



HAM HUM

Published by
AK-SAR-BEN RADIO CLUB, INC. - Omaha 1, Nebr.
Post Office Box 291 - Downtown Station



Vol. XIII
No. 7-8

July - August 1963



FIELD DAY 1963

Photos by Bob Miller, W0ZLY

HAM HUM is the official organ of the Ak-Sar-Ben Radio Club, Inc., of Omaha, Nebraska, mailed monthly to all members and to others upon request.



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NEXT MEETING

Next meeting - Friday, August 9th - 4-H Building, Ak-Sar-Ben Field, at 8:00 P.M.

Program will be a variety program and for lack of a better name could be called "Radio Fun Night." The program committee is devising a series of games and contests based particularly on amateur radio, but not necessarily. These games or whatever they might be called are designed to test your ingenuity, stimulate your imagination, and tickle your fancy. Whereas your technical knowledge might help here and there, it will not be necessary that you be an engineer for a full enjoyment of the program. This fun night will also include the usual eyeball QSO and refreshments. Remember...the place is airconditioned.

Last month's meeting was a potluck supper which was attended by about 40 Hams, XYLs and Junior Ops. An enjoyable evening was spent chewing and rag chewing.

The attendance prize was not drawn for the potluck supper. Therefore, there will be two attendance prizes at the August meeting.

Look forward to the annual picnic in September - place and

time to be announced - and to the auction meeting on October 11th at the 4-H Building.

JULY-AUGUST ISSUE COMBINED

Did you miss your July issue of Ham Hum? A few of you did because you called. Your editors took a little vacation so this issue represents a "July-August Issue Combined."

PAST PRESIDENT VISITS OMAHA

Dave Hollander, WØCJW, now portable, stopped in Omaha recently but a week later than the last Club meeting. Dave is on his way to California where he will be stationed and will send his address as soon as he gets one. As his time in Omaha was limited he saw just a few of his friends. To those he did not get a chance to see, he will return for another visit within thirty to sixty days.

Dave's XYL, Pearl, has been quite ill and they are flying her back which accounts for his hurry to California to locate a place to live. He expects to operate portable and to keep his zero call.

CHANGE OF DUES DATE

Note that the heading says "Change of Dues Date" - the dues remain the same. The dues date on most of our members is different. In order to save some time and effort on the part of the Treasurer, the dues structure of the Club has been changed so that all dues will become due and payable on January 1st of each year. This change will begin immediately and the Treasurer has been instructed to collect balance of the year payments in order to get all members on the new basis. This balance of year payment will be the same as that charged to a new member for the balance of a year upon entering the Club. This is 50¢ per month for the remaining months for a regular member, 25¢ per month for student members, and 10¢ per month for XYL members. Therefore, on your next billing for dues if you are not paid through December 31st you will be billed for the amount necessary to bring your dues up to that date.

New Articles of Incorporation and Bylaws are being printed to incorporate this change and will be ready for distribution at the August meeting.

FOR SALE:

Entire station: - SX111, Eico 723, BC 348, BC 221, PA amplifier, rotors, misc. parts, etc.

Ron Bushnell, KØPDM
Phone: 556-0095

Your Secretary has misaddressed QSL cards for the following which may be claimed at the next meeting: KØUKN and KØGOC/M.

SILENT KEY

On June 27, 1963 Ak-Sar-Ben Radio Club lost one of its oldest and most loyal members in the passing of Fay Powell, WØISV. Fay began April 12, 1891 in this world and made it to 72 years of age. He passed away sitting in front of his rig and as amateur radio meant so much to him this would no doubt be his choice.

Fay was introduced to amateur radio about 12 years ago and it was Earle Olson, WØJKE, who assisted him in getting a license.

He leaves a daughter Virginia (Mrs. Andy Miller) in Albuquerque, New Mexico and two grandchildren. Having spent the last many winters in Albuquerque and Long Beach, California and all points in between, and having made many ham friends both here and elsewhere, he will be missed.

15 June 1963

Dear Gang-

Sure enjoy Ham Hum and the activities of all the Omaha hams. Last week the Ø stations were coming in here on 6, but I was not able to snag one from Nebr. Most of the Qth's were Colo. Lost contact with WRT, tell old John to write when he finds time, and that goes for any one back there. Enclosed find a buck to help with the mailing of the paper. Hope to have a better beam by Fall, and may even buy some low band equipment to reach into Nebraska. Cul 73's

Millard J. Edgerton, WA6VZZ
3724 El Camino Ave.
Sacramento 21, Calif.

SIoux CITY WINS AGAIN

In the annual competition on Field Day between the Sioux City Amateur Radio Association and the Ak-Sar-Ben Radio Club, Inc., for the second year in a row Sioux City got more points and thus retained possession of the trophy for another year. In fact, they won with a considerable margin as they had a score of some four times our score. We don't really believe there is any marked degree of difference between Sioux City amateurs and Omaha amateurs. However, according to the records they had more of them working than we did and even though they used a higher multiplier than we did, we still could not come up to their score even by using their multipliers.

This contest was discussed at the last Board meeting and whereas we are very appreciative of the work done by our members, it will be necessary in order to keep Sioux City from having permanent possession of the trophy that we start working now to prepare for next year. You will find some pictures taken by Bob Miller, KØZLY, on the front and back pages.

This Field Day represented a test hop for some of the new equipment recently purchased by the Club which equipment is intended for a combination of emergency work, such Club projects as Field Day and other practice sessions, and for the establishment of an operating Club station under the call letters WØEQU. The equipment consists of a Galaxie 300 with AC supply, a Gonset G76 with AC supply, and a Polycom 62. A committee is currently working on

a suitable location for the Club transmitter so that it can be installed in operating condition.

Ham Hum:
Omaha, Nebraska.

Hi fellows:

Just a word to tell you that my new address is:

Dave Ablowich, Jr., W6OC,
779 Lasena Court,
Pomona, California.

Also enclosed is a tidbit to insure that I continue to receive HAM HUM so that I may to some extent keep up with the doings (and occasionally see a picture) of some of the friends and acquaintances whom I remember most fondly.

Have been hamming very little on the air but an awful lot on the job.

Thanks

Dave Ablowich, Jr., W6OC
Ex WØ DW -- W5 DW

SILENT KEY

Stanley Davidson
WØUJL

Council Bluffs, Iowa

Was with WOW-TV 10 years.

A former Omaha ham and club member, Joe M. Kelley, WØSLJ, was married in Clarinda, Ia. on June 30th.

Mrs. Kelley is the former Beul Dore also from Clarinda.

An Omaha reception was held at the home of Mr. and Mrs. Ralph Carlson in Benson.

"TRANSISTOR OSCILLATOR"

by Lin, WQMDL - de "Splatter"

Here is a simple transistor oscillator circuit. It is a bit unusual in that it uses two "complimentary" transistors. One is an NPN, and the other a PNP. These are direct-coupled, and the circuit oscillates with a wide variety of low frequency crystals without a tank circuit.

needed in the particular application I have. The wave form for a calibrator, etc., is not critical, and building the circuit as in Fig. 1. should suffice. Fig. 2. is the end result of swapping resistors to fit the unmarked transistors I used.

I went one step further and put

Figure 1.

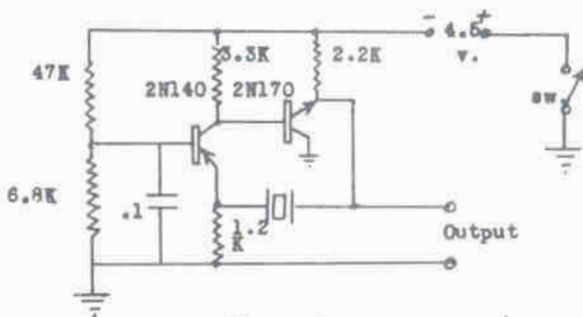
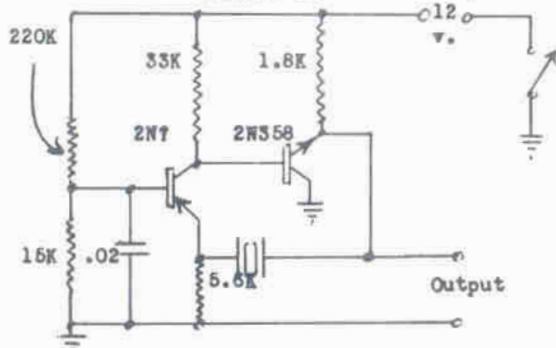


Figure 2.



It is very stable and quite suitable for a frequency standard, etc. Figure 1. is the original circuit, and worked with a couple of odd transistors I had. After viewing the output wave on a scope I changed values of resistors until the output wave was quite close to a sine wave, which is

the circuit on a printed circuit board. After finishing this part of the project I wondered if it was worth the time spent on making the printed circuit instead of doing it the more conventional way. Anyhow, it was good experience, even if it was time-consuming.

$$1 + 1 = 10$$

A better title would, no doubt, be "A Short Look At Electronic Computer Operation" or "Binary Numbers."

Our Arabic numerals, decimal points, plus and minus signs, exponents, etc., serve very well for paper and pencil arithmetic and higher mathematics and will continue to do so for the future. It could not be expected, however, that such a system would be the most desirable for automatic machine computation. Many problems arise when attempting to design a computer using the decimal system of numbers. Even most of the small machines use a binary system or a binary coded system in their arithmetic unit. The accuracy of computation in any system used is exactly the same as that using any other system.

An important part in our counting system is the "Zero." It doesn't look very nice at the top of a test paper - - unless there are two of them preceded by the symbol 1. The zeros place the symbol "1" in the position where it represents one hundred. The zero can be described, then, as a "Place Holder."

Watch your automobile mileage meter sometime. It is an example of numbers to the base ten in action. As the number on the units wheel moves up from zero through nine it reaches the last Arabic symbol and begins again with zero to repeat the process. As the units wheel moves from nine to zero, the tens wheel moves from zero to one. Hence the number ten appears in the windows. There is no symbol for ten, it is a combination of two symbols.

Now suppose the wheels had only nine symbols, zero through eight. As the units wheel passed from eight back to zero, the next wheel would go from zero to one. We would now observe one-zero starting in the windows although we have covered only nine miles. This is an example of a numbers system to the base nine.

To go one step further suppose these wheels had only two numbers, zero and one: As the first wheel goes from one back to zero the next wheel would move up to one. We would observe one-zero in the windows but we have only gone two miles. This is an example of a numbers system to the base two, or "Binary numbers." Lets go a little further; as you proceed the first wheel moves again to one and on to zero; this moves the second wheel again to one and on to zero; this moves the second wheel from one to zero and this causes the third wheel to advance from zero to one. The symbol one-zero-zero (not one-hundred) is now in the window, but if you recount the movement of the first wheel you will find that 4 miles have gone by.

In the field of automatic computers, two systems other than the decimal system are primarily used. The octal system and the binary system. The modern electronic computer was made possible by the binary number system which is based on two symbols: 1 and 0. This system was officially discovered about 300 years ago although it appears to have been used in China four thousand years ago. By giving the

symbols different *place values*, all numbers can be represented by a combination of the two symbols, 1 and 0. In the decimal system, as a digit is shifted one place to the left, its value is multiplied by ten.

This number - - - - - \rightarrow 3 3 3 3
 thousands \rightarrow \uparrow \uparrow \uparrow \leftarrow ones
 hundreds \leftarrow \uparrow \leftarrow tens

3 X 1000 3 X 100 3 X 10 3 X 1

means - - - 3000 plus 300 plus 30 plus 3 equals 3,333

In the Binary system, as the symbol is shifted one place to the left, it's value is multiplied by *two*.

This number - - - - - \rightarrow 1 1 1 1
 eights \rightarrow \uparrow \uparrow \uparrow \leftarrow ones
 fours \leftarrow \uparrow \leftarrow twos

1 X 8 1 X 4 1 X 2 1 X 1

means - - - - 8 plus 4 plus 2 plus 1 equals 15

The symbol 1 can be used to represent one, two, four, eight, sixteen, etc.

How does the binary system make modern electronic computers possible? In any electric circuit there are two conditions, one where the current is on, and the other where it is off. Many electronic devices are available which have two possible states; on and off or "0 and 1" of the Binary system!

Octal numbers are not generally used within an electronic computer; however, binary numbers can be readily converted to octal numbers by inspection and therein lies their value in computer work.

To examine the Binary system a little further we shall do an addition problem. Binary addition has four basic rules:

0 \neq 0 is 0 0 \neq 1 is 1
 1 \neq 0 is 1 1 \neq 1 is 0, with 1 to carry!

Lets add: 10 (2) In column 1: 0 \neq 0 is 0
 10 (2) In column 2: 1 \neq 1 is 0 with one to carry and this
 100 (4) is placed in column 3. One-zero-zero is the total.

Now by the use of relays, switches, diodes, multivibrators, and other devices, construction of computers, which are capable of making mathematical computations at the speed of electricity (186,000 miles per second), is possible. Their internal circuitry can be arranged to do a multitude of operations with speed and accuracy.

-- Funny thing, I always thought $1 + 1$ equalled 2, now they build a machine which says $1 + 1$ is 10 and it might be correct!

de Lincoln Log

CODE PRACTICE TAPES

WA6VTL, William G. Welsh, Editor of "Larc" Bulletin of the Lockheed Employees Amateur Radio Club, Burbank, California, an AREA publication.

"I've produced a series of six code practice tapes which have proven successful with thousands of amateur licensing class students over the past 15 years. I'm well aware of the fact that good taped code instructions are not plentiful so I've decided to make mine available to any amateur (or amateur group) who wants them.

These tapes are available at \$3.75 each, prepaid, as long as my present large supply lasts. There are six tapes in the series and you can order specific ones or the entire series.

Each tape is 1800 feet long and is recorded on both sides at three and three quarter IPS to provide three hours of code instruction per tape."

(Ed. note: Any club interested in procuring a list of the tapes and their contents, I feel sure that if you send Bill a self addressed-stamped envelope he will send it to you.)

WA6VTL, William G. Welsh
2300 W. Clark Avenue,
Burbank, California.

de Pack Rats

From "Mike & Key", W8MGP, Hal Gruber, Editor, AREA; Greater Cincinnati Amateur Radio Assn.

An American is a guy who sips Brazilian coffee from an English cup while sitting on Danish furniture after coming home in his German car from an Italian movie -- then writes his Congressman with a Japanese ballpoint pen demanding that he do something about all the gold that's leaving the country.

Harry Lieberman, comedian, San Francisco

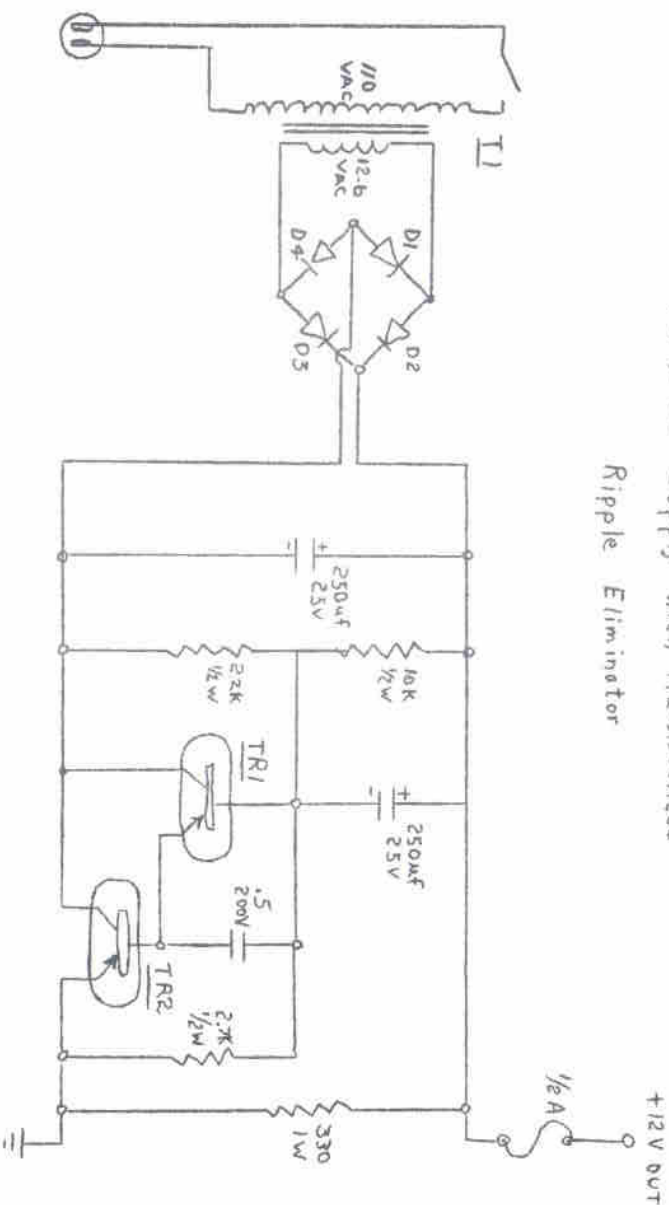
DON'T FORGET

Forget the hasty unkind word,
Forget the slander you have heard,
Forget the quarrel and the cause
Forget the whole affair because,
Forgetting is the only way,
To forget the storm of yesterday.
Forget the knocker and the sneak,
Forget the bad day of the week,
Forget you're not a millionaire,
Forget the gray in your hair,
Forget the blues but don't
Forget to pay your dues.

De the FEEDBACK

12 V. DC Supply with Transistorized

Ripple Eliminator



D1, D2, D3, D4

1N91

TR1

2N1130 or similar Low Power Audio Unit

TR2

2N386 or similar Power Unit

T1

Stancor P8130 or equivalent

De-K 31UV

Phila., Pa. PACK RAY

ON ARRL INCENTIVE PROGRAM

You will be reading the minutes of the May meeting of the Board and the editorials in June and July QST about the time you get this bulletin. The intent of the Board is to counter any trend to a wholly casual amateur radio and chart a sound program for the long range basis. Some amateurs seem to have thought the directors acting for a special group. Others feared a take-away of personal privilege. The Board action, we think, should be looked on as neither but a long term and courageous step to preserve those values in which we all share. The image of the amateur must be made tops in FCC and international circles where it counts. Purpose to give the amateur his best chance against renewed and continuing pressures at Washington and Geneva and future allocation conferences. For us to neglect to have built-in incentives for self-training and public service, entailing traffic competence and organization in the public interest for emergencies (see FCC Sec. 12.0) we become lower in the scale of technical competence, perhaps drift to a par with Citizens' Banders and might be thought worth about that much frequency space in the spectrum!

De ARRL CD BULL.

FOR SALE:

Johnson Ranger with push to talk in mint condition. Home telephone: Call 341-3591. Office telephone: Call 221-3362.

Robert Broom, Jr. KØOQL
2737 Caldwell St.
Omaha, Nebraska

VHF HAPPENINGS

Here is a letter received from Grandma Lou, WØCCD in reference to the 6 Meter Slave Certificate.

To Joe Berounsky, KØQDB and the officials of Ak-Sar-Ben Radio Club -

Thank you for the honor you have given me by voting to sponsor the Slave Certificate. I know in the 3 years I've been on 6 meters you will say I've tried to keep the people in other states acquainted with us here in Omaha and through the Slave Certificate, I feel we will make many new and wonderful friends. Thank you Joe and thank the Board of Trustees - I know you'll never be ashamed to say you have known me. Best 73 and all you fellows please tell the DX people about our certificate - work 10 slaves and receive one of the new Slave certificates for only 10¢ in stamps. Again 73, Grandma Lou, WØCCD. (We hope you get to send out many of these Slave Certificates, Grandma and keep up the good work.)

There seems to be a slight increase in activity on the 2 meter band with Dick, KØBOO in Lincoln back on the air again and keeping contact with his buddy in Omaha Don, WAØFVV. There is also a new station on 2 in North Bend, Nebr., WAØFQH and the name is Dale. We've also heard Maurice, KØLQI at Schuyler on again as well as some of the Columbus boys such as Verne, WØAYS and Leo, WØVJM. Omaha is still pretty lacking in 2 meter activity with only 4 or 5 stations on a very active basis. I hope all the Omaha hams will take advantage of the invitation to visit the CD Com-

munications Center at the Omaha Auditorium on Sun., July 28th. from noon to 3 P.M.

73 for now,

John, WØWRT

THOUSANDS OF MEGACYCLES FOR HAM RADIO

Adding up all the permitted megacycles in the bands 80 through 15 meters, we find several hundred thousand hams are operating on 1.6 megacycles (and sometimes all at the same time). Did you know that there is more bandspace on 10 meters (1.7 mc) than in 80 thru 15 combined?

A couple of Technicians asked for space on 10 meters but here's a list of some of the space they (and YOU too) haven't been using:

50	-54 mc	4 megacycles
144	-148 mc	4 megacycles
220	-225 mc	5 megacycles
420	-450 mc	30 megacycles
1215	-1300 mc	85 megacycles
2300	-2450 mc	150 megacycles
3500	-3700 mc	200 megacycles
5650	-5925 mc	275 megacycles
10,000	-10,500 mc	Here are 500 megacycles and all emissions except pulse is allowed here. Note, there are quite a few pieces of surplus radar sets and antennas which will work in this range - and pretty cheap too.
21,000	-22,000 mc	And here we have a whole THOUSAND mcs of our own to work with, and if you have a chirp no one will complain!

de Billings, Montana SPLATTER

Sure like your Club activities and your monthly Book. Thanks to a real nice Ham, KOMSS - old Mack, he's a real nice guy. Sure would like to get the Ham Hum. Looks like a real swell bunch of fellows up in Omaha. Best of 73's to all of you, and Mack's visit into Texas has gotten to be quite a legend. Hi!

73's

Moon Mullins (Fred C.)

K5AKY

1438 Freedonia Dr.

Houston 55, Texas

OFFICIAL BULLETIN NR 891 FROM ARRL HEADQUARTERS WEST HARTFORD CONN MARCH 28, 1963 TO ALL RADIO AMATEURS BT

As an aid to continuing improvement of efficiency in operation and increased enjoyment of our hobby, all amateurs are reminded of the continuing availability of operating aids from ARRL. Convenient cards illustrating the use of ending signals, the ARRL phonetic alphabet, time conversion to GMT, net signals and DX code may be obtained without charge from the ARRL Communications Department, 38 La Salle Road, West Hartford 7, Connecticut AR

CAMERA TUBES -- Characteristics and operating data for five types of television broadcast image orthicons are given in a new brochure (ETR-3402A) available from the General Electric Company, 316 E. 9th Street, Owensboro, Ky.

AREA TELEPORTATION ON THE HAM BAND

Recent experiments conducted at this activity have produced some amazing results. A general purpose coffee pot put within the R.F. field of a BC-610 transmitter with a multi-wound balun coil inserted midway in the path of the low frequency side of the output coil on the transmitter introduced standing waves on the liquid in the pot. Impressive reactance created by the total mis-match in the antenna section caused the liquid to vaporize and was found to collect on the input terminals of a communications receiver. After several seconds the vapor returned to its original state--coffee.

This will ultimately mean that coffee can be shipped throughout the nation, and possibly the world, by wireless means. The possibilities of such a phenomenon are unlimited.

Radiomen on watch will never have to leave their position to get their "cup of joe." Merely tuning a specified portion of the pre-determined band one can select a blend, dark roast, chicory or any combination thereof.

The term "home brewed rig" will definitely be used throughout the world by all communications personnel.

Coffee QSO's will spring up and instead of swapping QSL cards, two stations will exchange cups of coffee. No doubt new "Q" signals will develop, such as;

QCL - Your coffee is cloudy
QCO - You are splashing over
QCN - One lump of sugar please
QCR - Stir to the right
QCC - Add coffee
QTC - Stop sending, my cup is running over

(Anonymous)

"From 8th. Naval District Reserve Electronics Bulletin. Sent to AREA-W8BAH by J. F. Sorrells, RMC, USN, Chief-in-Charge, DREPO Office, Fourth Naval District, Philadelphia, Pa.

SELL OR SWAP:

I have a Heathkit Cheyenne with mic, HP-20 utility pwr supply, and an Eico 6V dynamotor that puts out 420V @ .280A. I would like to sell it or swap it for a low pwr plate modulated rig. Address all replies to Frank Brodale, 708 1st Ave. South, Humboldt, Iowa. All replies will be answered. Thank you.

OFFICIAL BULLETIN NR 904 FROM ARRL HEADQUARTERS NEWINGTON CONN JULY 3 1963 TO ALL RADIO AMATEURS BT

A new temporary third party traffic agreement has been announced whereby amateurs in the United States may handle unimportant personal messages on behalf of third parties with amateur station 4U1ITU in Geneva, Switzerland, during the period July 1 through December 31, 1963. This bulletin supersedes Official Bulletin Number 900 dated May 31, 1963 concerning 4U1ITU AR

A LOW POWERED 50 MC. TRANSMITTER

By John Snyder, W0WRT

The transmitter described here is a low power i.e. 10 to 20 watts input, unit for the 50 megacycle band.

I do not imagine that anyone would want to duplicate this unit exactly, however, it is my hope that other amateurs will become interested in designing and building their own equipment and could thus use some of the same ideas and techniques presented in their own equipment. It is for this reason then, that all chassis dimensions, punching and drilling information etc. are not included and I would like to reiterate that most of these dimensions are quite flexible and are subject only to reasonable care and common sense in making the layout.

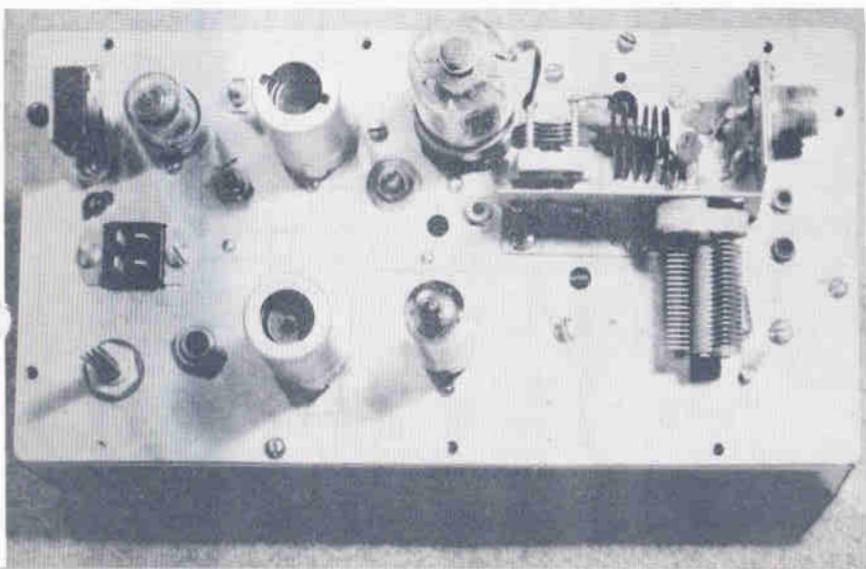
The oscillator circuit uses a 6AK6 tube in a Pierce harmonic oscillator circuit and the 2nd harmonic of the crystal is taken from the plate circuit. In this particular rig, we start out with a 6250 Kc. crystal and we double the frequency in the plate circuit and get 12.5 Mc.

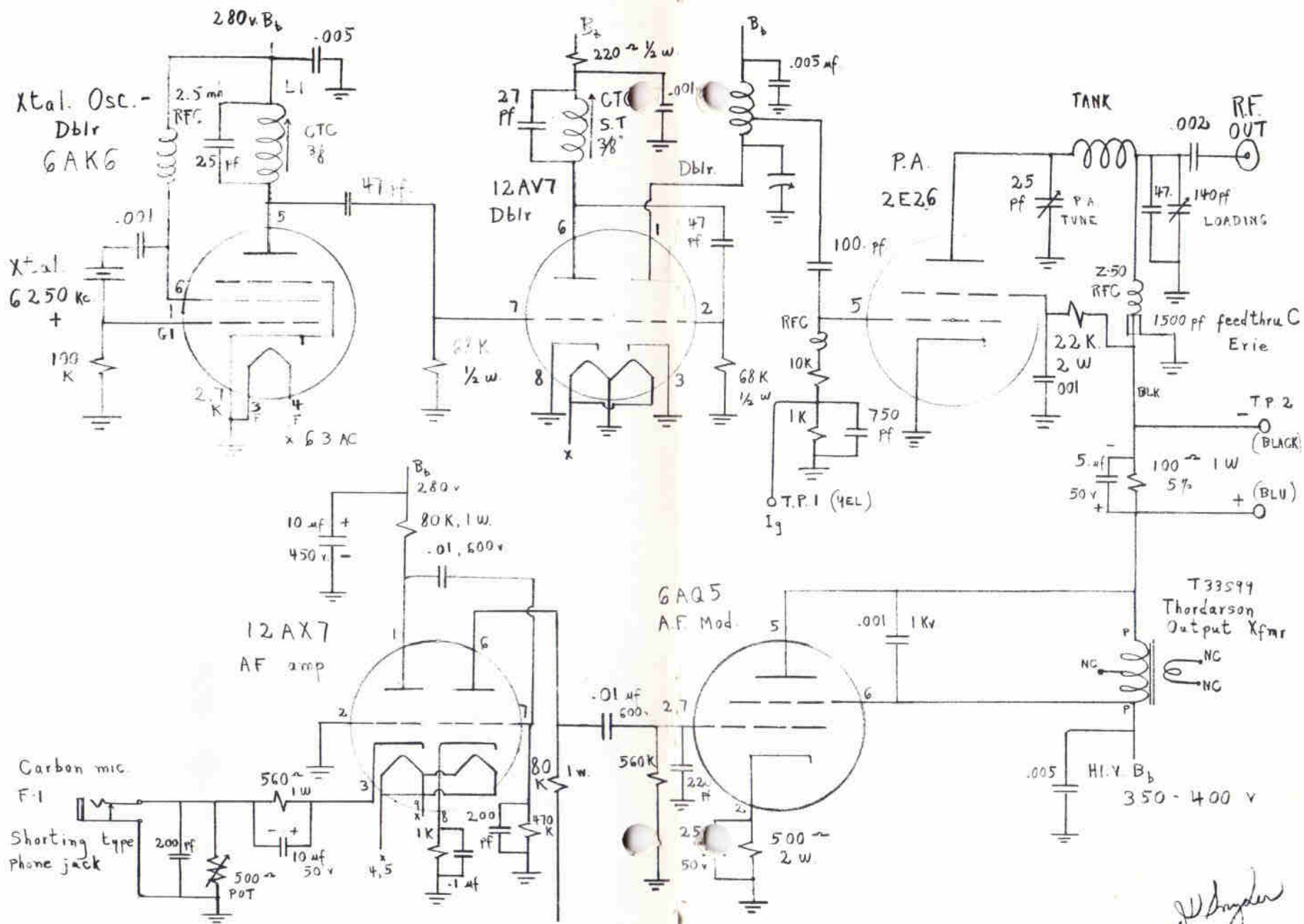
The 12.5 Mc. signal is capacity coupled through a 47 pf. capacitor to the grid of the first section of a 12AV7 tube which is used as a conventional doubler. The 25 Mc. output of this doubler is then capacity coupled to the second section of the 12AV7 and is doubled to 50 Mc.

The 50 Mc. signal is then capacity coupled to a straight-thru 2E26 class C amplifier which has a pi network in its plate circuit to couple the relatively high impedance of the 2E26 plate to a low impedance load of 50 ohms approx.

The audio section consists of a 12AX7 the first section being used as a grounded-grid amplifier, with a carbon (W.E. F-1 unit) microphone in the cathode circuit. The speech signal is further amplified in the second section of the 12AX7 and in turn drives a 6AQ5 power output tube which is commonly called the modulator. This is a Heising type modulator, a class A amplifier and

(See diagram next page- article cont'd P. 16)





AM 10 watt 50 Mc Xtrr

J. W. Wright
 W0WRT
 6-63

uses an audio output (plate to voice-coil) transformer as a modulation choke. The center tap and the v.c. leads of my particular unit are not used and are insulated and left floating.

Two sets of metering jacks are shown in the schematic; one set for measuring grid current and the other for plate current on the P.A. tube.

This unit will have more than adequate grid-driving power to secure linear modulation of the class C stage..this is one place where so many of the commercially made units fall down. Many of the commercial units are very marginal on grid drive to the modulated stage, consequently they are bugged with problems of 'downward modulation' and distortion. With any normal crystal, the unit shown will easily run 3 ma. or better of grid current and even this much isn't needed for good modulation.

The stages are sufficiently broadbanded so that it isn't necessary to be constantly retuning after making slight changes in frequency. I generally peak up my unit at about 50.4 mcs. and am able to cover from the MARS frequency of 49.98 mc. up to 50.7 or so without any need of retuning. Note from the circuit that slug tuned coils are used in the first 2 tank circuits and air type coils are used in the last doubler tank and the P.A. tank circuit.

This type of rig could be further simplified by using the more conventional 8 mc. crystals and then multiplying only 6 times instead of

8 but at the time this rig was built I had a good supply of G.I. Surplus 6 mc. rocks on hand.

BEST PROPERTIES OF TRANSISTORS AND VACUUM TUBES COMBINED

Development of new solid-state element called metal oxide semiconductor transistor has been reported by RCA. *By varying input voltage on the insulated gate, device as a whole can be made to switch, amplify, or otherwise regulate its output of electric current analogous to a pentode vacuum tube.*

In conventional transistors, similar results are achieved by making changes in magnitude of the input current. Circuits using these new elements are made by producing conducting paths in a slice of high-resistivity silicon, leaving gaps wherever an active element is desired. Insulator is produced by oxidizing the silicon over the gap. Metal electrode or gate is deposited on top of the insulator and connected into the circuit. By applying proper voltage on the insulated gate, gap becomes conducting and circuit is closed. Both "n" (negative) and "p" (positive) type devices have been made. Arrays of up to 850 of produced in area the size of a dime. (For more information write: Pre Relations, RCA, 30 Rockefeller Plaza, New York 20, N.Y.) (de IIT Research Institute Newsletter)

1 July, 1963

**MARS - SUBJECT: FREQUENCY
AND NET SCHEDULES OF AREA 3
TRAFFIC NET**

The new Area 3 Traffic Net will operate on a Frequency of 4580 KCS, effective this date. Single Side Band Stations will use LSB, and AM is permitted. This Net will operate, effective 1 July, for 3 hour periods, 7 nights each week, from 0000 ZULU (1800, Day Before, CENTRAL STANDARD TIME), to 0259 ZULU (2059, Day Before, CST). Participation credit will be allowed for each 1 Hour of the scheduled net period. A full hour of participation is required for this credit.

We need at once two additional NCS's. These NCS's will represent Nebraska on the Area 3 Traffic Net, and will operate as NCS for a one hour period beginning respectively at 0100 ZULU, Tuesdays, and at 0200 ZULU, Fridays. Please volunteer for one of these NCS assignments, with the understanding that every new NCS may make some mistakes, pull some "Boners," etc., and will not be criticized for it or them. He may be corrected, or asked to review the SOP, but will NOT be "Bawled Out," or "Panned." These NCS's will receive every possible help from the State Director and his Staff Members.

From Edmund E. Donze, AFØYEV
State Director for Nebraska

AK-SAR-BEN RADIO CLUB, INC.
P. O. Box 291 - Downtown Station
Omaha 1, Nebraska

Dear Sir:

I am writing to request that you change the address on my subscription to "Ham Hum" from:

Virgil Williams, KØEJO
1000 South Center
Shendandoah, Iowa

to:

Virgil Williams, KØEJO
1301 South Center
Shendandoah, Iowa

I am enclosing \$1.00 for postage charges. Thank you.

Sincerely yours,
Virgil K. Williams

DE MARS AIR

Air Force Mars activities will provide communications support to the local area at all times when this support will not interfere with the Air Force mission. This policy will allow for all types of communications support to CD, Red Cross, CAP, local authorities etc. This support may include temporary loan of equipment and supplies, however permanent issue cannot be made except to Air Force Mars stations. A well organized Air Force MARS structure within each state, with the state director working closely with local authorities, will do much to provide a good communications support capability from the local area.

From Edmund E. Donze, AFØYEV
State Director for Nebraska

LASERS

by James E. Lovan (WØWIS)

One of the most exciting developments to come out of the research laboratories in recent years is the optical maser, or laser. The name "laser" is derived from one of its important characteristics - Light Amplification by Stimulated Emission of Radiation. A second important characteristic is its ability to generate coherent electromagnetic radiation at either infrared or light frequencies. It is these two characteristics that scientists have used in producing some startling results, and which lead to anticipation of even more startling things to come.

Engineers have dreamed for many years of developing a device capable of generating light waves as efficiently and of as great purity as radio wave generators. They now believe the laser is a realization of that dream.

Light waves as we ordinarily think of them have many limitations. Most light sources are essentially hot matter. Light coming from such

sources emerges in a conglomeration of separate waves which reinforce or cancel each other in a random fashion, producing patterns which are radiated haphazardly in all directions. This results in a high degree of dissipation of the potential energy of the light waves. This might be illustrated by throwing a handful of pebbles in a quiet pool. Many waves from the many sources will spread out, sometimes reinforcing and sometimes cancelling each other, with haphazard patterns being formed on the surface of the pool. If a single pebble is thrown in the pool, only a single set of circular wavefronts will spread out, without interference from other sources.

Light waves such as those produced by conventional light sources are thus said to be incoherent. They are uncontrolled and jumbled, and the wavefront so produced varies from point to point and instant to instant, like the rings produced by the many pebbles thrown into the pool.

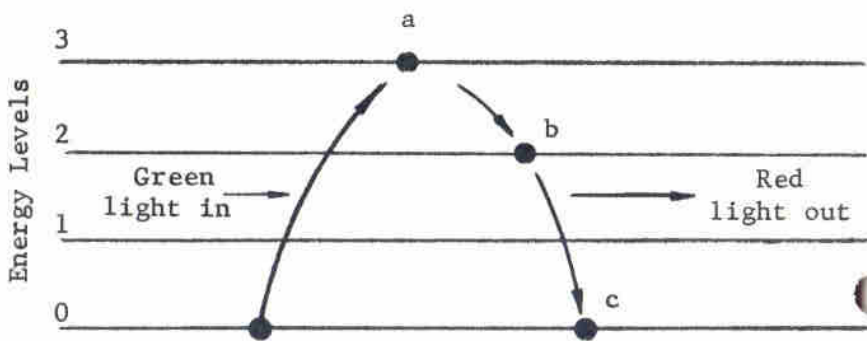


Figure 1. Chromium atoms in the ground state absorb energy from green light photons and rise to a higher energy level, (a); they then give up some

energy and fall back to a lower energy state, (b); when further stimulated they emit infrared light and fall back to ground state, (c).

On the other hand, light waves which have traveling wave surfaces of constant phase and amplitude, moving in a narrow beam, will follow definite laws of optics closely. One could imagine a point source of light generating such waves, spreading out in a spherical form from the source. At any given point at a distance from the source the wave fronts could be considered as plane surfaces, and at every point on the plane the strength of the electric field would be the same. As the wave fronts traveled past the given point the field strength would rise and fall smoothly and rhythmically, in phase, swinging from positive to negative in value. In other words, coherent light is monochromatic, unpolarized, and uniphased. The laser is a device which is used to produce such light.

The production of coherent light waves depends upon the harnessing and controlling of atomic energy. Several solid-state crystals, and also some gases, have been found adaptable to this purpose.

The synthetic ruby, doped with certain chemicals, such as chromium, has been most successful among the crystals, and helium, neon, argon, krypton, and xenon have been found useful among the gases. The principal requirement of such a material is that it be able to undergo stimulation and emit frequencies in the infrared and visible light region.

The ruby is aluminum oxide, and as used in the laser has had a few of the aluminum atoms replaced by chromium atoms. The ruby is machined into a rod. Its ends are optically polished flat, parallel to each other, and partially silvered,

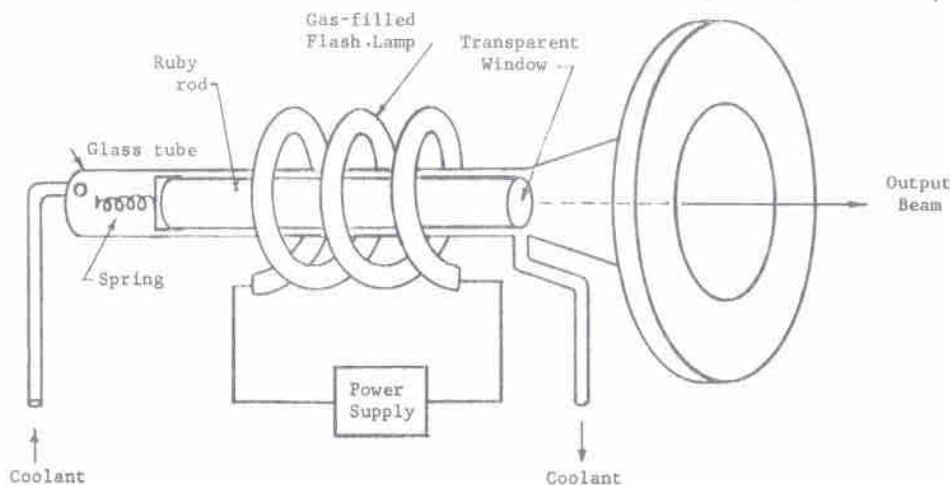


Figure 2. Current through the flash tube ionizes the gas, producing a flash of light, which is directed toward the ruby rod. Chromium atoms in the rod are raised to a higher energy level. Excited atoms returning toward ground state set up waves of light, which are built up by numerous reflections along the axis of the rod, finally being emitted as the laser beam from the transparent window. The output is directional, powerful, monochromatic, and coherent.

Besides the ruby crystal, other crystals which have been successfully tested include calcium fluoride doped with dysprosium, samarium, thulium, neodymium, and uranium. Further experimentation is being carried out by many research organizations.

with one end being less heavily mirrored than the other, providing a sort of transparent window so that a portion of light may escape through it under proper conditions. The rod is placed near an electronic flash tube which provides broad-band pumping light. Under stimulation of the light, some of the energy of the light photons is absorbed by most of the chromium atoms, raising the total energy of the atoms to a higher or "excited" state. This state is unstable, and the atom tends to try to return to the stable or "ground" state. During the time when the atom is excited it may be further stimulated by the photon source, and if it is struck by a photon with the same energy as that of one about to be spontaneously emitted, the incoming photon is augmented by the one given up by the excited atom, and a wave of light is released which falls in phase with the one that triggered the release. A wave which starts near one mirrored end of the rod travels along the axis of the rod to the other end, where it is again reflected back into the active medium, and reflected passages build up energy to the point that infrared light is eventually emitted.

Up to a certain critical intensity of light the ruby emits a burst of red fluorescence during the usual decay period of the atoms. But above that critical level maser action takes over, and an intense red beam lasting for about 500 micro-seconds, flashes from the thinly silvered end of the rod. See Figures 1 and 2.

A method of producing laser action using gas atoms in an electric glow-discharge has been successful.

When a mixture of helium and neon atoms are contained in a glass tube and pumped by a high frequency signal of about 30 mc., helium atoms are pumped to a higher energy level. As the helium atoms fall from this higher level toward the ground state they collide with neon atoms, losing their energy to the neon, which are thus raised to one of four distinct energy states. When these highly excited neon atoms are further stimulated by other photons they give up photons in the form of laser light in the infrared region around 10,000 Angstroms. The neon atoms then fall to the ground state in steps, but photons emitted in these steps do not contribute to the laser beam. A relatively small input of energy is necessary to produce a continuous supply of neon atoms at the proper level to maintain a continuous output beam from the laser. See Figure 3.

Actually the two types of lasers tend to complement each other. The crystal laser is a high power device, and appears to be particularly useful in pulsed applications. The gas laser is a low power device, and is characterized by a much narrower beam than is possible at this time with the crystal laser.

Several spectacular feats have already been accomplished by the use of the laser. MIT scientists bounced signals off the moon in 1962, illuminating a circle on the moon about two miles in diameter, using a twelve-inch telescope. Raytheon engineers have used it to burn holes through a 1/32-inch stainless steel sheet in two milliseconds. General Electric engineers have put holes through diamonds with a

temperature of about 10,000°F. The laser retina coagulator has been used to cauterize and to kill cells of the retina with the dangers of X and gamma rays being eliminated. In communications systems it is believed that it would be possible to transmit more information on a single beam of laser light than 25,000 television stations all transmitting at the same time.

Hughes Aircraft Co. has demonstrated a portable lightweight laser range finder, with a theoretical range of 50 to 60 miles under optimum conditions. The Korad Corporation has developed a ruby laser pulse generator with a peak power of more than 500 megawatts, with observed results of ionization of air in its

path producing a brilliant blue flash of light and "spectacular damage" to materials placed at the focal point. Such a device has high military potential.

TRG, Inc., has accomplished automatic frequency control of a laser to within 3 KC of the frequency of a second laser, a relative frequency stability of one part in 10 seconds. This degree of control is sufficient for practical communications by optical heterodyne techniques. Thus it appears that the way is now open for possible shifting of all techniques of ordinary radio frequency heterodyne detection up to optical frequencies.

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Tech. Inst., K. C., Mo.

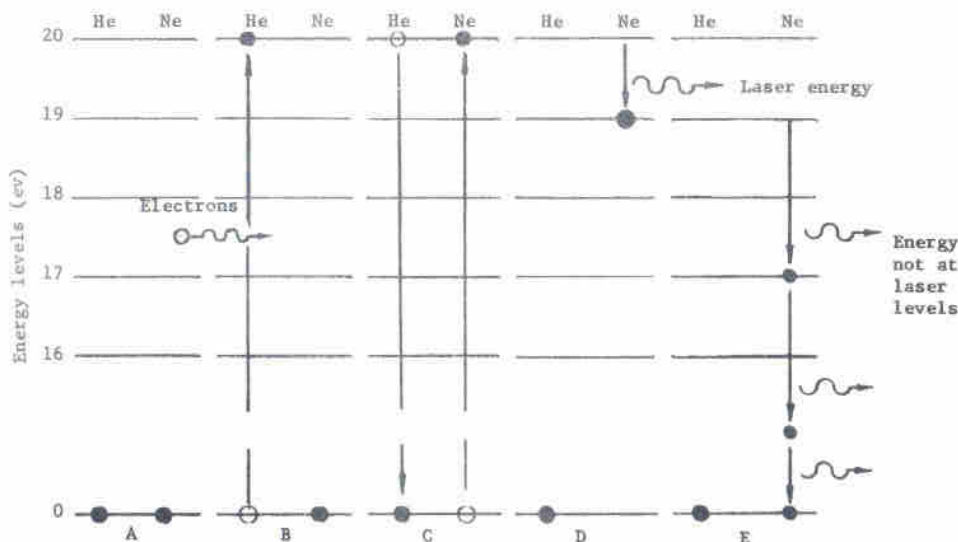


Figure 3. (A) Helium and neon atoms at ground state; (B) Helium atom absorbs energy from electron bombardment, and jumps up 20 eV level; (C) Helium falls back to ground state, colliding with neon, which rises to a high energy level; (D) Neon, stimulated by photon, emits a photon to the laser beam, and falls to a lower level; (E) Neon reverts to ground state in steps, giving up energy, but not contributing to laser beam.

lated by photon, emits a photon to the laser beam, and falls to a lower level; (E) Neon reverts to ground state in steps, giving up energy, but not contributing to laser beam.

SCM CORNER de Florida Skip

Have been trying to come up with a good subject for this corner when suddenly it occurred to me that I had it in my lap all along. Have been hearing much comment of a controversial nature regarding the use of CW recently both on the air and in various articles appearing in Florida Skip and QST letters. Unfortunately most comments originated from those who either cannot or do not care to use CW as a mode of communication preferring to regard it as 'horse and buggy stuff' among other things. Knowing most of the commenters personally this smacks of 'sour grapes' to me as I know most of you will agree if you are being honest with yourselves.

Granted that Continental and American Morse code are the oldest means of transmitting intelligence via wire or radio which, I suppose, should relegate it to wood stoves and butter churning if age itself had anything to do with it. Fortunately age does not necessarily make anything obsolete or less effective than anything else more modern. It depends on the circumstances.

How often have you been forced to either quit or depend upon one or more relays to effect communications with a desired station because of adverse conditions which made voice communication, whether SSB or AM, well nigh impossible? I know that this can happen and I have heard it. I'm sure that all will agree with me reception of CW signals can be effected using bandwidths so narrow that voice communications would be impossible in this manner. Narrow

bandwidths in the order of 35 or 40 cycles are possible at this station using numerous sharply turned High C circuits in the RF sections and cascaded AF selectivity in the AF stages. Of course, mechanical filters give an excellent account of themselves in this same application.

It is possible to receive a single CW station in such a mess that even expensive receivers not using this sort of filtering could duplicate. Please bear in mind also that you can crowd more CW stations in a given space than any other mode presently being used in the amateur bands.

Let's see if we can figure why this mode isn't being used more often under poor conditions. It can't be the cost since there is nothing that hurts the pocketbook less than a simple low - powered CW rig even in the order of 10 watts. Good selectivity and stability can be achieved in a receiver also without undue expense (except in the case of the mechanical filter which comes rather high), so it isn't cost.

Perhaps it is the old bugaboo of becoming sufficiently proficient in using the code that stops many operators. It isn't easy but it isn't unduly difficult either.

At one time ALL hams HAD to learn and use the code. There wasn't any other mode available. THEY did it so why can't you?

I'm sure we are as capable of learning as the old timers were. The only difference is that they had to do it while we can take the 'easy way' out and grab a mike.

Learning to use the code IS a challenge. It is a REAL accomplishment. Don't let anyone sell you short in THAT. You must agree that it IS a useful thing to know unless you are only interested in casual contacts when conditions are good.

Did you know that even today all military radiomen are required to maintain a minimum useful code speed? Even pilots and navigators must keep qualified at a certain speed. There is a reason. CW can be used when ALL ELSE fails. In emergencies a small CW rig can be made from almost anything such as a small broadcast receiver. Communication has been carried on using milliwatts of power over long distances with the simplest of equipment.

I do not mean to say that all should forego the use of other modes but I DO say that ALL hams should retain the capability of using the code - the capability that was required of you when you obtained your license and the capability that you attest that you have when you apply for renewal. I wonder how many can handle the 13 WPM required of you - right now. If you cannot do this you are NOT qualified to retain your general status regardless of whether or not you think the FCC is right. That is the law gentlemen. You cannot, with impunity, act on your own interpretation.

In case many of you have had RTTY cross their minds in argument just ask ANY qualified RTTYer for his opinion and if he is honest with

you he will agree with these facts which I have stated. A machine of this type cannot think so therefore it will write whatever its pulses dictate. A human can think and reject that which is not pertinent and fill in that which is missing.

Before I am hung 'from the nearest yardarm' let me say again that I am NOT trying to especially boost CW or sell any other mode short. I am simply trying to bring out that when you overlook CW as a desirable adjunct to your station capability you are eliminating from your set-up the BEST means of getting through the most adverse of conditions and if you really desire to get through it should be available to you and you should keep yourself able to use it at such a minimum speed as to effect useful communication.

Let's make this a project for ALL stations. Get your code speed back to its original 13 WPM at least and get that feeling of being qualified to hold a general license under present FCC regulations.

If requirements do change in the future you will be that much ahead anyway and nothing is lost. Better yet, how about throwing together a small CW rig of five or ten watts and at least stick it away in a corner of the shack for the time when you might need it. If you want go go all the way use direct heating cathode types so you can run it from batteries. Everyone can't afford a generator and this little rig will draw a minimum of current.

Thanks and 73.

Ham K4SJH SCM E. Fla.

SMALL FINES ACT

de Florida Skip

(Editor's note: The following by WØHPE was taken from the Ham Monitor, Pretty Prairie, Kansas. I suggest you read it carefully and tell your friends on the air.)

The small fines act applies to Amateur Radio Service as well as to Citizen Band, Industrial, Marine and other special and Safety Radio Services. Twelve violations are listed which could make an amateur or other station covered under the act, subject to a \$100.00 to \$500.00 fine. The twelve are:

1. When a station is operated by any person not holding a valid operator's license or permit required of such station.

2. If a station fails to identify by giving the call sign in the manner prescribed by the Commission's rules.

3. When a station transmits any false call.

4. If the station is operated on a frequency not authorized for use by such station.

5. If the station transmits unauthorized communications on a distress emergency, or calling frequency.

6. Causes interference with any distress call or related communications.

7. Does not suppress spurious emissions in accordance with FCC requirements.

8. If transmitter is operated with power in excess of that authorized.

9. If the station renders a service not specifically authorized by

the licenses.

10. Uses an emission other than those authorized.

11. If station transmits with equipment other than shown on the license.

12. If station fails to answer official requests from the Commission.

In case of violating Nos. 2, 3, 5 or 6, the individual operator is subject to a \$100.00 fine levied against the licensee. In other words, if you operate another amateur station and violate one of these, both you and the owner of the station may be subject to a fine.

Under the Small fines Act, no more than \$100. may be charged for many violations of the same item during a 90-day period. If several items are violated, however, the fine may go up to the maximum of \$500.00. The 90-day period is specified to prevent multiple fines because of numerous complaints on the same item before a station receives an official notification from FCC. As in the past, if the violations are very serious, licenses may be revoked.

Although the new law is to be applied only in cases of willful and/or repeated violations, it might be well to review all the rules and regulations and renew efforts to operate our stations correctly. The tremendous pressure on the FCC for frequencies, anything we can do to improve the amateur service status is worthwhile.

If your modulator tubes should burn out - if your microphone should become useless - could you communicate if the situation required? The degree of skill in the art of c.w. and code as specified in the F.C.C. rules is no capricious thing. Nor is accidental. It is this skill which has demonstrated to the F.C.C. and to the Military who have been our strong backers that we have a great potential that is in the public interest.

As for technical knowledge, sure today's commercial equipment is complicated and only a few would attempt major repair or adjustment to most of it. True, also, is the fact that keeping a station in daily operation requires that we keep pace with the trend toward more sophisticated gear in order to meet competition. However, at least we can try to remain familiar with the theory of operation of basic circuits and localization and correction of minor difficulties. After all, voltage is voltage, current is current, and resonance. These things will be around for quite a while, no matter what.

A mail-order ham who obtains his license renewal dishonestly by failing to remain qualified is no more an amateur radio operator than the CBer who tries to simulate ham radio communication on eleven.

We haven't arrived at the point of advocating that the F.C.C. require proof of competency for renewal. If 20% who renew each year would exercise their free enterprise in establishing the proof to themselves, we would have, within five years, a much better quality and greater

strength in our amateur fraternity. Otherwise . . . let the F.C.C. do us the favor of reducing our QRM for us by kicking the mail-order hams off our well-worn air.

W0DQL, de Splatter

**OFFICIAL BULLETIN NR 907
FROM ARRL HEADQUARTERS
NEWINGTON CONN JULY 25 1963
TO ALL RADIO AMATEURS BT**

On July 4 William Willis left Peru on a solo transpacific raft voyage to last from 3 to 5 months, sailing the Humboldt current to Australia, via Samoa. The only means of communication during the period will be by a hand powered transceiver. The 70 year old American navigator and explorer has a limited knowledge of the code but will transmit daily position reports on 8364 kc, 2 or 3 hours after sundown and later on 2 or 3 hours before sunrise, using the identification Salvita Three. Any information as to the position of the raft should be forwarded immediately to Mr. R. C. Griffiths, Marconi Marine, 75 West Street, New York 6, New York AR

Area News Release #56
pp6.

IT HAPPENED LONG AGO:

Quite a few hams are now observing, at their own election, "Quiet Hours." This is nothing new. We had "Quiet Hours" with us years ago. However, in the large cities, people stay up for late movies on

(Continued from P. 25)

TV. 8 P.M. to 10:30 group go to bed at 11 P.M., then a new group take over the viewing until 1 A.M. This would be too much to ask a ham to observe both time periods as "Quiet Hours." However, unless we do get on the ball and strive to improve public relations, and hope that manufacturers will put in the filters, we may have this subject to contend with. It may be a local condition, but recently one manufacturer refused to hand out filters as they have been doing for many years. This was reported by K8SCI at Lakewood, O. My answer to any amateur who is going through TVI problems is first to make sure he is a member of the ARRL, then join some local amateur radio club.

Editor:

Hip, hip and Hooray! for the "Old Grouch." While tuning on ten before the Baltimore C o. AREC net (which meets Monday at 8:00 PM local time on 28.680, I've heard the clowns he must be talking about. These guys sound worse than fugitives from the Citizens Band. Their humor is not only smutty, but not really funny. Why don't these guys wake up and join our group or another emergency group or even an INTELLIGENT round table or knock session? It's their TVI that people probably hear and all hams get a bad name from these clods.

Speakin' of TVI, I disagree with the Old Redhead. If you can't QRT then I feel that a remark to the effect that you will cooperate and help your neighbor in every way (which I hope

you will) which you know he'll hear can do wonders for your relationship and if he hears you say you're leaving the air for his sake he'll be less inclined to quibble about a line or two, if most, but not all, of the trouble is cleared up. Obviously unkind remarks only do ham and are better not

At the risk of being railroaded out of the AREC and other groups of my fellow amateurs, I would like to give SUPPORT - that's right - SUPPORT to the bill to charge fees for applications and renewals for amateur (and CB etc.) licenses. I realize that this is an unpopular stand but all I ask is that my fellows in this fine hobby stop and SERIOUSLY consider what his means to us.

At the thought of losing \$5, the clowns who take the General Class Exam every 30 days from the time they get their Novice until they pass and this about 50-70% of the failures and crowding of the exam rooms could be eliminated at the FCC. This saves those waiting for tickets time that is now used to process these failures.

Those who join RACES "just for the card" would hesitate to do so if this pretty card would cost them \$5. Our RACES ranks would be at least a LITTLE and probably a LOT more dependable.

If you look in the Call-Book you see many calls that haven't been used for years. I feel that the \$5 would stop about 10% of this and make these calls available for use, thus postponing the need for a call in areas without them.

Finally, if amateurs paid this small cost for their privilege (it's not a right, you know) they would

most likely receive even better treatment than they do now in regard to TVI and similar complaints. Think it over.

de Auto Call
Frank Merceret, K3MDL,
5793 Clearspring Road,
Baltimore 12, Md.

**OFFICIAL BULLETIN NR 899
FROM ARRL HEADQUARTERS
WEST HARTFORD CONN MAY 23
1963 TO ALL RADIO AMATEURS BT**

A new agreement concluded between the Dominican Republic and the United States effective May 22 permits amateurs of the two countries to exchange communications on behalf of third parties. The limitation to personal or technical messages not important enough to justify the use of commercial circuits is similar to earlier third party agreements. The current list of countries with which U. S. amateurs may make such exchanges is Bolivia, Canada, Chile, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Haiti, Honduras, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru and Venezuela AR

Two genuinely disturbed inmates of a state mental institution were walking unattended on a crisp afternoon when one of them suddenly dove into the turbulent, icy waters of a river that bordered the grounds. Without hesitation, the other plunged after him and saved his life.

"A brave and wonderful act!" applauded the superintendent later. "Any man who does a thing like that obviously is completely sane. Tomorrow you may go home."

The inmate still was expressing his gratitude when a white-faced orderly whispered an urgent message into the superintendent's ear. "I'm afraid I have bad news for you," the superintendent told the inmate. "The man whose life you saved has hung himself."

"Oh, no," protested the inmate. "He's fine! I just hung him up to dry!"

de Ensco Bulletin

**OFFICIAL BULLETIN NR 895
FROM ARRL HEADQUARTERS
WEST HARTFORD CONN APRIL 25
1963 TO ALL RADIO AMATEURS BT**

Attention DXers. Announcement is hereby made of the addition to the ARRL Countries List of Glorioso Islands. Glorioso Islands are French territory under the administration of the Overseas Department of Reunion and located off the northern tip of the Malagasy Republic, which separates them from Reunion. DXCC credit claims for contacts with the Glorioso Islands may be made starting August 1, 1963. Such confirmations must be for contacts made June 25, 1960 or later. Confirmations for Glorioso Islands credit received before August 1, 1963 will be returned without credit AR

