

Revised W6OWP Radio-Teletype Converter

The circuit on pages 8 and 9 overcomes the two most frequent objections to the single-filter converter described in "RTTY" for February, 1954. These objections are (1) high input signal requirements and (2) no visual means of accurate tuning.

In the original circuit, an FL-8 range filter was used. By substituting a high-Q resonant circuit, gain rather than loss in the filter element is realized and use of a more effective limiting "front end" is made possible.

A 6E5 "tuning eye" is wired into the discriminator. The "eye" closes when a signal is tuned to the frequency of the filter. This converter works on the 'space' function the same as did the previous model. Noise reduction quality of FSK is achieved through the limiter "clamp" action on the "mark" signal. Shift range from 200 cycles to any maximum is accepted without serious deterioration of performance. For receiving make-break (spacing function), or when "mark" function is attenuated during selective fades, delay bias in the discriminator acts to hold operating threshold at the average level of the keying signal during inter-keying intervals.

Normal headphone level is adequate input. Gain is adjusted to the point necessary to overcome fading. The compound limiter will maintain a substantially constant level to the discriminator over a wide range of input signal variation.

If the circuit values specified are followed closely, only three adjustments are necessary to place the unit

in operation.

1. Adjust R2 for the correct printer magnet current (usually 30 ma.).
2. Connect converter input to receive and tune in a steady carrier. Set R1 so its variable element is at ground potential and adjust B.F.O. to maintain the eye in closed position. Correct setting of R1 is when the eye barely closes, with no visible overlap, when the incoming signal is tuned to the resonant frequency of the filter. The above procedure establishes this setting.
3. Connect a milliammeter in the circuit to the printer and tune in a steady signal for eye closure as above. Place send-receive switch in "Recv" position. Current in the printer loop should drop noticeably but will not be completely cut off. Selectively try different values of capacity at C and use the minimum value which will reduce current to zero.

Tuning FSK Signals: The receiver B.F.O. should be set at zero with receiver I.F. An FSK signal is then tuned in using the band spread dial until it is centered on the I.F. as indicated by an audible best which will be the means of the total shift (normally 425 cycles). Now, if the B.F.O. control is rotated to either right or left, two points where the converter "eye" closes with keying will be found. The correct one . . . in either direction . . . is the one where the printer will copy, indicating tuning of the space function. Since all amateur RTTY and most commercial

(Continued on Page 4)

DOCKET NO. 11501

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington 25, D.C.

FCC 56-113

28037

DOCKET NO. 11501

In the Matter of
Amendment of Section 12.107 of Part 12,
Rules Governing Amateur Radio Service,
concerning radio teleprinter transmissions.

ORDER

At a session of the Federal Communications Commission held in its offices in Washington D.C., on the 8th day of February, 1956;

The Commission having considered its Notice of Proposed Rule Making in the above-entitled matter which it was proposed to amend Sections 12.107(c) and 12.107(d) of Part 12 of the Commission's Rules to remove the present lower limit of 800 cycles on the frequency shift used for amateur radio teleprinter transmissions; and

IT APPEARING, That in accordance with the requirements of Section 4(a) of the Administrative Procedure Act, the above-mentioned Notice of Proposed Rule Making was duly published in the Federal Register on September 28, 1955 (20 FR 7230) and that the time provided therein for the submission of written comments by interested parties has now expired; and

IT FURTHER APPEARING, That all comments received in response to the above-mentioned Notice of Proposed Rule Making were in favor of the proposed amendment and the majority expressed the opinion that: (1) experimentation in teleprinter techniques would be encouraged; (2) more reliable teleprinter communication would result; and (3) interference to other modes of amateur communications would be reduced; and

IT FURTHER APPEARING, That it is in the public interest to encourage the advancement of the amateur's skill in the communication and technical phases of the radio art by making available for amateur radio teleprinter operation frequency shifts below the present lower limit of 800 cycles as provided by the proposed amendment;

IT IS ORDERED, That under authority contained in Sections 4(i) and 303(e), (g) and (r) of the Communications Act of 1934, as amended, that effective March 16, 1956, Sections 12.107(c) and 12.107(d) of Part 12 of the Commission's Rules are amended as set forth in the attached Appendix.

FEDERAL COMMUNICATIONS COMMISSION
Mary Jane Morris
Secretary

Attachment: Appendix

SECTION 12.107 OF PART 12, RULES GOVERNING AMATEUR RADIO SERVICE, IS AMENDED AS FOLLOWS:

12.107(c) When frequency shift keying (type F-1 emission) is utilized, the deviation in frequency from the mark signal to space signal, or from the space signal to the mark signal, shall be less than 900 cycles per second.

12.107(d) When audio frequency shift keying (type A-2 or type F-2 emission) is utilized, the highest fundamental modulating audio frequency shall not exceed 3000 cycles per second, and the difference between the modulating audio frequency for the mark signal and that for the space signal shall be less than 900 cycles per second.

W6OWP Converter

(Continued from Page 2)

RTTY use a standard of shifting lower on "space" a little practice will fix correct procedure firmly in minds since tuning for these signal will always be done the same way.

Filter note. An 80 mh. telephone load coil toriod (KL7CK suggestion) tuned with a .1 paper condenser is the filter used in the "working model" of the circuit described. The resonant frequency is about 1800 cycles. If the converter were to be used for AFSK as well as FSK, the filter should be tuned to the standard AFSK "space" tone of 2975 cycles. A commercial toroid, such as the readily-available U.T.C. HQA series in the range from 80 to 200 mh. and tuned from 1500 to 3000 cycles should be equally satisfactory.

Bart — W6OWP

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and is published for the benefit of all
RTTY Amateurs and Experimenters
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For Traffic Net Information:
W6FLW W6IZJ

For "RTTY" Information:
W6CL W6DEO W6AEE

VE7KX, Lulu Island, B.C.

James T. Hepburn

Am enclosing a couple of fotos of the layout here but they are not very good ones. I never have any luck trying to take equipment pix with a flashgun and will have to repair my old shutterbox and take some full sized time shots when the chance comes up. Lot of gear in a small room makes it hard to get decent short of layout, mebbe when the weather gets better and can shoot in thru the windows will get a better picture of the equipment. The transmitter is a Wilcox 96A. I should say there are two 96AS. They are the tall narrow units. The near one in the foto is on eighty and the far one is on forty. The larger center cabinet originally was a Wilcox 96-200 long wave RF section but have stripped it out and contains now the power supplies in the bottom and the twenty meter RF section on the top shelf. The rack in the other foto has four power supplies including bias supply for VFO BC-348 BC-221, etc., then the dial panel for controlling the transmitter frequencies and functions, then the VFO A W6OWP job using the components out of a command set for the variable OSC FSK by a 6C4 as per Aug. 53 QST. Next up is the meter strip measuring line voltage—whole station except the NC300 is on 220 volts—three power supply voltages and last meter is switched for VFO plate currents. Above the meters is the electronic bug,

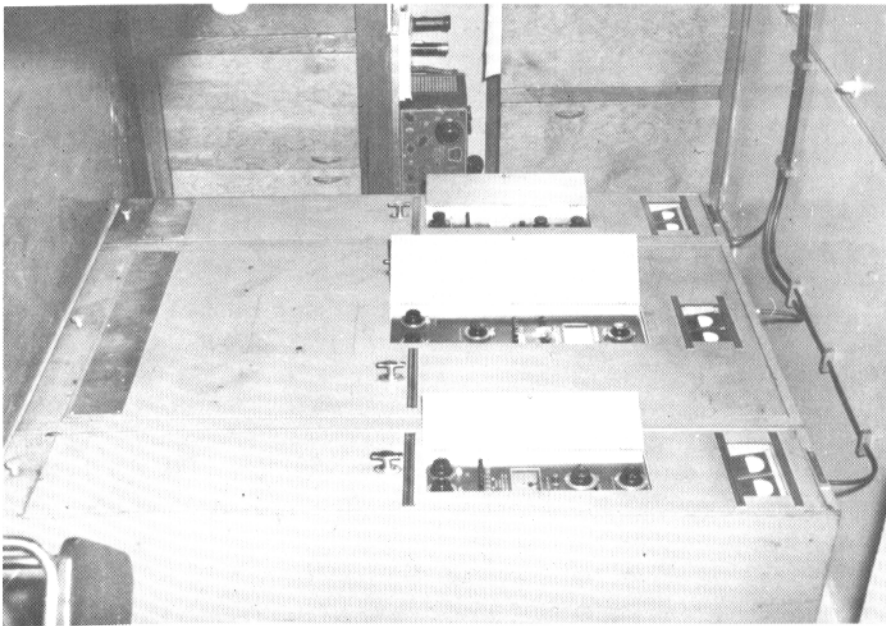
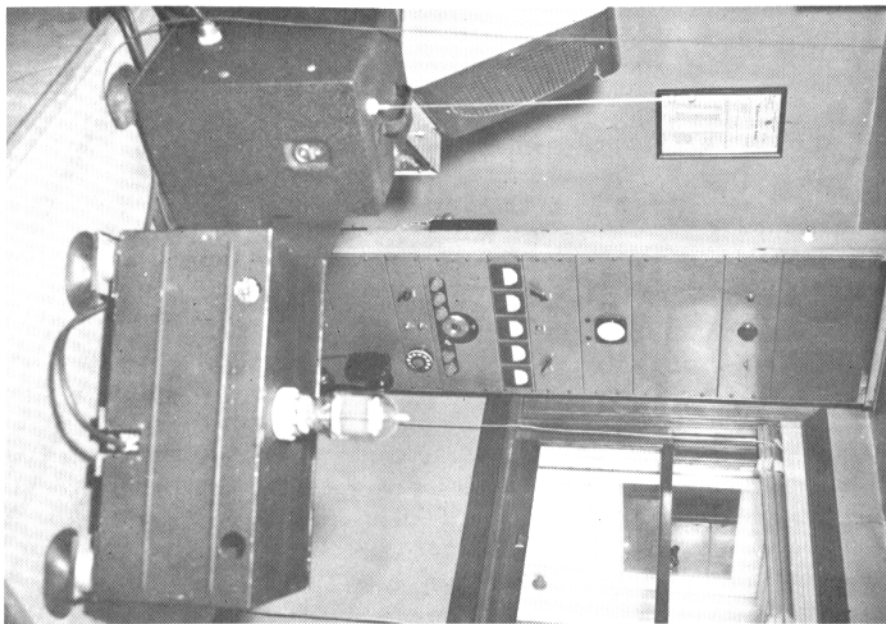
W6DPU version, then comes the T.U. with scope showinfi. It is now a revised gates as per July 55 RTTY using the W6SCQ filters ahead of the clipper tubes. Above the TU are three fixed tune receivers on our airline frequencies with their speakers at the top of the rack, but they are coming out as I have a W9TCJ electronic tape distributor on the way. The foto of the house shows two of the antenna poles and the two feeder line poles. There are three more antenna poles further back, also a little chic sale shack with antenna tuners in it. The feed lines come out just above the little window in the right bottom corner of the main house. Three grouped windows in the garage are over the workbench in the spare garage section.

Incidentally we are licensed for narrow shift. Our licence reads: "FSK not to exceed 900 cycles", so Don and I are all set if and when you fellas get it. There are two more RTTY stations on the way, VE7DZ in Victoria and VE7FM here in Vancouver. Have machines and are currently building transmitters but don't know how active they will be. They are both located downtown and have antenna problems.

—VE7KY

K

VE7KX

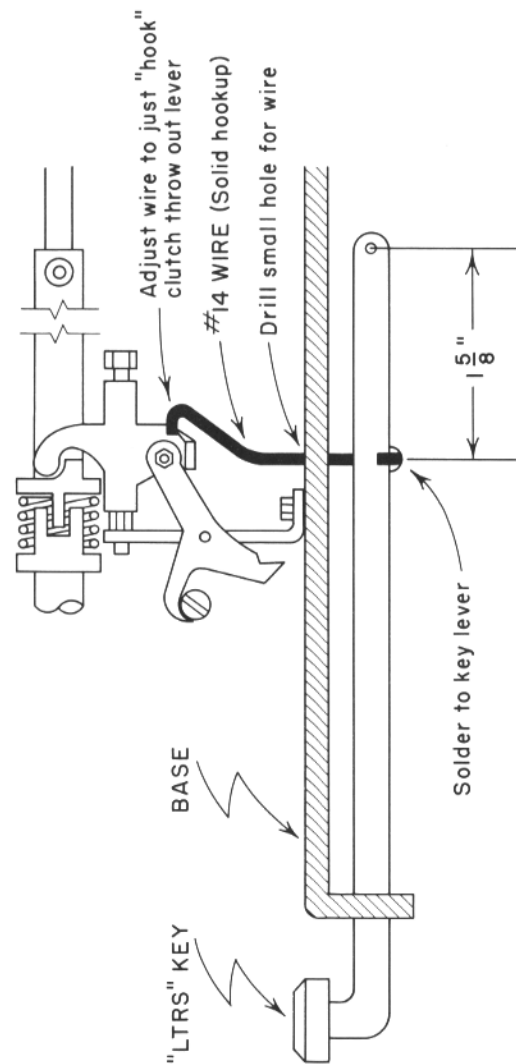


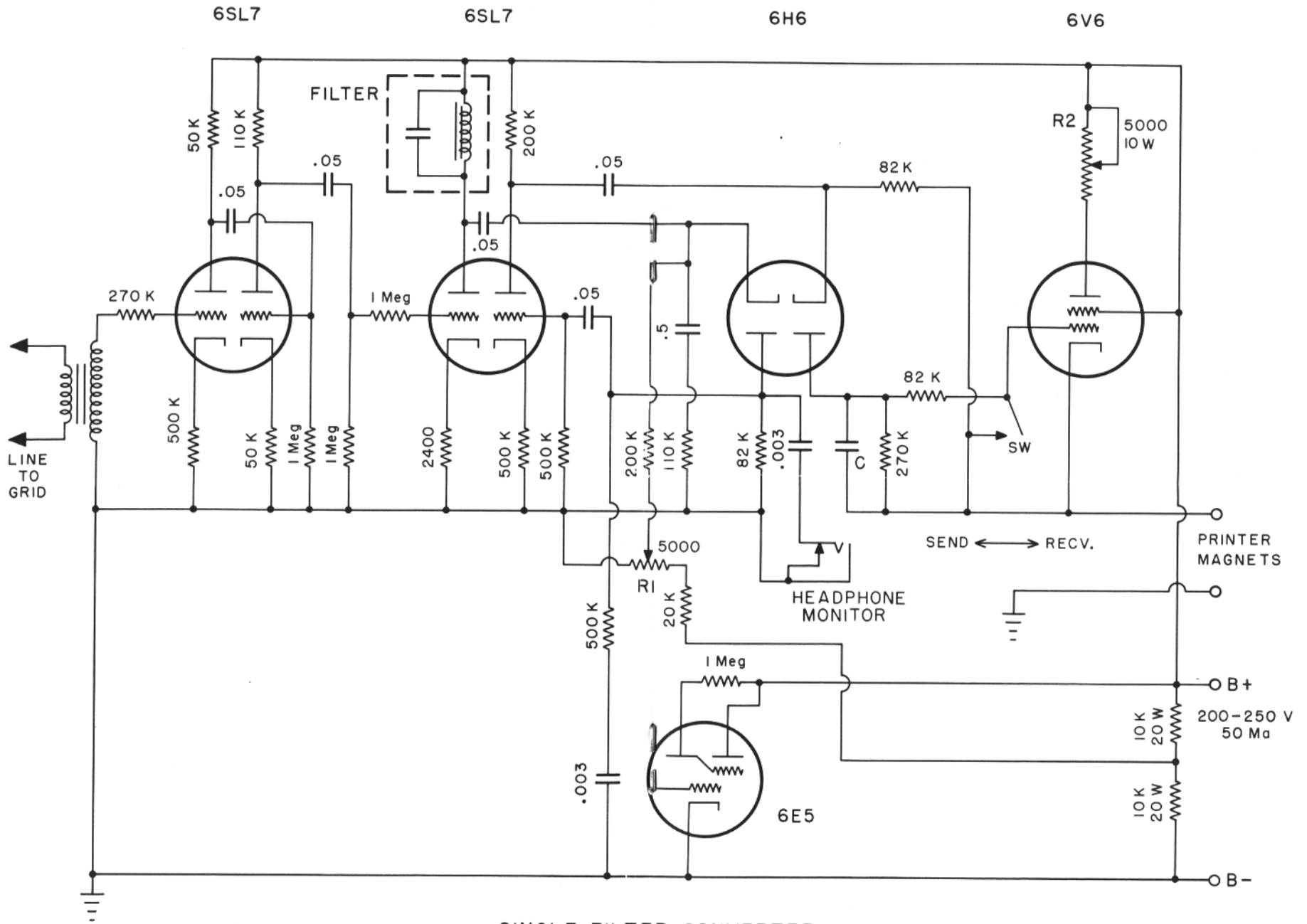
Modification of Model 26 Keyboard for Repeated Letter Function

Phil Catona, W2JAV, Hammonton, N.J.

I was needed into making up a change on the Keyboard of the Printer to provide continuous transmission of LTRS when the Ltrs key is held down.

W2BDI and W2PBG think that it is nice to have. Use it while stalling for time. I think it has other more useful purposes. 73 Phil.





SINGLE FILTER CONVERTER

The W4TJU Terminal Unit on Narrow Shift

J. Doug Wells, W3EKA, es W4TJU, Pittsburgh, Pa.

The W4TJU terminal unit originally described in April 1955 RTTY was designed to operate on the standard 850 cps shift. However, since it is a discriminator type unit, it will operate on shifts of less than that with the lower limit determined by the sensitivity of the keyer circuits. Actually, the unit will work down to shifts as low as 120 cps as shown, although operation there is marginal. It is relatively simple to convert this unit, or any of a similar type, to narrow shift operation. This is not necessarily so with the brute force filter type, since filter skirt selectivity becomes quite a problem at small shifts, and it is usually necessary to go to lower frequencies for the tuned circuits (or what have you).

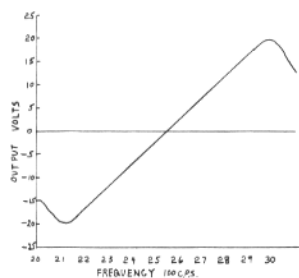


Fig. 1

The original tuning characteristic of the discriminator in the W4TJU terminal unit is given approximately by Fig. 1. This is the output voltage of the discriminator plotted against input frequency. About 5 volts change is actually sufficient to operate the keyer stages and from the curve it can be seen that this corresponds to a shift of about 100 cps. It would be better if the 100 cps shift corresponded to 15 or 20 volts change to allow for tuning error

and other factors which might result in marginal operation. There are two possible ways to modify the circuit and get the desired results. (1) put more voltage on the discriminator input (this is a losing game with the coils shown since as fast as one diode's output is increased, the other diode's output knocks some of it off) and (2) retune the tuned circuits. More needs to be said about the latter.

The coils used in the W4TJU converter were relatively low-Q TV coils (Merit MWC-3), and their low-Q results in individual diode outputs that look like Fig. 2. Since these curves overlap, the voltages subtract when combined and fed to the keyer stages, and you may expect that as the two peaks are moved closer together, the curve of Fig. 1 might get smaller before it got steep enough. That is, before the two circuits could be tuned 170 cps apart, the voltage outputs might be so nearly the same, you would not have

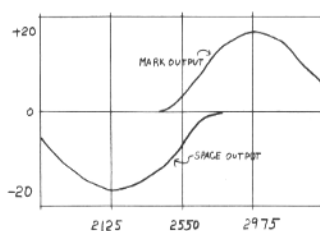


Fig. 2

gained in the change-of-voltage versus frequency characteristic. This will depend on the individual TU and might be tried first.

A surer way is to use the same cir-
(Continued on Page 15)

SECOND ANNUAL MARCH NEW YORK RTTY DINNER

The second annual New York March dinner for amateur radioteletype operators was held in Healy's Steak House, Monday evening, 19 March, 1956. Thirty-eight amateurs from various states attended.

Byron Kretzman, W2JTP acted as master of ceremonies. He called on various amateurs for reports of activities in the different parts of the country.

Merrill Swan W6AEE on surveys of the 40 meter frequency made by Frank White, Boyd Phelps, and others. General conclusion is that the present frequency of 7140 is no good in most parts of the country, altho it is usable in the west; where they can work between the strong interfering stations on 7183 and 7142. Merrill suggested a new frequency near 7100. The 80 meter frequency, 3620, is quite satisfactory. There are only a few CW stations near 3620, and commercial RTTY stations on 3118 and 3127. For 160 meters, which is open presently only for voice, the Coast Guard (in charge of LORAN) indicates that they see no technical objections to FSK. If there is sufficient demand, 160 meters should be opened to FSK and be very useful for local RTTY circuits. On narrow shift, which was recently available, no definite standard of shift has been set as yet, altho 170 cycles shift has been suggested. The west coast 2 meter stations use vertical polarization.

Southern California has about 150 amateur stations on 2 meter radioteletype. Thirty to forty stations check into the Tuesday night net. The frequency of 157.850 is exclusively radioteletype, and some operation is on 146.7, 147.71, and 147.750. It is noted that Chicago and Detroit also have active 2 meter radioteletype nets.

BOSTON: Jack Berman W1BGW reports that W1WB, W1NTL, W1WEW, and W1AFN are active on 2 meters. Some are equipped for autostart operation which has proved satisfactory. Stations are active on 80 and 40 meters.

CHICAGO: W9BGC seconds the comments by Merrill Swan. Also, a good frequency should be found for 20 meters. The Chicago area 2 meter net is on FM. Vertical polarization has been found very satisfactory in Chicago. The 80 meter net on 3624 kc meets at 1600 SCT. Sundays. W9TCJ is the able NCS, and W9BGC is alternate NCS of this Midwest RTNET. W1FGL, W1MX, and W1WEW are some of the distant stations checking into the net. Stations from all over the United States are invited to check into the Midwest net. The RTTY gathering at the October

(Continued on Page 14)



By golly I got busy this P.M. and didn't get to write Merrill but have a note on top pile one on my desk to write him and will do so first thing in the A.M. and get it out air mail . . . I am also going to ask him if there is anything new in TU circuits that would be less complicated and expensive for the boy and if so to send us the spec and if not to send us about a dozen extra copies of the Gates TU circuit as your and mine will be completely worn out and motheaten by the time it gets around to a couple more guys with hot soldering irons who aren't any more careful than you are. You bum . . .

W0WRO DE W0JRQ

RYRYRYRYRYRYRYRY

Well I think that Ray is shipping quite a few of the 26S out of town. He set the deal up just like we did here. Allied Van Lines is storing the machines and shippes and crates per orders. This is the second lot of 26 that we have purchased in the Chicago area. Both were over forty machines. Denver is getting some too. Placed about ten so far. ES some in north Texas too. And other parts of the country. Telephone Company has been most kind to RTTY, Inc. Hi

Well I can copy any shift with one of the three TU S here. But like you wonder how many of the gang can, of course, we do not have to leave 850 CPS shift yet. BU we can find our way, slowly. So as to not make to many mistakes! Hi. But we now have a chance to do some real work. Worked Bart a few times lately. In fact yesterday, he

was in trobles, his shift when sending mark or space only was FB, and was ABT 1700 CPS when keying it from the printer. Solid copy, but oh boy! ! !

Stan W6UPY ALIAS W7LUK was on yesterday too for first time in a long while. Yes, I have a very soft spot in my heart for my ole 12 which is still in use at a near by station. Doing OK on two metre' We are having our BI Monthly RTTY meeting with the RIO HONDO Club in Whitties this coming week end. Saturday at 7:30 W6DOU DE W6AEE AR K K

RYRYRYRYRYRYRYRY

Noticed in the last RTTY that someone was proposing that we change the RTTY net frequencies I am all for it. The ones we are using are strictly for the birds. Have been checking the bands and notice that there is a nice quiet spot between 3520 and 3530 KCS that 7120 seems to be clear and that we should move down below 14100 as the Latin phones seem to occupy the band above that frequency. The present RTTY frequency of 14140 is useless here as the Canadian phone band starts at 14150 and there are several high power locals right on the edge that really splatter across the RTTY frequency. Was going to suggest a spot down in no-mans-land between 14300 and 14350 but that is also licensed for phone up

here and illegal for RTTY in Canada also a few Latin phones in there too. So would suggest 14090.

Had quite a blow up on our twenty meter QSO we were having a snow-storm here Saturday morning and it was sticking on my feeders and freezing to about an inch thick. Was detuning the feeders so badly that I had to increase the coupling up to maximum to load up the final with the result that the soldered taps melted off the antenna coil and the rubber covered tap wires caught fire and smoked up the shack. Before I could shut her down the coax fitting on the transmitter end of the link coil shorted and also burned up had to madly search thru the junk box for another 81-ISP fitting and jury rig the forty meter ZXX antenna tuner onto twenty to get back on the air and still haven't got all the damage repaired yet. But the worst is yet to come the YF hasn't noticed the smudge and blistered paint on the ceiling yet. 73-VE7KX.

RYRYRYRYRYRYRYRY

For the "news" column of RTTY.

Have been hearing a lot of talk about a 20 meter Frog. For RTTY. Most of the frequencies mentioned are in the low edge of the band in the ORM.

Have you tried the high and around 14.330? Here in terms it is relative clear and have had some FB QSO's there.

Buck W5TJE

RYRYRYRYRYRYRYRY

ARMED FORCES RTTY RECEIVING COMPETITION

Mark your calendar for May 19, Armed Forces Day, 1956. Let's all make a special effort this year to raise our score. In 1954 91 copied the RTTY broadcast. But in 1955 the score dropped to 52. See page 10, ARTS bulletin 39 for the 1955 list.

The Armed Forces Day radioteletype-writer receiving competition will feature a special joint message from the Chief Signal Officer (USA), The Director, Naval Communications (USN), and the Director of Communications (USAF).

A letter of acknowledgment will be sent to each amateur participant who submits a copy made from the radioteletypewriter transmission of this message. Transmission will be at 60 wpm on the following schedules:

1300EST	AIR	7915 kc
	NDC	7375 kc
1300 CST	A4USA	5760 kc
	NDS	7375 kc
1300 MTS	A5USA	14405 kc
	NDFW and NDW2	7375 kc
1300 PST	AF6AIR	14405 kc
	NDW	7375

Each transmission will commence with a period of ten minutes of a test and station identification to permit amateurs to adjust their equipment. At the end of the test period, the message will be transmitted. The message should be submitted "as received" to:

Armed Forces Day Contest
Room BE-1000
The Pentagon
Washing 25, D C

Time and call signal of station copied and name and call sign of amateur receiving the transmission should be included.

New York Dinner

(Continued from Page 11)

Electronics Conference in Chicago (55 present) was well received. Anyone interested in another RTTY gathering next October please indicate so to W9BGC early enough so that plans may be made.

NEW YORK: Wayne Green W2NSD reports on his testing of a SSB rig. He shouted CQ and found himself in the middle of a 3000-way (?) round table on 75 meters. California was working easily. ZL3AR was worked easily on 20 meters. Possibility of using SSB rigs for XFSK was mentioned by just plugging in the AFSK tones.

WEST HARTFORD: F. E. Handy W1BDI reported that the ARRL will surely ask FCC for FSK on 160 meters if enough requests are made and suggested that those interested, write their Directors. Ed reported that W1AW and W1BDI are on RTTY in West Hartford, and W1MBP in New London.

Ed has been doing some fast traffic handling by taking messages on 80-meter CW and delivering on 2-meter RTTY. We should make full use of the versatility of RTTY. It is a very accurate and fast method of handling traffic. For good public relations for RTTY, some RTTY stations should be active in CD, RACES, etc. Three RTTY nets are now registered with the ARRL and will be printed in the May QST directory: The California 2-meter net, the Midwest, and the Eastern net. Stations should QNZ closer (zerobeat) for better nets. Ed sends ARRL bulletins, CIBL propagation predictions, etc. If no one uses the propagation predictions, at least they are good to test printers. If the machine falls apart during a

long tape, the machine fails the test! W1BGW is the able NCS for East Coast net.

W9BGC further notes that only in RTTY activity are amateurs ahead of commercial practice in the radio field. Altho amateurs pioneered many radio developments, lately they have been coasting on their reputation. Now RTTY puts the amateur ahead in one field, for the first time in 20 years.

W1BGW Jack Berman: W9TCJ is now OBS and does good broadcast service. We should take advantage of the large-traffic capabilities of RTTY. Original data, experimental results, etc. could be transmitted for amateurs to draw their own conclusions. Published data is boiled down and predigested so that the original engineering thoughts are lost.

W2PBG Bob Straub: We should move from 7140 to 7105 or 7110. 7140 is no good.

W6AEE Merrill Swan stated that the February anniversary SS contests are held on the weekend nearest 20 Feb. each year. Some RTTY Bulletins have been late due to troubles with typesetting. But should be running current shortly.

Last year 26 attended the New York dinner. This year 38 is a good increase. Next year let's see a 40% increase in attendance.

W3CRO and W2JAV gave an excellent technical talk on RANGING, exhibiting parts of the 26 printer to illustrate their talk. For lubrication, use only detergent-free oil, about #20 SAE. Otherwise, the german-silver

springs will turn green. Esso-Lube oil was suggested. For testing, NAM and NSS send some good RY signals when they have no other traffic.

Attendance:

W1AFN—Tom
W1BDI—Ed
W1BGW—Jack
W1EVZ—Jim
W1FGL—Morris
W1FZJ—
W1RBF—Ken
W1WEW—Ronney
W1WB—Blackie
W2AKE—Andy
W2AVI—Bill
W2BDI—Ed
W2EBZ—Clay
K2CSC—
W2GHH—Ken
W2JTP—Byron
W2JAV—Phil
W2KXT—Frank

W2LLR—
W2MIB—Doc
W2PBG—Bob
W2QGH—
W2NSD—Wayne
W2QYG—
W2TBD—Ted
W2TKO—Roy
W2OOG—
W2RMB—
W2PTD—Charlie
W2ZKV—
Rudy Coupez—
W3CRO—Roy
W3FMC—Fred
W3MHD—Fred
W5UHV—Ed
W6AEE—Merrill
W6DRL—Art
W9BGC—Joe
W9NOE—Dean
W9TPU—

W4JUV JV

(Continued from Page 10)

cuit with higher-Q coils. Since practically everybody is specifying toroids for their unit, or some other relatively high-Q coil, this should not be so bad. If the tuned circuits have a higher-Q and are tuned closer together, there will be less overlapping of the two curves and the characteristic should be easy to get. It may be possible to tune the circuits half-way between wide and narrow shift and operate on anything between 850 and the lower limit of the characteristic. This would be somewhat removed from the ideal, since

then neither of the standard cases (wide or narrow) would be the optimum tuning condition. It would be much better to use a switch to change the tuned circuit resonant frequencies for the desired shift.

Sorry I cannot give you any numbers on these proposals, but the recent conversion to W3EKA for me knocked out all my RTTY equipment and it is not available for experimenting at present. I hope these thoughts will be of some use to some of the gang in narrow-shift work.