, Jr., F5SF
66-Argeles-sur-Mer, France

IMRA News

Editor, *CQ:*

CQ is getting better all the time. Congrads on the fine job.

I especially enjoy articles which reflect the serious, useful side to amateur radio. After all, we aren't a bunch of overgrown boys playing with 007 walkie-talkies.

Articles like "International Mission Radio Assn. News" are a real inspiration and point the way to more serious partcipation in ham activities.

I also enjoyed the VE8OX's story in that article. I'm sure we would all like more space devoted to the nostalgic lore of Ham radio.

While we're at it; how about something on radio-control for hams. The other two rags never mention it. Perhaps you're all missing a real bet in that field.

Robert B. Brine, WB6RYQ
Sacramento, California

PLEASE include your ZIP code number on all correspondence.

Electronic Magazine [*from page 32*]

"New York, New Jersey, New Mexico," laughing hysterically.)

Finally the big day comes, your check arrives. There is a sudden impulse to cash it immediately because it certainly was meant for someone else. You disobey the impulse and glower as you show it off to your friends and relatives. You especially get a kick out of showing it to Uncle Elbert, who has referred to you as "that infernal fathead" ever since the day one of your transmitter's relays closed on his beard. Eventually the check gets buried in one of the several mounds of papers that you maintain, and it will never be seen again (except maybe by someone cleaning the room six months later, and then it will be thrown away with the rest of the debris). But what is money now? You have grown a beard, bought yourself a bright red-plaid scarf, a copy of J. D. Salinger, and are now unable to be spoken to by anyone with less than a Ph.D. in English Literature. You talk of going to Majorca or Big Sur to write a novel next summer, you will take with you only a pair of white bucks, pipe, chino pants, flannel shirt, and red scarf.

Life is ecstacy, each month you rush to the newsstand to buy a copy of *your* magazine, but to no avail. Maybe it *was* a mistake! You are at the limit of your sanity when you finally see your article in the current issue. Running your finger over the page, you repeat to yourself, "Build A High Power Code Practice Oscillator For Fun and Profit, by Melville Grong." You repeat it again. Tenderly you buy six copies and walk slowly home, hoping someone will ask why you are walking with a magazine sticking out of each pocket, and one in your teeth. But nobody asks, and eventually you are reduced to buying 25 copies and leaving them around town, at drugstores, libraries, bus stops and friends' houses. Of course in all of these copies your article happens to be circled in red.

And now you get your first letter from a reader. You rip the envelope to shreds trying to open it. Large chunks of the letter fall to the floor with the envelope. It starts off, "Dear Grong—I noticed in your article that you say capacitor C_5 is supposed to be .047 mf. Well I say that you're a loon! Any fool will tell you that it should be .05 mf." You are crushed, tears well up in your eyes and you swallow the lump in your throat. The next day's mail brings you seven more letters, each pointing out some other glaring error. You suddenly feel that the world is laughing at you behind your back. You give your red scarf to Aunt Hattie to use for a dust rag, and your white bucks to Fido, who has had his eye on them for weeks.

You put away your typewriter, taking a vow never to do such a foolhardy thing again.

The first layer of dust hasn't even begun to settle on the ol' Remington when you get a letter from your Editor. It starts, "Dear Grong—We are looking for someone to do an article on a vest pocket kilowatt and we were wondering if you . . ." Get back your scarf, you're a writer. ■

Oscar-5 [*from page 24*]

meter beacon transmitter, a 2 meter telemetry transmitter and a command receiver and decorder. Unlike the EURO-OSCAR satellite, it will not contain a translator and will not be used for communications. The Australian-built satellite is expected to arrive at OSCAR headquarters shortly, and will probably be launched as OSCAR VI later this year.

The giant ARIES radio amateur satellite is still under construction and is not expected to be

completed before the end of this year. Built by a group of radio amateurs in southern California, ARIES will be the largest and most powerful satellite yet built in the OSCAR series. The satellite will contain beacon transmitters operating in the 144-148, 220-225, 430-440 and 1215-1300 mc amateur bands, a 2 meter translator, and a command receiver and telemetry channels. The ARIES satellite is described in detail in the September, 1966 issue of *CQ*, beginning on page 29.

For those planning to use the EURO-OSCAR satellite as a 2 meter relay, it is suggested that the following article be used as background data: "OSCAR III, An Active Communication Satellite For Radio Amateurs", by G. Jacobs. Part I, which describes the satellite's circuitry and construction, appears in the October, 1964 issue of *CQ*, beginning on page 54. Part II, which describes how the satellite can be used for communications and other experiments, appears in the February, 1965 issue, beginning on page 38.

Information concerning the launch date of OSCAR V, its planned orbit, etc., will be featured in *CQ* as soon as this data becomes known.

FLASH: The antennas aboard the EURO-OSCAR satellite will be *circular* polarized, so that for best results *linear* polarized antennas can be used on the ground. ■

Jansky or Reber [*from page 35*]

The photo shows Jansky along side it, taken in the early thirties.

Some of the equipment (much of which Jansky designed and built) is shown in the second photo. He is pointing to the milky way, from which he discovered the extraterrestial signals were emanating. His assignment at Bell Laboratories was to find the cause of interfering noise plaguing the overseas radio telephone links, and this he did when he discovered the star signals.

The pressures of the oncoming war forced most of the Bell Labs employees, including Jansky, into war jobs (mostly radar). It was after Jansky had published several papers on his findings that Grote Reber began his work. Until this time, no one seemed very interested in Jansky's findings, and when he heard Reber was working on them, Jansky was delighted. In fact, Reber once told Karl that it was too bad that Jansky himself was not working in this field. To this Jansky cheerfully replied that after all, he had "skimmed the cream."

Karl Jansky's health never was good. In fact, a chronic kidney ailment caused the medical department at Bell Labs to reject him when he first applied for work. He was later accepted, through the intervention of his brother. He died in 1950, at the age of 45, never really seeing the fruition of what he had started.

The National Radio Astronomy Observatory in West Virginia recently built a new laboratory, which they named the Karl Guthe Jansky Laboratory (see photo). Inside the lobby is a plaque commemorating Jansky with these words:

Karl Guthe Jansky (1905-1950)
Father of the Science of Radio Astronomy
First to Discover Radio Emissions
From Outer Space at
Bell Telephone Laboratories
Holmdel, New Jersey, in 1932

As I read the story of Grote Reber, I got the feeling that the authors of the story never really said Reber was the Father of Radio Astronomy, but that only the man who made up the headline on the story and cover said it. At any rate, I hope this will clarify the issue.

Barry R. Campbell, W2CGX
17 Debbie Place
Berkeley Heights, New Jersey 07922

The Eico Keyer [*from page 21*]

ducts and the oscillator signal is heard. The neon bulb is mounted on the panel and so it also may serve as a visual keying monitor.

Construction and Facilities

The Model 717, which is housed in a perforated-steel case, is assembled on a plated-steel chassis that is fastened to a heavy extruded-aluminum panel that has grille openings for a 3″ × 5″ loudspeaker. The function switch has an OFF, TUNE and OPERATE position. The range selector has four positions that provide keying speeds of 3-8, 7-18, 17-40 and 38-75 w.p.m. Another control continuously varies the speed within the limits set for each range. There are monitor-level and tone controls. The latter permits the pitch of the a.f. oscillator to be continuously varied between 500 and 1500 c.p.s. Also on the panel are a power-on lamp and the monitor lamp.

On the rear are a phone jack, three screw-type terminals for connecting the external paddle, two screw-type terminals (one grounded) for connecting the relay contacts to the equipment to be keyed, a fuse and the line cord.

Assembly

The unit shown here was assembled from a kit with 10 easy-going hours spent in doing the work. The step-by-step instructions and parts identification were clear which, along with large diagrams on 22″ × 16″ sheets, made assembly easy and neat. The result was a job that functioned perfectly right off the bat.

Performance

Operationally, the Eico keyer performed according to the specifications. At all code speeds the dot-to-dash ratio held constant at 1:3 and with the spaces equivalent to the length of one dot. Dots, dashes and spaces were always completed, no matter how we manipulated either a single or double-type paddle in an attempt to upset the character completion. If while using a double paddle both paddles are simultaneously held closed, the dots take over; but not before a dash and space are completed in the event the dash paddle has been depressed a fraction of a second before the dot paddle. This can be an advantage for minimizing "stilted" formation of letters or numerals where dots follow a dash.

The monitor oscillator puts out a reed-like tone, but it is pleasant and with the provision for varying the pitch, makes it easily distinguishable from received signals during on-the-air operation. There are no provisions for feeding the receiver output through the phone jack, so "split" headphones would have to be used where headphone monitoring is desired of both the keyer and received signals. To avoid this inconvenience, a jack could be added for parallel receiver connections; however, due to the low-impedance output of the monitor, a matching transformer may be required if the receiver headphone-output is high impedance.

No problems were encountered in keying a number of different transmitters and even at the highest speeds, oscilloscope observations showed that the keying relay truly followed the character formations and did so without any evidence of contact bounce.

We did not have a standard single-paddle type key designed for operating a keyer, but one was easily improvised by splitting the dot and dash connections of a standard "bug" and adjusting its dot contacts for a solid "make" without vibration at the instant when the paddle was placed at the dot side. This worked out very well, even though we're not accustomed to an automatic keyer with a single paddle. Where this expedient or a standard automatic-keyer paddle is not available, one can be built from various construction articles on the subject (an interesting one is described elsewhere in this issue) or one may be purchased from among those currently on the market. The Eico Model 717 Electronic Keyer is priced at $49.95 in kit form, $69.95 factory wired. It is a product of EICO Electronic Instrument Co., Inc., 131-01 39th Avenue, Flushing, N.Y. 11352.

—W2AEF

Finger-Tip Switches [*from page 44*]

	Slide Type	*Rocker Type*
Crosstalk[6] @ 30 mc	—58 db	—48 db
Crosstalk @ 50 mc	—50 db	—40 db
V.s.w.r. at 52 ohms @ 144 mc	<1.1:1	1.3:1
Insertion loss @ 144 mc	<0.1 db	0.1 db

Operation with 1 kw r.f. power did not produce any indications of excess heating or other losses.

Although not intended to be switched while r.f. power is applied, there is less likelihood of switch-contact damage than with wafer-type rotary switches, inasmuch as there are no thin or sharp edges at the contact-breaking points. This was born out by the absence of switch damage after a Finger-Tip switch was shifted back and forth a number of times between separate loads while 1 kw of r.f. power was applied, even though r.f. arcing occurred. Nevertheless, this procedure is not recommended, due to the possibility of damage to the r.f. power amplifier during momentary no-load conditions or transients that occur when switching is conducted.

[1]Available from Adelphi Electronics, Jericho Turnpike, Westbury, L.I., N.Y. 11590.
[2]LMB model M-00. Available from Midway Radio, 58 West 45th Street, New York, N.Y. 10036
[3]Dow Key type DK-60-P. Allied part no. 41D5903, 70 cents each.
[4]Rotary types as currently used in amateur applications.
[5]Using specified switch elements.
[6]Due to a.g.c. action which tends to equalize the a.f. output from both weak and strong signals on a sensitive or high-gain receiver, the cross-talk rating during such use may *appear* to be poorer when observed by ear. On the other hand, the S-meter will provide a more accurate indication. ■

Announcements [*from page 11*]

during the entire contest. Participants will not be required to meet wattage, power or location specifications or limits. Scoring will be on the basis of contact points times the number of different ARRL sections worked. Winners will be on a basis of highest score attained in each division (Novice or General-Technician). Each charter member of the net worked will count as three points. All other members worked will count as two points. All their contacts will count as one point. All section multipliers will count one point. Contest entries will be mailed to the contest chairman Maryland Two Meter Termite Net, PO Box 153, Linthicum Hghts, Md. 21090. Contest entries must be submitted on standard log sheets and postmarked not later than midnight May 31st, 1967. Decision of judges is final. Ties will be decided on the basis of earliest entry submission date according to the postmark.

Scratchi [*from page 13*]

I coming to in Hon. Doctor's office. Having bandages on foot and on head. Bandages on foot are for where I knocking out some of the lion's teeth, and bandage on head are for where my head are hitting rock when I falling down.

Andres are being reel nice, but telling me he hoping I can get home to Feenix by myself, on acct. he now got even bigger problems. It seeming that when I kicking lion in teeth, I knocking xtal out of lion's xmitter. As a result, xmitter are self-oscillating, and because it having lots of doubler stages, it putting out signal all over place. Can be on any freakwency on any band. Not only that, lion taking off like scared rabbit heading north.

So, Hon. Ed., pleese telling all your Hon. Readers to listening on amchoor bands, and if they heering Andres' initials on see-w, calling collect post-hasty on landline. Of course, they should locking doors if signal are reel loud, because mounten lion are not reel friendly, especially as now having l/c toothache.

Oh, almost forgetting. Andre's full name is Andres Roberto, so every sixty seconds lion's rig are sending out di-dah di-dah-dit. Calling me quick-like if hearing this, as we needing to finding lion so Andres can finish his artickle.

Respectively yours,
Hashafisti Scratchi

Surplus [*from page 94*]

With reference to my column last month on v.l.f. equipment, I should mention that John Meshna, 19 Allerton St., Lynn, Massachusetts, has the RBA low frequency receivers, and also the higher frequency RBB and RBC sister sets.

For those interested in RTTY in the New York area, the Elmhurst Teleprinter Society, Felix W2YKV, 8424 57th Avenue, has a good stock of Teletype parts for all types of equipment. Felix cannot ship, so please, will locals only contact him. ■

USA-CA [*from page 89*]

had, all contacts must be made from a station operated by the claimant fixed, fixed portable or mobile within one call area. QSL cards will be submitted with a self-addressed envelope with sufficient postage or IRCs to insure delivery of certificates and return of QSL cards. If registered mail is desired, 5 IRCs should be sent. Apply to: Awards Committee, Society of Newfoundland Radio Amateurs, P. O. Box 1226, St. John's, Newfoundland, Canada.

The Gashouse Gang: Award and full membership for life can be obtained by working five members of the Gashouse Gang on any authorized amateur band or bands, using any mode of transmission. Although this award was not started until the end of 1966, all QSOs are good after May 8, 1966, which is the date of the last baseball game played at the old Busch Stadium in St. Louis, Missouri. Although you are not required to send the 5 members, two QSL cards, part of your application must be 5 QSL cards made out to the members you worked with stamps on them. Also make a list of your 5 contacts including the members call letters, certificate number (if known), date of contact, and whether the station is local or DX (more than 50 miles from you). Mail this list of contacts and five confirmations along with 50¢ to: Bob Nicolai, WØEKM, 4038 North Ninth St., St. Louis, Missouri 63147. Charter members are: K1VYC, K3ZPG, K4TBG, WA4EDL, K9IHM, KØJQU, WØEKM, WAØAVL, WAØGXK. Assoc. member WØDQE and full members are: K1QVW, WA2SSR, WB2DEG and WB2KWC. There is a complicated system of different color seals and ribbons, but space does not permit this information. Send s.a.s.e. to WØEKM. Here you are baseball fans.

Notes

A BIG thanks to Mike, K1DGQ for his kind offer to send POD 26s to VK9GN, CO1AR and OK1GT. How was your month? 73, Ed., W2GT.

Propagation [*from page 79*]

Western USA	12-15 (1) 15-18 (2) 18-19 (1)	07-09 (1) 09-12 (2) 12-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-00 (1)	06-08 (4) 08-14 (3) 14-20 (4) 20-00 (3) 00-06 (2)	18-19 (1) 19-20 (2) 20-02 (4) 02-04 (3) 04-05 (2) 05-07 (1) 19-20 (1)‡ 20-21 (2)‡ 21-03 (3)‡ 03-04 (2)‡ 04-05 (1)‡

ALASKA

*Openings Given In GMT**

To:	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Eastern USA	*Nil*	19-21 (1) 21-23 (2) 23-03 (1)	20-22 (1) 22-02 (2) 02-06 (3) 06-08 (2) 08-10 (1) 10-14 (2) 14-16 (1)	06-11 (1)
Central USA	*Nil*	18-21 (1) 21-23 (2) 23-05 (1)	02-08 (3) 08-14 (2) 14-22 (1) 22-02 (2)	07-12 (1)
Western USA	*Nil*	18-20 (1) 20-23 (2) 23-02 (1) 02-05 (2) 05-06 (1)	00-03 (3) 03-08 (4) 08-10 (3) 10-14 (2) 14-17 (3) 17-00 (2)	06-08 (1) 08-13 (2) 13-14 (1) 08-12 (1)‡

✓ ED VALUES FROM HERB GORDON

✓ **60 ohm, 200 watt non-inductive Globar,** type CX. When immersed in oil, and connected as a load to your transmitter, this makes a perfect dummy. **$7.50.** Weight 3 lbs. ✓ **Globar, 200 watt, 600 ohms,** non-inductive resistor suitable as terminating element for Rhombic or by paralleling ten of these you could have a two killowatt load for your final. **$3.50** each. Weight two lbs. ✓ **Popular 5V4G** thermionic rectifier used as replacement in Collins and other high quality communications receivers. $1.05. Weight 1 lb.	✓	✓ **Sockets:** RCA 9935 7 contact socket with built in capacitors. Semi-shielded for use with 829B. 3E29 and 832. **Price $1.80.** 100 available. 1 lb. ✓ **G.E. Air Capacitor.** 20-440 pf, 7" long x 2" x 2" ceramic end caps with 1/4" shaft. Heavy brass construction, .015 spacing. Excellent as a loading capacitor or for general purpose work. **$4/ea.** 1½ lbs. ✓ **Dual Bearing Hammarlund Capacitor.** 100 pf straight line capacity. Excellent for a variety of general uses. **90¢ each,** 10/$7.50 4 oz. each
✓	✓ **100 feet** of brand new factory fresh **RG-58** made by Phalo. Weight 5 lbs. ✓ **Bud Transmitting Choke,** 4.3 M.H., 12 ohms, capable of furnishing power for that kilowatt final on 10 through 160. **Only $1.49.** 1 pound. ✓ **Mobile antenna bargain,** complete with accessories, including hardware, cement, connector, and adaptor. Manufactured by General Electric. Radiator element 18¼" long, excllent for 2 meters. **$3.95.** Weight 3 lbs.	✓
✓ **Phone Patch Kit:** All parts necessary to build your own phone patch except chassis and hardware. Features very expensive Western Electric bridging transformer, (worth more than $40.00). Complete with instructions. **Only $5.95.** Weight 5 lbs. Hundreds and hundreds of these kits have been sold. ✓ **American Beauty 3138** 100 watt soldering iron with asbestos cord and plated iron tip, cool handle. Heavy enough for most work; light enough for even some of your delicate work. $12.50 regularly—our price **$4.95.** 3 lbs. weight.	✓	✓ **Plate transformer 2850 volts** either side of center, rated at 500 mils continuous duty and insulated for 4286 volts. The primary is intended for 207, 220 or 225 volts single phase. This merchandise, made by Union Electric & Manufacturing Co. in Jersey City, is offered in limited quantity at **$34.95.** The transformer measures 9½" wide x 7⅜" deep x 9½" high and weighs 59 lbs. Here is a tremendous value. Check the weight with copper and steel prices today and see what a value it is. Only 17 pieces available.
✓	✓ **Loading Capacitor.** Here is a two-section loading condenser each section varying between 20 and 600 pf so that the sum of the condenser will extend up to 1200 pf which is more than adequate for most high powered finals. The spacing is excellent. The condenser measures 3⅜" behind the panel. Its width is 3¼" and its maximum height with the condenser open is 2¾." This is straight line frequency. A particularly good value at **$3** ea. ¼" shaft. 2 lbs.	✓
✓ A few **DC to DC converters** are left at **$12.95.** Accepts 6 volts of DC and converts it to 12 volts of DC at up to 6 amperes of output. Fine for Volkswagen owners. Weight 5 lbs. ✓ Brand new **Sylvania 6146B:** A tougher, more rugged long lasting 6146, capable of 25 per cent more output. Only **$4.50.** Allow 1 lb. for postage. ✓ 500 sets of **632 heavily plated steel machine screws** with matching nuts. A wonderful assortment for the experimenter. Weight 3 lbs. **$1.95.**	✓	✓ **Solid State or selenium rectifier transformer** made by Raytheon, their #UX9115A; primary 60 cycle; secondary tapped, from 28 to 48V; rated 2 amps but good for 4 amps. 4½" high x 3½" deep x 4" wide. **$4 each.** 7½ lbs. ✓ **800 Volt, 750 ma** top hat **silicon rectifier** conservatively rated, excellent for general replacement purpose. **45 cents each,** ten for $4.00 Postage paid. ✓ **4 CX1000 brand new,** factory fresh Eimac tetrodes. Only **$90.00** each, fully guaranteed.

HERBERT W. GORDON COMPANY

"Helping Hams to Help Themselves"

Woodchuck Hill • Harvard, Mass. 01451 • Telephone 617-456-3548

Ham Shop

ADVERTISING RATES: Commercial and organization ads, **35¢** per word. Non-commercial ads for other than subscribers **10¢** per word, including abbreviations and addresses. **Minimum Charge $1.00.** No ad will be printed unless accompanied by full remittance. Current CQ subscribers must send mailing label from CQ wrapper in lieu of cash payment.

Closing Date: The **5th** day of the second month preceding date of publication.

Because the advertisers and equipment contained in Ham Shop have not been investigated, the publishers of **CQ** cannot vouch for the merchandise listed therein. We reserve the right to reject advertising which we feel is objectionable.

Direct all correspondence and copy to: **CQ HAM SHOP, 14 Vanderventer Avenue, Port Washington, L.I.N.Y. 11050.**

RADARS Wanted: Radar equipment of all kinds bought. Write: M. Cemprola, 550 Fifth Avenue, New York, New York 10036.

RTTY gear for sale. Write for list issued monthly. 88 or 44 Mhy toroids, five for $1.75, postpaid. Elliott Buchanan and Associates, Inc., Oakland, Calif. 94610.

GOVERNMENT surplus picture catalog 25¢. Meshna, Nahant, Mass. 01908.

4-used 200 foot F.M. TV towers. Dismantled and ready for shipment. Blaw-Know model N16. Plans available. FAA hazard painted. Will sell one or more. For additional information contact Owen J. McGarrahan Co., 16 Pelham St., Cambridge, Mass. 02142. Phone area code 617-547-3250.

NOVICE Crystals, all band, $1.30 each. Free list. Nat Stinnette, Umatilla, Fla. 32784.

THREE Line Rubber Stamp $1.00, four lines $1.25, knob handle, postpaid. Chief's Stamp Shop, Maynard, Arkansas 72444.

FREE CATALOG: Electronic parts, tubes, wholesale. Thousands of items. Unbeatable prices. Areturus Electronics Corp., 502 22nd Street, Union City, New Jersey 07087.

QSL's by RUTGERS VARI-TYPING SERVICE, Thomas Street, Milford, N.J. 08848. Free Samples.

YOU NEED IT, we got it! Unheard of bargains in Coaxial Cable, Switching Equipment, Meters, Relays, Connectors, Capacitors, Transformers, etc. Phone or visit! Open Monday-Saturday till 5 P.M. Windsor Distributors, 46 Fulton Street, Brooklyn, New York 11201, Phone 212 MA4-7038.

ZIP CODE directory $1.25. Lutchkus, P.O.B. 213, Carlisle, Pa.

QUADS: Proven sensational! All metal (except spacing insulator dowels); full size; two element; absolutely complete with boom, all hardware, wire and fittings; terrific gain and directivity; no bamboo or fibreglass; uses single 52 ohm coaxial feedline. 10-15-20 quad, $35; 15-20 quad, $32; 10-15 quad, $30; 20 meter quad, $25; 15 meter quad, $24; 10 meter quad, $23. Remit with order, shipped charges collect same day. Gotham, 1807 Purdy Ave., Miami Beach, Fla. 33139.

VACUUM Variable capacitors, Jennings UCS, 10-300MMFD, 7.5KV, complete with gear drive train, mounting bracket, brand new, $27.50 postpaid-insured. Supply limited, satisfaction guaranteed. Bill Slep Company, Drawer 178CQ, Ellenton, Florida 33532, Phone (813) 722-1843.

HOBBYISTS, EXPERIMENTERS, AMATEUR SCIENTISTS, STUDENTS. . . . Construction plans-all complete including drawings, schematics, parts lists, prices, parts sources . . . LASER-build your own coherent light optical laser. Operates in the pulsed mode, in the visible light range—$6.00 . . . DIODE LASER-Invisible light (infrared) can be continuously modulated—$3.00 . . . REVERBERATOR (Echo) Unit-build your own. Use with your automobile radio, home radio or hi-fi, electric guitar, etc. $3.00 . . . RADAR-build your own ultrasonic doppler radar. Detect motion of people, automobiles, even falling rain drops. Transistorized, uses standard small 9-volt battery—$4.00 . . . LONG RANGE "Sound Telescope"—this amazing device can enable you to hear conversations, birds and animals, other sounds hundreds of feet away. Very directional. Transistorized. Uses 9 V. battery—$3.00, or send 25¢ coin or stamps for complete catalog . . . TECHNICAL WRITERS GROUP, Box 5501, State College Station,, Raleigh, N.C. 27607.

1,000 gummed address labels, 50¢, 3 sets, same or different name $1.25. Mart's, Box 454, Mackinaw, Illinois 61755.

"HOSS-Trader," Ed Moory; offers 2 each of the following opened displayed demonstrated equipment with factory warranty: SB-34, $349.50; Swan 350, $348.00; NCX-5, $459.00; NCL-2000, $549.00; Swan 500, $410.00; Galaxie 5 MK-11, $349.95; TR-4, $495.00; T4-X, $335.00; 2-C, $195.00; R-4A, $339.00; KWM-2, $995.00; 32S-3, $739.00; 30L-1, $449.00; Package Deal, New Classic 33 Beam and Ham-M Rotator Demo: $209.00. Special ROHN 50 ft. fold over tower $189.00 prepaid: Swan Mark-1 Linear Demo $395.00; Reconditioned Gear: 2-A, $149.95; KWM-2, $695.00; TR-3, $369.00 SB-34, $319.00; Swan-350, $309.00; Swan 240, $159.00; TA-33 beam perfect, $89.00; Ham-M Rotator, $85.00; 312B-4. $149.00; Classic 33, $95.00. Ed Moory (W5BDR) Wholesale Radio Co., Box 506, DeWitt, Arkansas, Phone Code (501) 946-2820.

HOT-SHOT CARD. Designed for clubs and individuals engaged in emergency communication, this 4" by 5" red card with black printing may be placed in your mobile unit's window to identify you as an "Emergency Radio Unit." Card is on a heavy Bristol board stock and is almost identical to those issued to regular emergency vehicles by many agencies. 50¢ each, ppd, or available in bulk amounts of 25 cards for $6.25. Order now from HOT SHOT CARD, c/o CQ's Ham Shop, 14 Vanderventer Ave., Port Washington, L.I., N.Y. 11050.

QSL'S Samples 10¢. N & S Print, Box 11184, Phoenix, Arizona 85017.

RED or WHITE, die cut Scotchlite letters. Day-Night Visibility. Postpaid/letter, 2"-15¢, 2½"-20¢, 3"-25¢. Portage Industries Inc., Dept. B, Box 188, Portage, Ind. 46368.

POLICE—fire—aircraft—amateur calls on your broadcast radio! Tune the band with TUNAVERTER. Free catalog. Salch Company, Dept. CC, Woodsboro, Texas 78393.

RUBBER ADDRESS STAMP including call letters. Three or four line text $1.50. Signature stamp $2.88. Free catalog. Jackson Stamps, 1433 Winnemac, Chicago, Illinois 60640.

SHIELDING Systems, Kits, accessories. Eliminate mobile interference. Estes Engineering, 1639 West 135th, Gardena, Calif. 90249.

FREE CATALOG—Loads of Electronic Bargains. R. W. Electronics, Inc., 2244 South Michigan Ave., Chicago, Illinois 60616.

CREATIVE QSL cards. 25¢ for catalog, samples 50¢ coupon. Personal attention. Imaginative new designs. Wilkins Printing, Box 787-3, Atascadero, Calif. 93422.

FCC Commercial operator License preparation by correspondence. Grantham, 1507 N. Western, Hollywood, California 90027.

QSLs—BROWNIE—W3CJI—3111 Lehigh, Allentown, Pa. 18103. Samples 10¢ with catalog 25¢.

NEW!!! 1,000 Glossy Q.S.L. cards by the Rabling Redskin, only $4.75. Samples and details 10¢, refundable. Post Office Box 564Q, North Bergen, New Jersey 07047.

TELREX, A.P., New Jersey 07712—Offers PL67 Tech. Data, description, price list, quality engineered antenna systems, Feed-Thru Rotators, "Baluns", Mono-Poles, 5 Band I.V. Kits.

DON'T BUY EYEBALL cards or business cards until you see ours. Samples Free. D & L Printing Company, P.O. Box 58, Roselle Park, New Jersey 07204.

SOUTHERN NEVADA Amateur Radio Club thanks participants and exhibitors who made "SAROC", the "FUN-CONVENTION", such a success in 1967. Stellar Industries, E G & G, Southern California Edison Company, Brad Thompson Industries, Mission Ham Supplies, California Highway Patrol, Henry Radio, Tistao Towers, Weatherbie Electronics Center, Swan, Tri-Ex Towers, Collins, Hallicrafters, Hy-Gain, Radio Products, Linear Systems, Hotel Sahara, MARS, Raytheon, Superior Engraving, United States Air Force, WCARS-7255, W6SAI. "SAROC" 1968 "FUN-CONVENTION" will be centered in the heart of the entertainment capital of the world at Hotel Sahara, Las Vegas, Nevada, January 4-7. QSP, QSL-card, ZIP and telephone number for details to Southern Nevada Amateur Radio Club, Box 73, Boulder City, Nevada 89005.

FOR SALE: HW 32 with Dynalab Tri Band Conversion, needs alignment. $125. WB2IDQ, RR#2, Cuba, N.Y. 14727.

4-1000A's . . . $39.95, 2/$75; 4CX1000A's . . . $59.95. Guaranteed, postpaid, insured. K6CAA/KH6, Box 435, Hanapepe, Hawaii 96716.

COMPLETE station, mint condition. Heath Kit SB 200, 300 and 400 factory checked. 72" Walnut console Formica cost $300, C.D.R. Rotor, 3 El. High Gain ant. Viking phone patch, World globe, 24 hour clock, Mike, Speaker, coax cable, 32 ft. Spaulding tower and many extra goodies. First certified check for $1,200 takes all. J. H. Coffey, WA-4-VIG, 101 150th Ave., St. Petersburg, Fla. Phone 391-5038 (Not collect).

SELL: Collins 75A-4 serial 3063 with manual, excellent condition; speaker; HT-32 transmitter with manual; Electro-Voice 630 microphone; homebrew amplifier 4-811A in parallel, grounded grid, built-in power supply, 10-15-20 meters. Pick up and take all for $800.00. Will entertain offers for each or all. B. F. Fulton, K4NKI, Hereford Road, Roanoke, Va. 24018 weekends.

SALE OR TRADE: My collection of X-Band (3CM) Microwave components. Many other goodies for the ham or experimenter. Send stamp for list. P.O. Box 40, St. Clair Shores, Mich.

PHONE PATCH LOG. Must for ur shack. $2.00 incl. post. in U.S.A. Proceeds for Charity. Check or M.O., K7ZOH/1, Box 251, N. Scituate, Mass 02060.

G.I. WRIST WATCH $6.95. Gov't. surplus catalog 10¢. B & F, 44, Hathorne, Mass. 01937.

SWAP my PL-172 tube and socket for serviceable Teletypewriter. K1VTW.

QSLS samples 35¢. Sackers, W8DED, Holland, Mich.

WANTED: Tubes, transistors, semiconductors, test equipment, meters. Bernie W2MNP, Box 257, Canal Station, N.Y., N.Y. 10013.

SCARC Hamfest June 18th 0900-1800 near Mountain Playhouse, Route 219, Mile north Jennerstown. Entertainment, Restaurant, Displays, Prizes. Further information K3PQK, Box 17, Ursina, Pa.

SB-34 w/new mobile mount. SBE Mike. HB xtal calibrator installed. Good condition. $280. K4AWR, B. L. Ferris, Rt. 1, Box 134C, Flat Rock, N.C. 28731.

FREE!

Ham Shop Ads

Beginning with the March issue, CQ will offer a new free service, on a trial basis, to its subscribers. What's the deal? Simply this: If you are a regular subscriber to CQ, you will be offered a FREE Ham Shop ad in the very next available issue of CQ, and *every* issue during the duration of your subscription! No strings attached! It's just one more little way we feel we can better serve our regular readers.

How does it work? Just **type** or print your ad, (limit: 3 lines or about 150 characters), on a **POST CARD,** attach your mailing label from your latest issue of CQ, and mail it to: **(POST CARDS ONLY)**

FREE Hamshop Ads
CQ, The Radio Amateur's Journal
14 Vanderventer Avenue
Port Washington, L.I., N.Y. 11050

That's all there is to it.

A few logical limits have to be imposed: Due to space limitations, only six columns per month can be allocated to the New Free Ham Shop, so ads must be run on a first-come, first-served basis. Postmark will be the determining factor. If, because of late arrival, your ad can't make a given issue, it gets first preference for the very next issue, but still you'll want to get your ad in early. Only one ad per subscriber per issue. Your mailing label is an absolute **must;** no label, no free ad.

July CQ is the next issue you can make. Deadline is May 5. Mail your ad today.

No ads from commercial enterprises, please. This service is designed to aid the cash-tight **amateur** only!

The publisher reserves the right to refuse any ad he feels is unfairly deceptive or unsuitable for an amateur magazine. He also reserves the right to withdraw this offer without notice.

CLEANING Ham shack junk box. Hnudreds of goodies. Detailed list 10¢. Harlod, Box 283, Saxonville, Mass. 01706.

COLLECTORS: 18 years CQ 1947-1964, 216 issues $22.00. 23 years QST, 1936-1940 and 1945-1962 (minus March 1945 and October 1955) 274 issues $28.00. Excellent condition. No splitting type or year. You Pay shipping. W1KZQ, Box 686, Baltic, Conn. 06330.

"HAM-JAMBOREE" at WRL May 20th, 1967, 8 AM to 5 PM, CDT. Manufacturers displaying include Swan, Galaxy, Gonset, Waters, Collins, National, and more. Prizes include at least three transceivers, (ie: Swan 500, Gonset GSB6, NC200, etc), plus many more. No cost involved. Special prices on many items. Visit WRL at 3415 W. Broadway St., Council Bluffs, Iowa.

2MTR station HW-30 used only 5 hrs., exlt cond., xtls, xtl mic, 2 mtr 6 el. beam ant, 15 ft. coax, all $55. No swap or portion. Robert Heath, WN4DDR, Box 231, Woodberry Forest, Virginia.

HAMFESTERS Radio Club, Chicago, Illinois, proudly announces its 33rd Annual Midwestern Hamfest, Sunday, August 13, at Santa Fe Park, 91st and Wolf Road, Willow Springs, Illinois, near Chicago. The Hamfest features manufacturer and distributor exhibits, swappers row, awards and a variety of activities for all. This year Hamfesters salutes the "Armed Forces". Also displays by the military. For complete details and map of the location, write: Gregory Purtock, WA9MRE, 2916 West Marquette Road, Chicago, Illinois 606029.

P.J. Bandmaster all Coax antenna, the traveling hams dream. Portable. Quiet reception, broad band. Write: Endres Electronics Systems, Rt 178, Lake Isabella, Calif.

FOR SALE: 20-40 meter duo-bander Hy-Gain beam, $90. Good condition. Would prefer pick-up deal. Notre Dame Amateur Radio Club, Box 176, Notre Dame, Indiana 46556.

WANTED: Heath Compact, SBE or any commercial or good Hi-Grade home constructed linear. Will consider trading any of the following new items. Curtis-Mathes eleven inch TV, new production 1967 Motorola transistor nine inch TV or 23" Motorola table TV. All with UHF and brand new. George Magera, W4YLT, Mullins, S.C.

QSL Cards, CB WPE fluorescent and glossy cardstock. Plastic call letter plaques. Samples 10¢. April Sign Co., 56 290th, Van Dyke, Washington, Michigan.

HIGHLY Effective home study review for FCC commercial phone exams. Free Literature. Cook's School of Electronics, P.O. Box 517, Monticello, Ky. 42633.

WANTED: Carrier level indicator meter for pre-war RME Model 69, 70 Communications Receiver. Pictorial layout, operating manual, schematic. Ray Fisher, Box 234, Charleroi, Pa. 15022.

SAROC 1968 fun convention hosted by Southern Nevada ARC, QSL with ZIP. For details write to: SAROC, P.O. Box 73, Boulder City, Nev. 89005.

WANTED: Swan 350 or Drake TR-4. Trade over $500 worth of Lionel H.O. Trains, tracks, switches, console transformer. F. E. Coble, 251 Collier Ave., Nashville, Tenn. 37211.

NOVICE Crystals 80, 40, 15 M, 6 for $9.00, Knight Xtal Calibrator X-10, $10.95, Dow Key DK-60-G 115 AC, $12. W. Shipley, WA4WTO, 1531 Barnes St., Cookeville, Tenn. 38501.

WANTED: Forty foot tower for use with a stacked array, quad and two meter beam. Must be in good condition. R. Novack-WA4YBY, 185 Shore DR South, Miami, Fla. 33133.

SALE OR TRADE: Make offer. Brand New Mod. is Teletype Mach. Trade for Transceiver or SSB XMTR. or Cash. Bob Chambers, Box 293, Norwalk, Calif. 90650.

HALLICRAFTERS SR-46 Transceiver, HA-26 VFO, MR-40 Mobile Kit, Pt. Mike, Extra Xtals, Complete $200. FOB E. L. Nilson, Box 304 RD1, Sewickley, Pa. 15143.

FOR SALE: NC-303. Going back to Europe. Like new. Matching speaker. 100 kc & WWV calib., modified front end. Anton Tomov, 6101 16th St., N.W., Washington, D.C. 20011.

WANTED to buy: Old radio tubes for my private antique wireless museum. Need DeForest spherical "AUDION" with candelabra screw base, UV 203, etc. R. W. Schnedorf, W9LGH, 610 Monroe Ave., River Forest, Illinois 60305.

ANTIQUE Radios, Speakers, Some Parts, Rare Meters. What's ur need? J. Nelson, K7RZZ, 9614 N. E. 3rd St., Vancouver, Wash. 98664.

HY-GAIN TH-4 tri-bander $55 or best offer. Mosley V-4-6, 10-40M trap vertical $10. P. B. Holmes, WB6KXI, 9733 Comanche Ave., Chatsworth, Calif. 91311.

SELL: Brand new National 200 and AC 200 in factory sealed cartons $390. FOB. Al Johnson, W6EPO, 229 Lindell Ave., El Cajon, Calif. 92020.

SELL OR SWAP: 1925 Norden Hauck BC rcvr. Also issues/years of QST, CQ, magazines. Paul Amis W7RGL, Rt. 2, Box 2378-B, Bainbridge Island, Wash. 98110.

HEATH SIXER with 12 volt supply and microphone in good condition must sell make offer. I. D. Smith K8VEX, 124 E. Sycamore St., Wyland, Mich. 49348.

DIG DOLLARS out of that Dusty WWII surplus! I need 6 to 10 Globar Type "A" 350 ohm resistors. 1" dia x 8" lg. metallized ends. A. Horst W9CUX, 833 Considine Road, Geneva, Illinois 60134.

SWAN Mark I linear. Like new, real bomb. Trade for 32S3. Also want HA 1-TO Keyer. F. E. Coble WA4LXX, 251 Collier Ave., Nashville, Tenn. 37211.

SWAN 512 D.C. power supply, works with Swan's 350, and 400's. $95.00. Postpaid. John Schroeder W6UFJ, 5625 Quinn St., Bell Gardens, Calif. 90201.

WANT Collins S. Line Trans-Rec. and P.S. W. P. Borden, 7840 S.W. Capitol Hwy., Portland, Oregon 97219.

HX-30 50mc SSB Tx $150., HA-20 Linear $85., Gonset Comm III, 144 mc $135. All exc. cond. M. R. Arnold W6NLO, 1019 E. Grant Ave., Escondido, Calif. 92083.

WANTED: Johson Matchbox 250-23-3 or Harvey Wells Z Natch. Advise condition, price and if manuals in first letter. T. M. Tully, 54 New Dorp Plaza, Staten Island, N. Y. 10306.

WANT good condx Heathkit AG-9 Audio signal generator. State price, Dr. R. J. McDonald VE7APC, 2578 Ottawa Ave., W. Vancouver BC, Canada.

FOR SALE: Hallicrafters HT 40 Transmitter $40. and HG 10 VFO 80 thru 2 $18. Harry Miller WA3BSK, 820 12th St., Altoona, Pa. 16602.

WWII German Radio sets; TFu6.K Transceiver, 4.5 to 6.6 MHz, $35.; EEIS Receiver, 24.7 70 61 MHz $35. F. W. Chapman W8TKR, 1367 Villa Rd., Birmingham, Mich. 48008.

CANADIANS—Sk-20, 2-stage, RF Preselector (not homebrew) $15. postpaid. Allan Greer VE7BUI, 7590 Grandview Hwy., Burnaby 3, B.C.

WANTED: National NC-100 or NC-101. State condition and price. Lorenson, Hillsdale, N.Y. 12529.

FOR SALE: HQ145XC Rec., Seneca 6&2 transmitter S-200 speaker, Johnson 6&2 meter converter, $365.00. Frank Miller, Clarkson, Nebr. 68629.

HALLICRAFTER HT-40 $50.00, Pierson KE 93 receiver and AC power supply $70. DX 35 $20.00. Want or trade any above for Heath Kompact Linear with or without D.C. power supply. William Baxter K7LIW, 402 E. Jacinto St., Tucson, Ariz. 85705.

ANTIQUE radio, studio microphone, 1914 U.S. Army sets, sell or trade for ham or test equipment, even if not in operating condition. W. J. Boer, 449 Hill St., Boonton, N. J. 07005.

HT-33A Mark I for sale, excellent condition, very few hrs. on final, with manual, $250. FOB or will deliver 125 miles. All inquiries answered. Ray Milligan WA9ABI, P. O. Box 83, Geneva, Ind. 46740.

WANTED: Band W 850A Pi network inductor or Johnson 226 series variable inductor 226-3. L. Rondeau K9PPI, 2436 Carney Ave., Marinette, Wisc. 54143.

EP2DM sells his Heath SB-10, SSB adapter with manual $60. —Ameco all band preamp $25., both like new. Javad Mesbahee, Box 545, Demorest, Ga. 30535.

SELL: SR-150 w/ac supp and Shure 440SL xclnt cond. $380. U-ship. P. W. Sparks W9FQX, 767 B McGuire Ave., Klamath Falls, Ore. 97601.

CANADIANS: RTTY reperfs and TD units. R. M. Ronald VE4RE, Box 974, Brandon, Man. Canada.

FOR SALE: Best offer Water's 10-1000W dummy load Wattmeter Model 334, mint condition. Getting new model. Victor Beale, W8NOQ, 9924 Hambelton, Livonia, Mich. 48150.

WANTED: 100V-200V with 160 meters. F. Huberman, W2JIL, Box 11, Atlantic Beach, N.Y. 11509.

WANTED: Hallicrafters Linear, HT-33A or B. Any cond. with or without tubes if price is right. State cond., price in first letter. Bob Pennington, W4YOH, 1087 Southgate Drive, Charleston, S.C. 29407.

SELL: H. W. Sams Photo Facts folder 1-110 in 8 binders. Make offer. H. C. Olsen, W8ZMN, 818 S. 19th St., Escanaba, Mich. 49829.

TELETYPE, Model 19 with cover, excellent cond., green wrinkle, with doghouse and tape reel. $10 or swap. J. Thomsen, W9YVP, 11001 S. Pulaski, Chicago, Ill. 60655.

WANTED: Antique receiving and transmitting tubes, made prior to 1920. S. M. La Dage, W2EZM, 431 Oakland Ave., Maple Shade, N.J. 08052.

TOP PRICES paid for pre-WW II amateur receivers and transmitters to add to my collection. Write W6DOR, E. G. Taylor, 7542 Meadowair Way, Sacramento, Calif. 95822.

SELL: Perfect 75A-4 #3882, Collins Updated, Noise Blanker, Vernier Knob, 3 Filters $495.00. COL. O. A. HEINLEIN, W7BIF, 107 Wyoming, Boulder City, Nev. 89005.

SELL OR SWAP: Knight 5" Oscilloscope. Tom Dornback, 19W167 21st Place, Lombard, Ill. 60148.

WANTED: Info on converting Health Q-Xer for 50KC i.F.; 275 W Matchbox; Jan. '61 73. Selling P. E. 3/57 to 5/64; E.I. 5/58 to 5/64. John Becker, K9WEH, 2435 Birchwood, Wilmette, Ill. 60091.

FOR SALE: Old Reliable's Linear Amplifier and Power supply as described in Jan. 67 CQ. $45. E. H. Marriner, W6BLZ, 528 Colima Street, La Jolla, Calif. 92037.

"SHAWNEE"—Heath HW10, 6MTR, 20W. Trans-Rcvr, with Halo $140, Heath HW 19 "PHONE PATCH" $20., All Perfect. S. R. Samuels, 76-13 251st St., Bellrose, L. I., N. Y. 11426

CLEGG 22'er & 66'er Clean used very little complete original cartons, manuals etc. 200. each. Going Side-Band. H. L. Synder—K3YMN—2185 Sampson St., Pittsburgh, Penn 15235.

NEW 4CX250F tubes $10.00. Good used 4x250 tubes $4.00. Good used 4X250 tubes $3.00. Mark Humphries—WB6MSK, 553 31st St., Manhattan Beach, Cal. 90266.

SWAN 350, latest factory mods., original box, 1½ years old, for $325.00. Swan 512 D.C. Supply—$90. Both for $395. will ship C.O.D. John Schroeder, W6UFJ, S625 Quinn St., Apt. N, Bell Gardens, Calif., 90201.

Hy-Gain 203BA 20 Meter Beam $49.95. You pick up. E. V. Weiner—KOCKX, 511 5th Ave., Coralville, Iowa 52240.

CANADIANS: Teletype reperfs. Tds, polar relays, loop supplies. R. M. Ronald, VE4RE, Box 973, Brandon, Manitoba.

7th ANNUAL Streator Radio Club Pre-Starved Rock Hamfest Dinner on June 3rd at 7:00 P.M. at the Grove Supper Club, Tickets $3.50. Reservations must be in by May 21, 1967. Write Thomas Blakemore, 605 W. Stanton St., Streator, Illinois 61364.

SELL: HT32, $195.00, excellent condition, modification and updated by factory. T. Snedden, 785 Euclid Ave., Glen Ellyn, Iillinois 60137.

FOR SALE: Paneled hamshack, rig, beam, worshop included with purchase of my spacious eight room ranch. Ideal suburban location. Am offering first to ham fraternity because non-ham family would not appreciate amateur features. This home has all extras and is priced right at $25,000. Can also sell furnished if interested. Phone (516) 334-5135. Marc Felt, W2GYQ, 50 Prince Lane, Westbury, Long Island, New York 11590.

SELL: KWM-1 Power supply 12 V. all cables; KWM-1 Mobile Mounting Rack Complete $95. SR-500 Hallicrafter Transceiver—500 Watts ped. AC & DC P.S. P.T.T. mike, mobile installation kit; ready to go. Excellent Listed $695. sell for $450. John S. DiBlasi W2QNR, Box 230, Port Washington, L. I., N Y. 11050.

ARCHERS! Have good 45 lb. bow. Used very little. Need Eico 722, or other, VFO. R. L. Cross WN7GFS, Rt. 1, Box 266, Scappoose, Ore. 97056.

WANTED: National Receiver, State Price. P. J. Skinner W9QXR, Galesburg Research Hospital, Galesburg, Ill. 61401.

SELL: Jennings type UCS-300 vacuum variable capacitor; also B&W type 852 kilowatt inductor. Send your offer to M.I.T. Radio Society, Box 558, 3 Ames St., Cambridge, Mass. 02139.

SX-101A good condition $175. Henry C. Garretson, K2SSX, Box 175A-RD3, Troy, N. Y. 12180.

EICO 753 Tri band transceiver. ssb/am/cw, like new, late model. Shipped in original carton. $90. A. Gerhard, 326 W. Third St., Berwick, Penna.

WANTED—Schematic or instructions for Transcon 10 Meter XMTR-Converter. Will pay costs and return promptly. R. Hutchinson, W3W1Y, 1705 Kaywin Ave., Bethlehem, Pa. 18018.

WANTED: QST—June 1960 and August 1960. L. C. Fisher, 1205 Schindler Dr., Silver Spring, Md. 20903.

SELL OR TRADE: TV, Camera, VHF/UHF Gear, Hi Fi, List for Stamp. C. E. Spitz W4AP1. 1420 S. Randolph St., Arlington, Va. 22204.

FOR SALE: DX100B with SSB kit installed and SS-10 in good shape Will ship collect on freight charges $120 for both or best offer. Will sell separate. Dr. R. C. Colburn, 17036 So. Clark, Bellflower, Calif. WA6NGL

PROC. IRE/IEEE solid July 33 through Dec. 65. Sale or trade. No single copies. Fabulous research etc., W2AKU, Ed Sanders, 70 Maxwell, Geneva, New York.

COLLINS 8Ri XTAL Calib Mint Condx $10. Motorola 55A Alternator w/Trans Reg. Good $40. H. C. Sherrod, 3635 Barcroft View Terr., Falls Church, Va. 22041.

FOR SALE: Heath HG-10 VFO excellent condition, Globe Chief Deluxe Xmtr., and Knight R-55. Make offer, will answer all. G. J. Cotellis, Jr. WA4RGD, 1903-32nd St. W., Bradenton, Fla. 33505.

RECEIVER, SSB exciter, VHF gear and test equipment wanted, even if not operating or damaged. Will buy or trade for other equipment, camera or typewriter. J. Boer, K2OYN, 449 Hill St., Boonton, N. J.

HEATH solid state multiplex twins, AA-14 & AJ-14 with bookshelf speakers, all in oiled walnut. Ranger 1 and Vanguard 6 mtr. converter w/10 mtr. out. Sell or trade for transceiver. Robert F. Cann W4GBB, 815 Ben Franklin Drive, Sarasota, Fla. 33577.

WANTED—QST's—Last four issues needed to complete private collection. 1916—FEB., MAY, JUNE, JULY. Any reasonable price paid. K2EEK, CQ Magazine, 14 Vanderventer Ave., Port Washington, L.I., New York 11050.

WANTED: Silver Dollars any date. Must see actual coin before I can make a firm offer. If interested in making a profit on your dollars send your silver dollars to me by insured mail. I will return any and all postage even if we can not come to terms. Coins not accepted will be returned immediately by insured mail. Send to HAM SHOP, c/o CQ MAGAZINE, Box CESR, 14 Vanderventer Avenue, Port Washington, L.I., N.Y. 11050.

Viking Ranger with manual on air, clean. $95.00 FOB. A. Clark W41YT, 41 Lenape Dr., Miami Springs, Fla. 33166.

POLAROID: Model 90A camera. Mint Condix. Orig Bx and Lit. A steal at $30. or swap for Ham TV, 2M FM etc. make offer. R. Beatie, 1904 E 114 Ave., Tampa, Fla. 33612

EICO 753 sideband transceiver for sale. Factory checked, clean, and stable solid-state VFO. $225 with solid state power supply. D. E. Logan Jr.—WB2FBF 21 Judith St., Nanuet, N.Y. 10954.

WANTED TO BUY: Old radio receivers and transmitters, books, magazines, call books, early radio and wireless parts for amateur museum. Erv Rasmussen W6YPM 164 Lowell St., Redwood City, Calif. 94062.

FOR SALE: Gonset G S B 100, $105. P/S 1800 volts, $25. Gonset super 12 converter $25. Tecraft 6 meter transmitter $25. R. Velazquez, WA2YDH, 34-36 64th St., Woodside, N.Y. 11377.

SELL: Collins 31ØB cw exciter with PTO, homebrew 100 watt amp-modulator. Sell separately or together. P. Rubinfeld, WB2JNS, 97 Mountainview Rd., Millburn, N.J. 07041.

HAVE lots of Ham Radio parts and components would like to swap them for Lincoln Head pennies or what have you. Pennies prior to 1935. R. G. Wilson, W3GHD, 139 Campbell Ave., Havertown, Pa. 19083.

$5.00 for manual and schematic for Rex Bassett GC-75. Will return after photographing if requested. Ed McCormick, W5MRZ, P.O. Box 36, Wynne, Arkansas 72396.

FOR SALE: 61 Ft. Vesto Tower. $150. Can't ship. Ted Harvey, W2CTE, 21 Ramapo Ave., Suffern, N.Y. 10901.

HEATH MARAUDER & 75A3 for sale. David Sachs, WB2VZM, 2279 East 22nd St., Brooklyn, N.Y. 11229.

FOR SALE: HT-37 ($200) and HT-41 ($175). Both in excellent condition. SX-99 with Heath Q-Multiplier, good novice rcvr, $50. K4IIF, Box 205, Winter Haven, Florida 33881.

COMPLETE STATION: Collins 32V3, Filter, Relay, P.T.T. D104 Mike, Phone Patch, HQ129X Recvr, Xtal Calib., Spkr. Like new, hardly used. F.O.B. firm $295. Ant. only needed! Monroe M. Freedman, W2ASI, 15 Kensington Oval, Isle of Sans Souci, Davenport Neck, New Rochelle, N.Y. 10805.

MODEL 19 Teletype cover with doghouse and tape reel. $10.00 or swap. Will answer letters if you send stamp. No postcards. J. Thomsen, W9YVP, 11001 South Pulaski, Chicago, Illinois 60655.

TWO METER Station: SCR 522, matching power supply & extra tubes, Tecraft CC-144 converter (14 mcs IF), 8 element beam. $60. package. D. E. Logan Jr., WB2FBF, 21 Judith St. Nanuet, N.Y. 10954.

TWO'ER with 12 VDC supply, halo, 5-element beam. Will deliver within 50 miles. $55. cash. KØFPC, R. V. Davis, 1005 So. Lexington, Harrisonville, Missouri 64701.

NEEDED one Collins Mechanical filter F-455J-21 (2.1kc) for Collins 75A4. Harry M. Riddle, W8EDL, 2661 Northwood Ave., Toledo, Ohio 43606.

SELL RDO rec. with manuals $100. covers 40 to 100 mcs. described in Oct. and Nov. CQ, good condition. Frank Kedl, W7CRP, 55 E. 8th St., Sheridan, Wyoming, 82801.

WANTED: New or like new A4-22 Control unit part #ACU-83. Give full particulars. J. L. Rigau, W4QGW, Box 685, Gloucester, Va. 23061.

RCA-5820 image orthicon, used only 40 hours; make offer. Want ATV gear, Vidicons, 432 MC gear. R. E. Beatie, 1904 E. 114 Ave., Tampa, Fla. 33612.

BEGINNER wants SWL, REC, VTVM, RF sig. gen., scope, Heath Edu-kits, EF1, EF2, EF3, orig. owner late models. Cash or photo equip. Allan A. Sonsky 191 East 17th St., Brooklyn, N.Y. 11226.

FOR SALE: Heath HG-10 VFO excellent condition, and Knight R-55. Best offer. G. J. Cotellis, Jr., WA4RGD, 1903 32nd Street, West, Bradenton, Fla. 33505.

WANTED: Early vacuum tubes for my private antique wireless museum. Need DeForest spherical "Audion" with candelabra screw base, UV203, etc. R. W. Schnedorf, W9LJH, 610 Monroe Ave., River Forest, Ill. 60305.

FOR SALE: Collins KW-1 transmitter. 1,000 watts phone or C.W. In fine condition. $1,000.00 F.O.B. Athens, Georgia. George F. Norton, W4EEE, Georgia University Station, Athens, Georgia 30601.

SENECA 6 & 2 meter, very clean, unmodified 2 years old, $135. or swap for other gear. Joe H. Owings, KØAHD, 10217 St. Daniel Ln. St. Ann, Mo. 63074.

HA-1 TO KEYER. Excellent condition. $45.00 postpaid. J. R. Belt, WAØJIH, 1206 Main St., Parkville, Mo. 64152.

NEW Triplett 221T meters 100 mils and 1000 mils $6. each B&W 426 72 ohm LP filter $10. B&W CC50 dipole connector with RG59U attached $2. G. L. Countryman, W4JA, 75 E. Bay St., Charleston, South Carolina 29401.

FOR SALE: Radio News, CQ, QST, RSGB and callbooks. Write for list. 15 cents per copy plus postage. John M. Sulak, W8UMR, R.D. 2, Box 109, Wellsburg, W. Va. 26070.

WANTED BC221 or LM Freq. meter with original cal. book, R11A, R23 or BC453. State price, Weight, and condition. L. Wuertz, 517 Camp St., Sandusky, Ohio 44870.

METERS 3½ Weston round 0-50; 0-75; 0-80, $3.50 each P.P. QST, CQ, Western Radio Amateur, Electronics 1935-1938: Bill Hayward, WØPEM, 3408 Monterey Street, St. Joseph, Mo. 64507.

SELL or TRADE plus cash 250-23-3 Matchbox/coupler, Duomatic keyer, D-104 and stand. Need 30L-1, 312B-4, SM-1 or SM-2, 200 and 500 cycle 32S3 filters, Superex Fones. Henry Taylor, K7NHG, Star Route, Olga, Wash. 98279.

B&W 5100 and 51SB for sale. WA5CMC, C. Ludlam, 2309 Bullington St., Wichita Falls, Texas 76301.

WANTED: B&W 1 kw grounded grid linear L-1000-A, L-1001-A or LPA-1. George F. Marts, WØTDH, 4201 Colvin Drive, St. Louis, Mo. 63123.

For further information, check number 19, on page 110

READER SERVICE

NAME_____ CALL_____
(Please Print)

ADDRESS_____

CITY_____

STATE_____ ZIP CODE_____

Please send me more information on your ads in the May 1967 *CQ* keyed as follows:

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	Total Inquiries				

Void after May 1967

CQ MAGAZINE, Dept. RS
14 Vanderventer Ave.
Port Washington, L. I., N. Y. 11050

For further information, check number 39, on page 110

advertisers index

WHERE IN THE WORLD ARE YOU?

If you've been living anywhere but in a cave for the past ten years or so, you just may have noticed a change or two in the world around us . . . little things like new countries, new boundaries and enough name changes to tangle a Greek's tongue. In fact, things have been changing so fast recently that the old World Atlas you've been depending on as "the last word" is 43% WRONG if it's more than just a few years old!

Being the thoughtful, self-effacing folks we are (ahem!) we've arranged with Hammond, Inc. to offer either of two great "new perspective" revised and updated Atlases at a bargain price when purchased with a one or two year CQ sub (a bargain in its own right). Here's what you get:

Buy a one year sub to the oldest and largest independent magazine in amateur radio—CQ—at the regular rate of $5.00 and receive the 320 page Hammond AMBASSADOR *World Atlas at bonus price of $9.95 (Nationally advertised at $14.95).*

OR . . .

Buy a 2 year sub to CQ at the regular rate of $9.00 and receive the 464 page Hammond MEDALLION *World Atlas (120,000 indexed entries, full color, world statistics, gazeteer-index, 11¾" x 15¼") at the bonus rate of $10.95. (Nationally advertised at $19.95).*

rculation Dept.
Q Magazine
Vanderventer Avenue
rt Washington, N.Y. 11050

ntlemen:
closed is my remittance of $_____ for the following:

One year subscription to CQ plus the Hammond AMBASSADOR World Atlas @ $14.95
Two year subscription to CQ plus the Hammond MEDALLION World Atlas @ $19.95
New Subscription. Start with _____ issue.
Renewal or Extension Subscription.

AME _____

DDRESS _____

TY _____ STATE _____ ZIP _____

PLEASE PRINT CLEARLY

NOTE: Atlas cannot be purchased separately at this bargain price.

THE NEW GALAXY V MARK 2

5 BAND TRANSCEIVER MOBILE OR FIXED STATION

NOW--even Better than Ever!

NEW 400 Watt POWER!

SIX WAYS BETTER!
Yet Still Only
$420.00

These NEW Features...

- New 400 Watt Power
- New Precise Vernier Logging Scale
- New Printed Circuit VFO
- New CW Sidetone Audio
- New CW Break-In Option
- New CW Filter Option

YOU CAN'T MATCH ALL THESE FEATURES ANYWHERE...*AT ANY PRICE!*

Plus all the great features that put the GALAXY V in a CLASS by ITSELF!

- **Smallest** of the High-Powered Transceivers. (6"x10¼" x11¼").
- **Great for either Mobile or Fixed Station.** No compromise in power.
- **Hottest Receiver** of any Transceiver — Special New Six-Crystal lattice filter.
- **Complete 80-10 Meter Coverage.** 500 KC on all bands, with 1 Megacycle on 10 Meters.
- **Both Upper and Lower Selectible** Sideband.
- **Highest Stability.** Drift less than 100 CY in any 15 minute period after warmup.
- **The personal drift chart** of every Galaxy that comes off our line goes with the unit to its new owner!

Write for free Brochure, complete specs on the GALAXY V MARK 2—

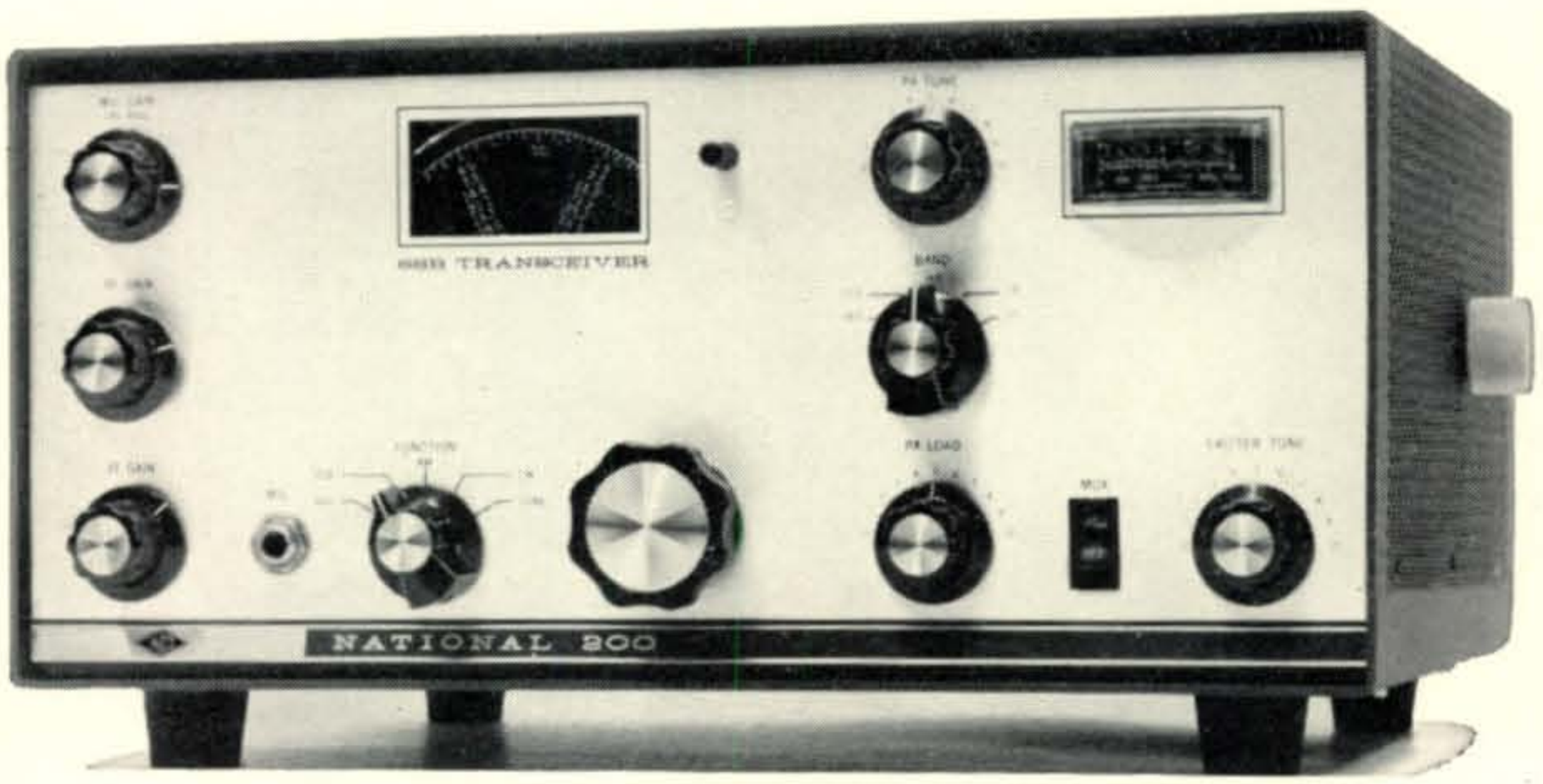
GALAXY ELECTRONICS

"Pacesetter in Amateur/Commercial Equipment Design"

10 South 34th Street • Dept. CQ-17R • Council Bluffs, Iowa 51501

For further information, check number 28, on page 110

Join the National 200 club



Own the most versatile 5-bander on the market ...priced even lower than a kit rig!

National's new 200 is fast becoming the most popular 5-bander on the market . . . and it's no wonder! Here's an ideal rig for mobile, portable, or home operation . . . the fastest way to move up from single band or triband. The price? . . . an amazingly low $359! Performance? . . . here's what Jim Fisk WIDTY said in a recent issue of a noted amateur radio publication: **"When National came out with their new model 200 transceiver a few months ago at a lower cost than any other five band transceiver on the market, I just couldn't believe that it would perform as well as the more expensive models. But — after using it for several weeks in chasing DX, I find that they have done a superb job and it performs right along with the best of them. The sensitivity is fine, the selectivity afforded by the steep-sided crystal filter is excellent, and the audio reports, if I am to believe the fellows on the other end, have all been good. Reports of, 'tremendous audio quality,' 'really sounds good,' and 'very clean and crisp,' have been normal reports during the time I have had the 200 on the air."**

Feature this for $359! ■ Complete coverage of the 80 through 10 meter bands. ■ 200 Watt PEP input on SSB, plus CW and AM. ■ Separate product and AM detection plus fast-attack slow-release AGC. ■ Crystal-controlled front end and single VFO for high stability, and identical calibration and tuning rate on all bands. ■ Crystal lattice filter for high sideband suppression on transmit, and rejection of adjacent QRM on receive . . . plus solid-state balanced modulator for "set-and-forget" carrier suppression. ■ Operation from new low-cost AC-200 supply or from NCX-A or mobile power supplies. ■ ALC. ■ 45/1 planetary/split gear tuning drive. ■ Automatic carrier insertion in AM and CW modes. ■ Panel meter automatically switched to S-units on receive. ■ Universal mobile mount included.

ONLY $359.
with National's full One-Year Guarantee

National Radio Company
37 Washington Street, Melrose, Massachusetts 02176

For further information, check number 23, on page 110

Powerhouse!

Choose an RCA Power Tube for every Amateur Application

At RCA, power tube engineers are constantly working to improve the line—to provide the best possible tube for each amateur's choice of band, mode, and power. Check the tabulation ...see your authorized RCA industrial tube distributor for the *right* tubes for your rig—CW or phone—in the bands you operate. For specific tube data sheets write to RCA Commercial Engineering, Section E15M, Harrison, N.J. 07029.

RCA Electronic Components and Devices

The Most Trusted Name in Electronics

A FEW OF THE MANY RCA POWER TUBES FOR AMATEUR USE

Frequency	Power	Tube Type	Remarks
Up to 60 MHz	low	6146B/8298A	The latest version of the original RCA-developed "standard"
	medium	pair of 6146B/8298A	General use RF amplifier or AF modulator
	high	813	
Up to 500 MHz	low	8072	Ideal for VHF/UHF
		8462	Quick-heat type for mobile use
	medium	8121	No chimney or expensive socket required
	high	8122	Low-drive requirement
500 MHz and above	high	7650	KW (CW) input up to 1215 MHz

Available from Your RCA Industrial Tube Distributor.

For further information, check number 33, on page 110