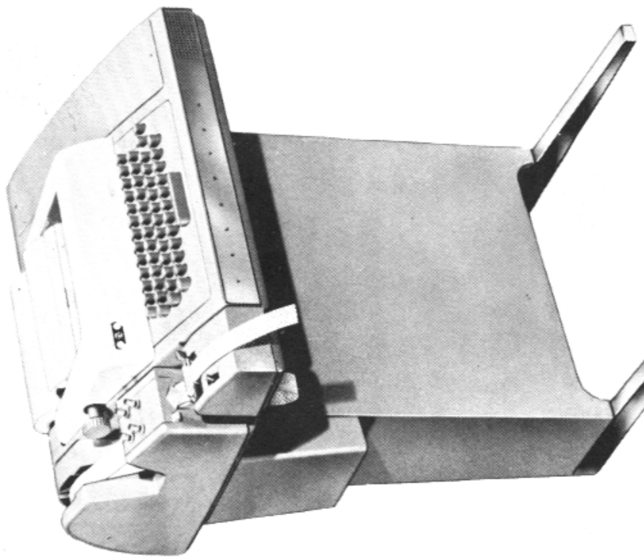
RTTY



THE MODEL 33 AUTOMATIC SEND-RECEIVE SET FEATURES A TAPE PUNCH, TAPE READER AND A PAGE PRINTER WITH KEYBOARD IN ONE COMPACT UNIT 22 INCHES WIDE. THIS SET CAN BE EQUIPPED WITH CONTROLS FOR USE IN TELEPHONE LINE COMMUNICATIONS.

RYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYR

NEWS OF AMATEUR RTTY

JULY 1963
30 CENTS
VOL. 11, NO. 7

HORSE TRADES

This page of the Bulletin is for use of amateurs who have RTTY EQUIPMENT FOR SALE OR TRADE and those looking for equipment to buy or trade. It is a free service and may be the means of getting someone on the air.

RTTY, Inc.
372 WEST WARREN WAY
Arcadia, California
Return Postage Guaranteed

PASADENA
JUN 29
3 AM
1963
CALIF.

U.S. AIR MAIL 8¢

WANTED: Cover for 14 TD. Swap or sell: 74912 and 80166 pinions for 74913 and 80165 fiber gears. K7GCP.

FOR SALE: Polar relays, type 255A and 209 FG, $1.75 each. Sockets, 50¢. Please add 35¢ for postage. NEED shield and socket for two-inch scope tube. K7BON, 419 Russell Drive, Billings, Montana.

FOR SALE: Model 14 typing reprf with kybd and cover, $75.00. Model 19 and table, and power supply, sync motor, $100. W6FDJ, 3018 Berlin Way, Oakland 2, Calif.

FOR SALE: Model 14 TD in good condition, has original wiring, tight tape lever, slip base and parts manual. $65.00. Will ship with shipping charges collect. K8OGV, 2949 White Road, Grove City, Ohio.

FOR SALE: Model 19 with table, tape distributor, home brew converter, and supply, $250.00. Will deliver within 200 miles. J. Foristiere, 3079 Madison Avenue, Fresno 1, Calif.

FOR SALE: Model 15 page printer, complete with sync motor, table, cover, and rectifier. New condition, $125.00. WA6VVR, 850 Linden Lane, Davis, Calif.

SELL OR TRADE: Complete set of three manuals for 28 ASR. New. Want surplus military weather equipment. W1LWV, 99 Water Street, Millinocket, Maine.

WANTED: Manual (Navships 91490) for CV-89 URA-8A frequency shift converter. Also need test jumper cable to operate CV-89 out of case. K6ARR, 428 Finley Street, Auburn, Calif.

TRADE: Like new Model 14 tape printer and table for 1909 SVDB penny. K4GFN, 1410 Huntoon Avenue, Louisville 15, Ky.

FOR SALE: Model 28 page printer manual; complete, 1″ thick. Description, adjustments, parts. New in factory box. $7.50 postpaid. W4NZY, 119 North Birchwood Avenue, Louisville 6, Ky.

WANTED: Tuning indicator scope or monitor scope for use with T.U. Also need gear and pinion for use with AC sync motor to be used on a 14 type Teletype tape printer at 60 speed. K4FPW, 1935 Strathmoor Blvd., Louisville 5, Ky.

NEW, ECONOMICAL PAGE PRINTERS ANNOUNCED BY THE TELETYPE CORPORATION

A new family of page printers for use in private wire or telephone line communications has been developed by the Teletype Corporation.

The Model 32 and 33 sets fill the needs of the great majority of users whose operations require page printing, tape reading and tape punching equipment at economical investment levels.

These compact units operate at 100 words per minute and can be converted to slower speeds by simple gear changes.

The Model 32 utilizes a three-row keyboard and operates on a 5 level, standard communications code.

The Model 33 is equipped with a four-row keyboard and operates on an 8 level, message and data communications code.

Both models are available as automatic send-receive sets, keyboard send-receive sets, and receive-only printers.

The Model 32 and 33 Automatic Send-Receive sets feature a tape punch and a tape reader mounted on the left of the console, as well as the keyboard and printer.

If desired, these sets can be equipped with dials, pushbutton controls and data sets, making them capable of turning on, transmitting messages to, and turning off remote, unattended stations via the telephone network.

An answer-back mechanism in each Model 32 and 33 set has a capacity of 20 different characters. Thus, this equipment can respond to a call with its station identification.

A function mechanism is built into each set to allow automatic control of peripheral equipment.

A floor stand, built especially for the Model 32 and 33 is included with each printer.

Each set measures 18½ inches deep, 18 inches wide (the automatic send-receive set is 22 inches wide to accommodate the punch and reader), and 33 inches high, less paper roll. Weight, not including floor stand and paper roll is approximately 35 lbs.

This type of equipment is manufactured for the Bell System and others who require the utmost reliability from their message and data communications systems.

For more information on the Model 32 and 33, write to Teletype Corporation, Dept. SP-17, 5555 Touhy Ave., Skokie, Illinois.

USING THE W6NRM DIODE DRIVER CIRCUIT TO KEY THE FSK INPUT ON A CENTRAL ELECTRONICS 100V TRANSMITTER

ELSTON H. SWANSON, W2PEE

Oyster Bay, L. I., N. Y.

The Central Electronics 100V transmitter contains as standard equipment frequency shift keying circuitry in the form of a reactance tube shunted across the 8 megacycle fixed oscillator circuit. This reactance tube is keyed between the two valves by external contacts, either keyboard or a polar relay. The amount of shift is determined by a built-in shift control potentiometer which is on the front sub panel of the transmitter.

In order to preserve the highly desirable design objective of the W6NRM TU of eliminating polar relays, it was necessary to devise a means of keying the 100V FSK input from the diode driver circuitry of the Mark IV TU. It turned out that this is a very simple proposition and the attached circuit plugged in to the FSK-1 input jack on the 100V will do the job very well.

In using this unit one should not attempt to control the amount of shift with the shift adjustment on the Mark IV, but rather turn it to a point where maximum shift is realized and then control the shift with the control on the 100V. A bonus feature appeared since it became obvious that it was very simple to obtain narrow shift keying for CWID in this unit with the addition of one resistor and a jack. The circuit appears below.

For convenience, I built this into the smallest mini-box I could get hold of, and since it requires no access can be hung behind the exciter somewhere.

ARMED FORCES DAY MESSAGES 1963

"CW"

CQ CQ CQ DE NPG NPG NPG NR 1
R 182100Z
FM WASHINGTON DC
TO ALL RADIO AMATEURS
GR 219
BT

Throughout this unsettled world today thinking people are deeply and conscientiously concerned with ways and means of promoting unity and lasting peace between all nations. People who value a peaceful existence for themselves, their descendants and their fellowmen cannot help but be concerned. The depth and gravity of their concern is reflected in the effort which they devote to promoting world peace and discovering expedient methods to that end. In your avocation of amateur radio each of you has a unique capability for promoting international goodwill. It is a capability which is informal and personalized in comparison with the sophisticated, formalized methods used in the higher levels of international diplomacy. Nevertheless, it is an important asset in the area of international relations which each of you should, in behalf of us all, use wisely and cherish highly. The ability to communicate spontaneously with fellow amateurs in foreign countries makes you a spokesman, a representative of the United States, an ambassador pro tem. The mutual friendships and goodwill which you can collectively stimulate, promote and increase may well tip the balance permanently to the side of mutual understanding and lasting harmony between all people of the world.

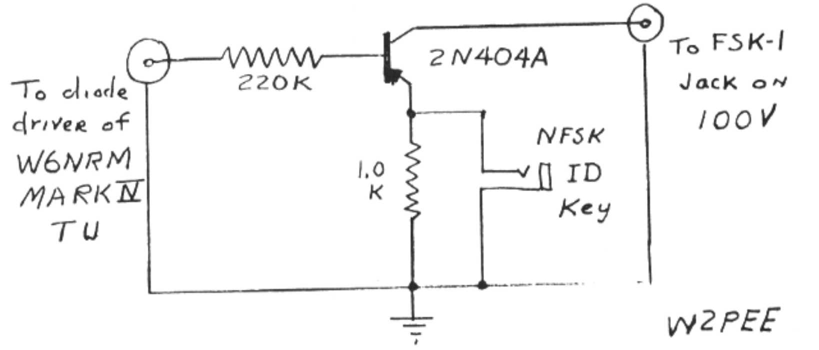
(signed) Robert S. McNamara
Secretary of Defense

"RATT"

CQ CQ CQ DE NPG NPG NPG NR 1
R – 182130Z
FM WASHINGTON DC
TO ALL RADIO AMATEURS
GR 194
BT

On this 14th anniversary of Armed Forces Day the Military Communications Services of the Department of Defense extend greetings to all amateur radioteletypewriter enthusiasts. Those of you who have built, assembled and are operating the equipment necessary to communicate by radioteletype possess a high degree of technical ability which is self evident. It is a technical ability which is born of the true pioneering spirit, an adventuresome spirit which is generated by an inherent individual desire to explore new horizons. In exploring, developing and adapting radioteletype communications for amateur use have improved and increased your technical ability. In assisting other amateurs in this endeavor you have contributed to the technical advancement of amateur radio as a whole. Progress in the science of radio communications depends largely upon the technical efforts of such people as you. It is you who will be the most versatile, who will contribute the most in communication emergencies. It is you technically proficient explorers who, by deed and accomplishment, will brighten the historical pages of amateur radio communications progress.

(signed) Robert S. McNamara
Secretary of Defense



GETTING STARTED ON RADIOTELETYPE

VIII. FSK FOR THE HT-32; HT-37; AND OTHERS

(INCLUDING NARROW SHIFT CW ID)

by

IRVIN M. HOFF, K8DKC
1733 West Huron River Drive
Ann Arbor, Michigan

The Hallicrafter single-sideband transmitters (like several other types) have the VFO going in one direction on some bands and in the opposite direction on other bands. Thus, for RTTY, it becomes necessary to have a FSK system that one can reverse for proper operation on any band.

In article VI we discussed various means of adapting the Mainline FSK system to different requirements. A review of that article will help understand the specific application to the Hallicrafter (and others) transmitters.

On some bands, we need conduction of the FSK diode keyer for mark, and on other bands we need it for space. Therefore we must have a means of getting similar conduction each time, although it must be on the opposite impulse for some bands. This poses a special problem, but is easily solved with this diagram, which includes narrow shift ID — which also must be "reversed" to get CW ID on mark each time:

Explanation of the various components will be at the end of the article.

Now for those using a keyer tube who would like to incorporate the FSK directly from the keyer tube loop, you will have to isolate the keyer from ground in this case, and here is the method used:

As a final convenience, if you do not already have push-to-talk, you can easily add it in a matter of minutes by bringing out a connection of the cathode resistor on the voice-operated relay tube, such as is being done in the HT-32A; HT-32B, etc.:

Switch S-4 may be mounted anyplace that is convenient to the teletype position — many fellows put it immediately to the right of the keyboard for "instant break-in". It should actually be combined with switch S-1 to give optimum station operation. like so:

That about completes the Mainline FSK System for those transmitters needing to be reversed on some bands. There is no need to modify the transmitter in any way, and with a test tube adapter, one can lift the relay tube; insert the adapter; replace the relay tube and add R-13 to pin 3 (for a 12AT7 tube) for the push-to-talk. The keyer may also be built in a similar manner, although it is frequently difficult to find a test tube adapter that will plug into the shielded 7-pin socket. However, they are made, and also can be made at home from vector sockets, etc.

The VOX position of the transmitter will be used, so remember to run the microphone gain to zero and disable the mike to keep it from actuating the VOX system accidentally.

With this system, the receiver can be operated or not operated for transmit — your choice.

This system will allow you to have constant control of the printer, which is always left in series with the keyboard, and switch S-1 will allow you to mute the printer whenever you do not wish to print — tuning in a station; during his CW ID, etc., without turning off the printer each time.

IDENTIFICATION LIST

J-1—Teletype equipment, including keyboards, reperfs, TD's, printers, etc., all in series
R-1—22 ohms 2 watt surge resistor
D-1—Silicon Rectifier of at least 100 ma 400 PIV
T-1—Stancor 8421 or equivalent
D-2—Not critical—try whatever you can find in the way of a germanium diode. We like the 1N270, but in this circuit the 1N34A; 1N100; 1N297, etc., etc., all work well
C-1—At least 40 mfd. at 200 WVDC or larger
C-2—3 - 12 mmfd variable with good RF dielectric such as steatite.
C-3—Not critical—0.02 is fine, etc.
RFC—2.5 mh—ask for a miniature size as it only needs to handle 4-5 milliamperes current
S-1—SPST toggle switch—mutes the TU and turns the power supply into a local loop for standby or transmit
S-2°—This is the same switch, and we recommend a CRL 1458, which is a 4-pole two position switch, non-shorting
S-3—Not included
S-4—SPST for push-to-talk (actually should be incorporated into switch S-5 to mute the TU during transmit)

MAINLINE FSK SYSTEM

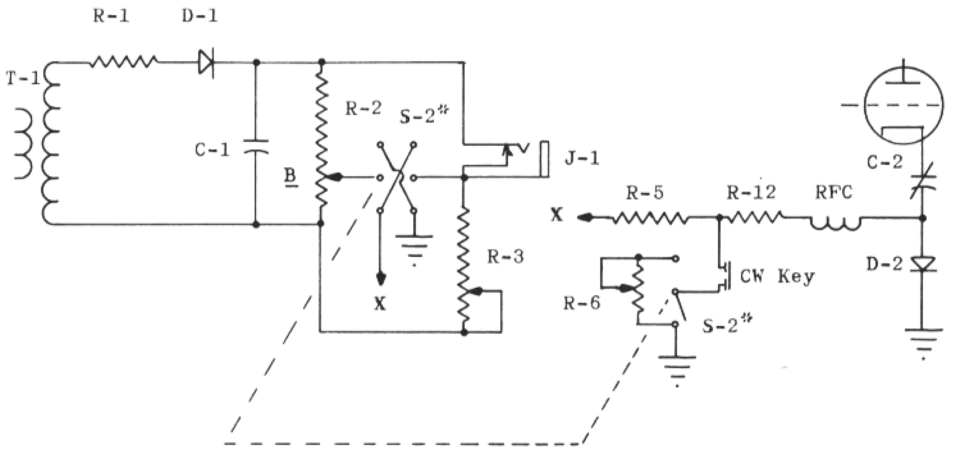


Figure 1

MAINLINE FSK SYSTEM

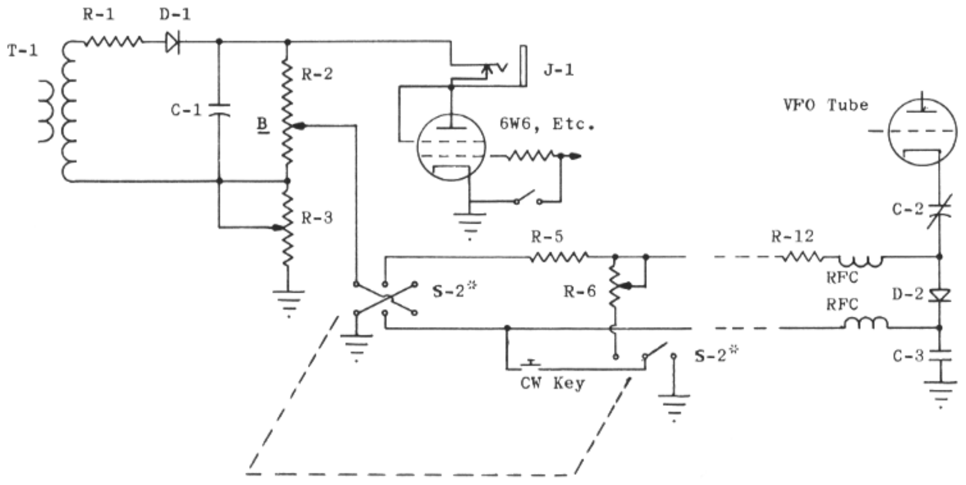


Figure 2

MAINLINE FSK SYSTEM

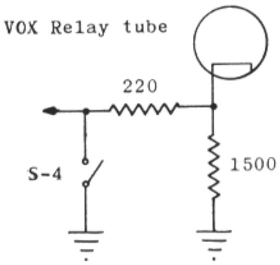


Figure 3

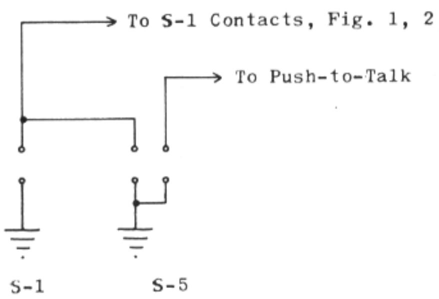
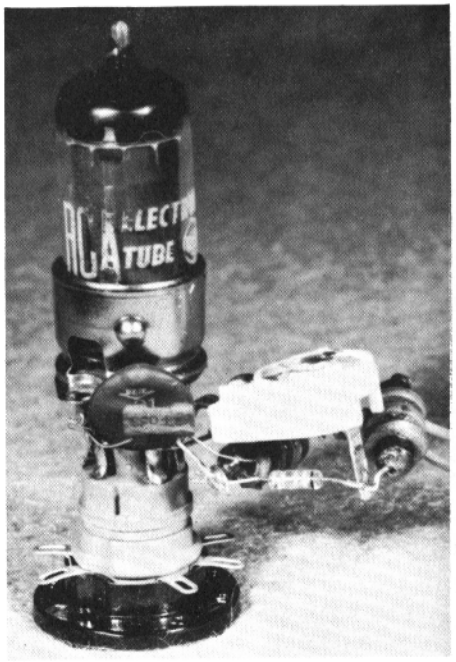


Figure 4



S-5—Transmit switch—DPDT toggle. Puts station on air and converts TU power supply into local loop for transmit.
R-2—10K 10W variable for 20-30 ma loops; 25K 25W for 60 ma loops
R-3—7500 ohm 25W for 20 ma; 5000 ohm 25W for 30 ma; 2500 ohm 25W for 60 ma loops
R-4—Not included
R-5—5000 ohm 5W isolating resistor for narrow shift CW-ID
R-6—50K pot for CW-ID—normal ½W carbon
R-7—Not included
R-8—Not included
R-9—Not included
R-10—470K 1W
R-11—22K 1W
R-12—12K 1W, or value giving about 4 to 7 ma current through the keyer during conduction; may need to be smaller value
R-13—220 ohms 1W
TAP B, Diagrams 1 and 2—Set to give equal current through R-12 during conduction (mark on one direction of S-2* and space the other direction.) Will be about 4-5 ma.

"LETTERS"

Just thought I'd drop you a line to let you know how much I enjoy the RTTY magazine. Don't know just why I didn't get involved in RTTY long ago because I was involved in quite a bit of it during WW-II in the Pacific. I was Staff Comm. Officer in charge of operations at NPN (Guam) during the latter part of the conflict and we had plenty of RTTY. As a matter of fact, between Capt. Ham Dow and I, we started the first RTTY broadcast to ships at sea when I was at NPN – but that's another story.

What I'd like to know, or suggest for an article, is where the devil does a guy find out about all the gadgets and accessories that go to make up the complete RTTY station? I get to looking over the "Horse Trades" and get so confused that I'm not sure just what I want. What the heck is "rapid feed out" and what's it good for? I think I understand about the "end of line indicator" but I thought all perforators had them – now it seems they come "with" and "without". And I thought all "typing reperfs" had a keyboard but the adds indicate maybe they don't. And "automatic carriage return"– I guess this must be something that returns the carriage when it gets to the end of the line if the carriage return signal is missed. Never had them on the machines at Guam. There are just a lot of things like that which leave me a bit baffled and I just wonder if there is any one reference where all this gibberish might appear. It just seems to me that there are more attachments than they have now days for automobiles – some come with standard equipment, and others you have to buy half of the parts separately! Maybe I'll get the hang of it as time goes on but I'd certainly like to know how to specify what I want and have some idea of what I need.

We don't have too much RTTY activity around here, so there aren't many fellows to touch base with to gab about RTTY. I am pretty well acquainted with W0AJL and W0WRO, and W0JRQ, who have been quite helpful. But it's almost like it was when I first started looking for the Boehme keyer and the Klein—almost everyone said, "What's that?". . . But I finally found them – on the East Coast!!

Again, I want to say I enjoy the magazine and get quite a kick out of the arguments that go on regarding the various methods of making the TU click – band pass vs. comb filter, flip-flop vs. saturated diodes, etc. I got hold of a couple of years of back issues from W0JRQ and have been going through them.

73, Glen R. Glasscock, W0FA

Clips and things notwithstanding, the following just might be the millenium for tape storage. Some preliminary ground work is indicated:

1. Develop a congenial relationship with the office gal who handles the stationery supplies by:
   a. an occasional cup of coffee
   b. compliment a new dress, hat, hairdo, etc.
   c. generally make her think she is really great. (Maybe she is!)

This should make available all of the empty boxes in which typewriter ribbons are delivered. These boxes are about 2½" square by 1" thick, and make a perfect cartridge with a fairly acceptable capacity. Remove one of the tabs for easy feed out. The same source could provide gummed labels used for file tabs also.

Now, if you want to do it real cool, put each tape on a core.

Follow procedure 1-a, -b and -c with the TWX/WUX girl at the plant.

This should furnish any amount of core material from the heavy cardboard tubes on which rolled teletype paper is delivered. This tubing is about 1" ID x 1¼" OD, and a little attention with a hack saw and sand paper will provide cores ¾" long. A tape trailer about 8" to 10" long can be affixed to the core for re-roll.

The same core sandwiched between two movie reel flanges makes a nice jig for the re-roll bit.

For unusually long tapes, try 1-a, -b and -c with the little woman. Nabisco wafers come in a box 8" or 9" square and 1" thick which do very well, and she just might furnish a few of those. The wafers make pretty good nibbling too.

I am afraid that paper clips, aluminum clips, etc., might damage the perforations in a piece of real fine copy.

Regards,
Jack, W9HRH

* * *

A few months after the W6NRM Mark III T.U. appeared in the Jan.-Feb. '61 issues, I built it. Am well-pleased with the results.

Since the T.U. power supply also powers an AFSK generator, I added a small choke to the original supply in order to reduce the ripple on B-plus.

Several months ago, I was asked to build another Mark III for a friend of mine who has neither facilities or faculties. While gathering parts – Lo and Behold! – a Mark IV appears in the March edition.

Upshot of this is a T.U. that might well be called a Mark III.V Unit.

Ever wonder how to permanently mark tube sockets, pots and other things on an aluminum chassis? Until recently, I could find nothing that would adhere without eventually flaking off. Then the idea struck me that it would be feasible to stamp the nomenclature into the aluminum surface.

This was done but with the effect that the displaced aluminum formed a ridge about each character. By placing the entire chassis in a large container of water such that the top of the chassis was below the water level by a quarter inch, a convenient (if wet) system for wet-sanding the chassis was obtained. Starting with a somewhat medium grit of 3M WETORDRY waterproof silicon carbide paper and ending up with as fine a grit as I could, extremely pleasing results were obtained.

The raised character edges melted away leaving an engraved appearance, the chassis surface had a "silky" look. Finally, three coats of clear plastic were sprayed on to preserve the surface.

73,

Norm Krohne, W9SKF

* * *

RTTY RTTY RTTY RTTY RTTY RTTY DER QUICKISCH BRAUN SCHMARTENFOX OBERJUMPIN DAS BACK OF DER LAZISCHER DUMBKOPF BARKENYELPENPOOCHER EIN 2345678900 EIN 2345-67890 EIN 234567890 RY RY RY RY RY RTTY RTTY RTTY RTTY RTTY RTTY W0JRQ W0JRQ W0JRQ LAKEWOOD COLORADO (NEAR DENVER) TESTING RY RY RY RY RY RY.

Copied by KH6AX

* * *

My mother had a stroke on April 25 and is partially paralyzed on her right side and having trouble speaking but making a good recovery. She is 76 years old.

For the first month my phone bill was very high as I kept in touch pretty much every day.

W5ISN (Doc Connover) has been meeting me for the past several weeks at 0300 GMT. He has done such a thorough job of visiting my mother and sister and the nurses I have hired and also my stepfather that I have quit telephoning altogether. Doc sure is doing a job for me. Takes my letters which they read to my mother. Gives me several letters every day, etc. I thought you might be interested in giving him a pat on the back for doing a good job on RTTY.

If W5ISN does not subscribe to RTTY, let me know and I want to send you the money for a subscription for him. If he doesn't get it, he should. And I'd like to give it to him. He is in my old home town of Clovis, New Mexico. W0AJL

"NEEDLES" IN SPACE TALK BACK

LEXINGTON, MASS. — Fifty pounds of tiny copper "needles" are starting to talk back to scientists who hurled them into space a few weeks ago.

And the backtalk may mean a major breakthrough in worldwide radio communication.

It began about two weeks ago when officials at the Massachusetts Institute of Technology's Lincoln Laboratory announced that radar contact had been made with 400 million copper wires — dipoles, or needles — sent into orbit 2,000 miles above the earth after release from a satellite.

Scientists said Saturday that transcontinental radio communication has already been made for limited periods by reflection off the orbiting needles.

The needles, finer than human hairs, are less than an inch long. The field, 10 miles wide and about 10 miles thick, is increasing in length at a rate of 10,000 miles a day. Eventually they will ring the earth in a polar orbit some 40,000 miles in circumference.

It's hoped they will provide a method of long-range satellite-relay radio communication which cannot be affected by weather or "jamming."

Contributed by W0AJL

* * *

It is with regret, we report the death of Lester P. Hammond, W6EV, better known as HAM. Born in Boston, Massachusetts, February, 1896, and died June 13, 1963. Ham has helped many an RTTY'er through the past years and will be missed by all.

Subscription Rate $3.00 Per Year

RTTY is the Official Publication

of the

RTTY Society of

Southern California

and is published for the benefit of all

RTTY Amateurs and Experimenters

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For "RTTY" Information:

W6DEO W6CG W6TPJ W6AEE

DX RTTY

BUD SCHULTZ, W6CG

5226 N. Willmonte Ave.,

Temple City, California

Hi DX'ers:

It's been another good month for chasing DX and lots of the reports received here this month indicate that the Stateside group has been increased by a flock of new calls. One of the new ones reporting some fine DX contacts is W7UKH, Bud, of Pocatello, Idaho. So far Bud has worked all continents but Africa on RTTY with 100 watts input!! This should encourage some of you low power lads who may have been passing up the DX fun. W7UKH says he is going to stick to the low power until he makes his WAC. The twenty meter band has been very spotty out here on the Coast during the midday hours but has been opening up for DX around 0100 GMT and often remains open for eight or nine hours. Europe still comes thru from about 1500 until around 1800 GMT on many days. Speaking of Europe — several new Italian stations have been showing up with fine signals and are no doubt of the result of the pioneering efforts of Bruno, I1RIF, in that country. Two new ones logged here this month were I1BNO and I1ZZG — both operating around 14,090 Kcs. I1ZZG worked K3GIF for his very first RTTY contact on June 9th about 0100. A number of DL's continue to be on quite regularly — the most frequently heard were DL4IA and DL3IR. No word this month from the Swiss group and a few contacts were reported from the UK typers but activity there has apparently dropped off from the high peak it showed a few months back.

Ed, K3GIF, reports working ET3USA and says the QTH is the same as ET2US, who kicked up so much DX dust a few months ago. 5A2TC seems quite active and shows up with fair readability here on the West Coast about 2300 GMT on week-ends. Still nothing to report from South Africa except that Henry, ZS1FD, has been on an extended business trip through Europe and should be back on the band by the time this column is in print. A Michigan station reports printing EL5B on 14,110 with fairly good copy thru heavy phone QRM. No further confirmation on this one.

Byron, W2JTP, of CQ Magazine forwarded a letter from a group of Argentinian hams seeking some skeds on RTTY from the Stateside gang. Those listed in the letter were LU1AA, LU3BAC, LU9KA and LU5AZ. Before any arrangements could be made for the skeds LU1AA turned up on the twenty meter band and made what he said was the first official RTTY contact between the USA and Argentina with K6QGR. Thanks to an "assist" from the listening post at W6AEE, I managed the second QSO with LU1AA and was rewarded by an airmail QSL confirmation two days later! LU1AA, Horacio, has a beautiful FSK signal and should make a new country for many of the W gang in the next few months. Until further notice this group will be looking for RTTY contacts on 15 meters from 2200 to 2300 and on twenty meters from 2300 until the band folds up. They are also active on 7040 Kcs. according to their letter.

The "down under" gang are still holding up in fine shape. Eric, VK3KF, shows up every week-end with tremendous signals and Bruce, ZL1WB, continues to come thru consistently starting about 0500 GMT. Bruce doesn't usually get home from work until this hour so if any of you are in the shack at that time try putting on a tape and letting him know you are around. The chances are—you will be rewarded with a fine "landline" QSO. Bruce's only complaint is that not enough of the gang are listening at that time of the night. Al, W6UGA, is trying to locate a model 15 printer for VK4RQ at a reasonable price. Al has generously offered to handle the crating and shipping. If any of you can help with this worthwhile project please contact W6UGA in Riverside.

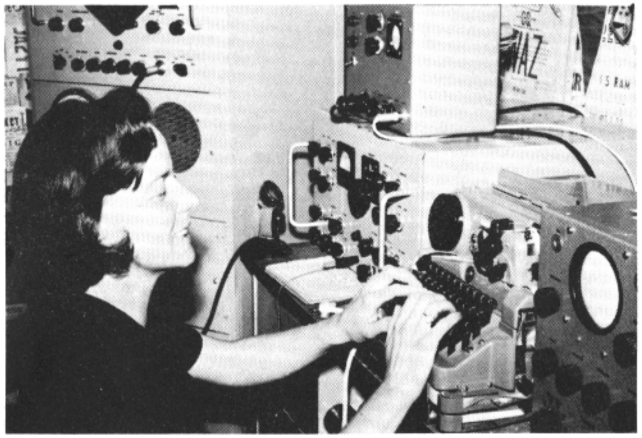
Cas, HL9KK, writes that he has been moved again and is temporarily off the air but expects to be back on by the middle of the month. He included some fine fotos of himself in a "delayed free fall" over the rice paddies of Korea. Will try to get the Editor in Chief to let you have a look-see if the space is available. Actually, these fotos are very unique QSL confirmations of the RTTY contacts we had with Cas last April and are real collector's items.

Well, enough of this non-sense for this trip. Thanks to the following for their contribs: W8CJ, W7UKH, W0AJL, K3GIF, W2JTP, DL3IR, LU3BAC, W6UGA, and W6AEE. How about putting your call on this list next month? This is your column — help, help!

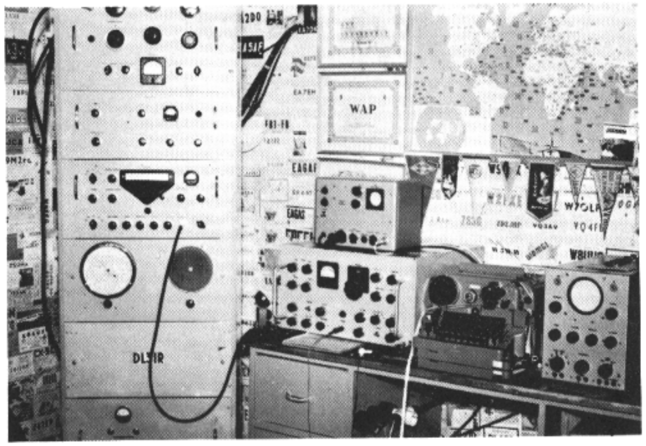
73

Bud, W6CG

K6IBE WITH THE LIMITERLESS, TWO TONE TU, IN OPERATION.



DL3IRS XYL, MUNICH.



DL3IR, MUNICH

K6OWQ'S SAYS, "TRACKING TO THE OPENING POINT TO GET OUT OF THE RICE PADDIES DE HL9KK"

W6CG'S SAYS, "I REALLY HAD TO MOVE OUT ON THIS ONE."

FOR SALE: Two new and complete CV-89 scope monitor assemblies with 2BP1 tube and controls, $15.00 each. Four of same as above, less 1Z2 tube, $13.75 each. W3LST, 228 Plummer Street, Oil City, Pa.

FOR SALE: One Model 15 with table, good condition. One Model 14 typing reperf. Needs work, most parts included. One Model 15 typing unit, needs work, all parts included. One Model 19 keyboard. Needs work, all parts included. Several type baskets for Model 15. One set of tone filters UTC-Model TGR 2125 and TGR 2975. $150.00 for lot. Andrew Gross, Jr., 1134 Coronado Way, Livermore, California.

FOR SALE: Model 14 TD, $50.00. Model 14 Receiving reperf, sync motor, 60 wpm, cover, reel, keyboard base, $75.00. Model 19 keyboard, $40.00. Model 15 printer, $100.00. Model 14 strip printer cover reel & base, $40.00. R. Miller, 6982 Walling Lane, Dallas, Texas.

SELL: Brand new Model 15 to the highest bidder. This is new—never been used. Also for sale—two CV89A's with comparator, $500.00. Also one model 14 typing reperf with kybd, cover, sync motor, holding type magnets, $120.00. Also sell two Kleinschmidt TTRA/TG, with covers, good condition, $175.00 each. W4AIS, 7 Artillery Road, Taylors, South Carolina.

WANTED: VFO modified for FSK TTY shifter use on amateur bands as well as MARS. Also want mobile and base 2 or 6 meter FM units. K4FPW, 1935 Strathmoor Blvd., Louisville 5, Ky.

WANTED: January and July 1962 issues of RTTY. Also model 14 transmitter distributor or better. K2MTW, 230 Westminster Avenue, Buffalo 15, New York.

FOR SALE: Model 14 reperf with kybd., cover, sync motor, 60 wpm gears, $130.00. 75 wpm gears available. Model 14 receiver only typing reperf, $100.00. Model 15, sync motor, $150.00. Model 28 KSR, $400.00. Model 28 reperf with gearbox, $175.00. Many spares available for above units, guaranteed, in perfect condition. WV6VVP, 1920 Downey Place, El Cerrito, Calif.

FOR SALE: Teletype parts, order by Teletype number. RA87, $9.00. FGC-1, $75.00. 11/16" tape, $8.00 per case. Single copy paper, $12.00. Reperfs, $39.00. 88 mhy toroids, $1.00 each, five for $4.00. FOB. K5KTX, 7031 Burkett, Houston 21, Texas.

WANTED: Jan., Feb., Oct., Nov. and Dec. 1961 copies of RTTY. Norman McCourt, 6014 Doweing Avenue, Berkeley 34, Missouri.