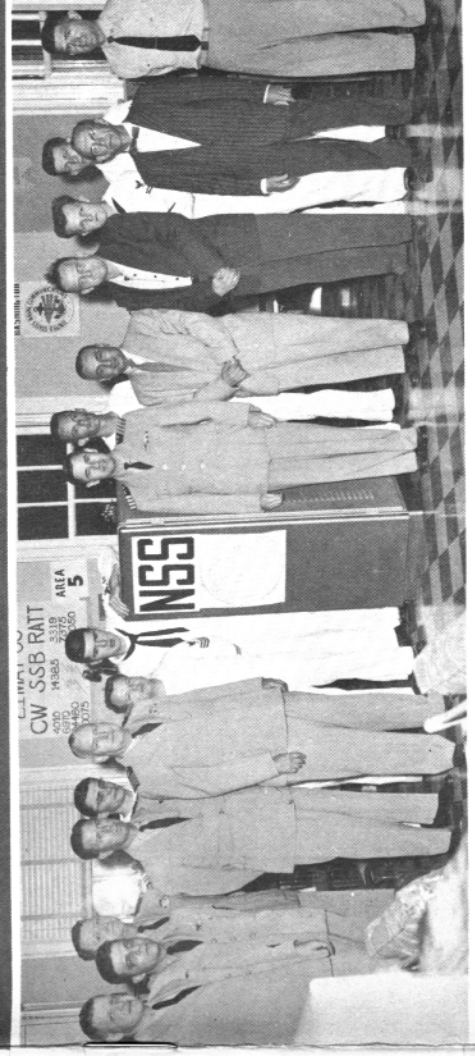
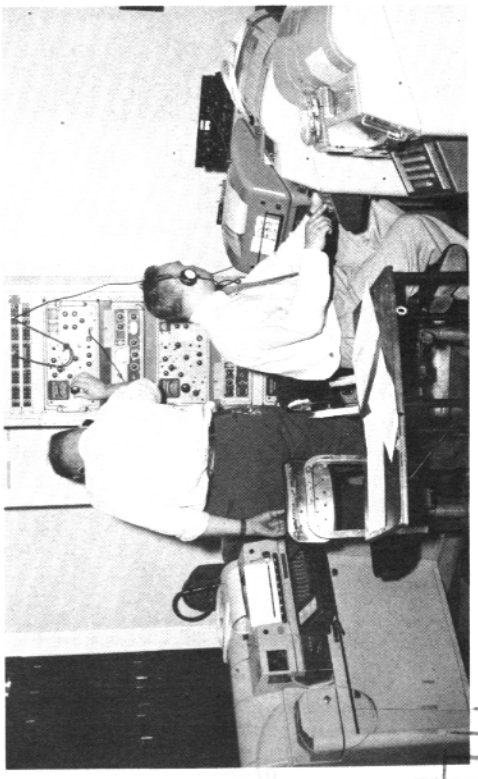
# RTTY

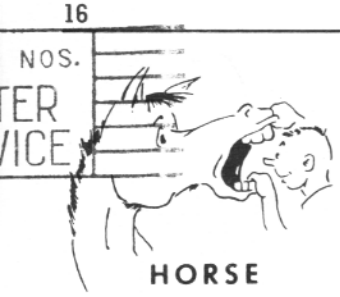


NEWS OF AMATEUR RTTY

OCTOBER, 1960
25 Cents
VOL. 8, NO. 10






## 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.

**FOR SALE:** Model 26 & table, W6AEE TU, carton paper $80 ..... W6SQM
**FOR SALE:** Model 14 typing reperf, TD, TT power supply, Loading coils, RTTY complete ... W4NYF
**FOR SALE OR TRADE:** Model 2A perf, for 2.1 or 3.1 kc Mechanical filter ..... VE6VK
**WANTED:** Good RTTY converter (cash) ..... W3LST
**FOR SALE:** Two model TMC, XFK FSK exciters with manuals, 1 to 7 mc with 2E26 final, also 51J4 receiver ..... K2MLT
**FOR SALE:** Model 12 printer $25.00 ..... W6AWI
**FOR SALE:** New FGC-1 bay, reasonable. Colonel Hugh D. Avery, P. O. Box 587, Fort Huachuca, Arizona ..... W6CD/7
**FOR SALE OR TRADE:** Type CW-51024 Demodulator with tubes (mfg. by W. E.) Model OTC FSK Monitor w/tubes, new condx Automatic Keying unit, mfg Boehme Co.. W3ZYK
**FOR SALE:** TTY TU, W.E. type CF-2-B Model 19, cover and table only Model 15 keyboards Model 14 perforators TTY Distortion Indicator Regenerator Unit Model FRXD-4 Reperf TD ..... KL7AKD
**WANTED:** May, July 1958, Jan. Feb., June 1959 RTTY's ..... WØEPY
**FOR SALE:** Model 15s complete with tables, excellent condx, ..... RTTY, INC.
**FOR SALE:** Model 28 ASR, complete with non typing reperf & TD ..... RTTY, INC.

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# RTTY SWEEPSTAKES CONTEST
## NOVEMBER 4, 5, 1960

The seventh Annual RTTY SS Contest will be held starting Three PM EST on the 4th November and running until Three AM 6th November, EST. This will provide thirty-three hours of operating for those who can stay at the GREEN KEYS that long. We have many new RTTYers this year, and hope they will join with the rest of us in the fun.

Stations will exchange messages consisting of message number, originating stations call, check or RST report of two or three numbers, ARRL Section of the originator, local time (0000-2400 preferred), date and band used. Score one point for a message received and acknowledged by RTTY. Score one point for each message sent and acknowledged by RTTY. For final score, multiply the total message points by the number of different ARRL (see page 6 QST) worked. Two stations may exchange messages again on a different band for added message points, but the section multiplier does not increase when the same section is worked on another band. Each foreign country counted by ARRL for DXCC credit is treated as a new section for multiplier credit. Logs should be mailed to RTTY, INC., 372 Warren Way, Arcadia, California.

In order to be scored, contest entries should be received by RTTY not later than November 15th, 1960. Certificates will be mailed to the top ten scorers in the contest. Best of luck and see you in the contest.

CONTEST PERIOD

| Time | Start | End |
|---|---|---|
| EST | 1800 - 4th | 0300 - 6th |
| CST | 1700 - 4th | 0200 - 6th |
| MST | 1600 - 4th | 0100 - 6th |
| PST | 1500 - 4th | 0000 - 6th |
| HST | 1300 - 4th | 2200 - 5th |
| GMT | 2300 - 4th | 0800 - 6th |

RTTY would appreciate any comments regarding this contest, and if you wish, include them with your contest entry.

—0—

The officers of the CATS cordially invite all RTTY'ERS to attend the sixth annual "CHI-RTTY" meeting to be held on Sunday, 9 October 1960. The afternoon technical session will again be held in the plant cafeteria of The Hallicrafters Co., 1000 S. Kostner Ave., Chicago. The cafeteria will be open from 10:30 for rag-chewing, renewing old acquaintances and first eyeball QSO's with the button pusher on the other end of the circuit.

The afternoon session will feature equipment displays, short talks on items of interest to all RTTY'ERS and a question and answer period. Leading RTTY amateurs, including Byron Kretzman, KØWMR, RTTY editor of CQ magazine are expected to be present.

As usual, there will be no registration, admission or other charges at the afternoon session. The only cost to the individual will be for his own food. Coffee and sandwiches will be available in the cafeteria for lunch. An evening dinner meeting will be held following the afternoon session.

Once again, some lucky individual will walk away with a Teletype Model Twenty-eight to be awarded as the dinner prize. There will be other door prizes at the afternoon session, but attendance at the dinner meeting is necessary for a chance at the "28."

Dinner tickets, at $4.50 each, are available from:

George M. Boyd, W9SPT
c/o The Hallicrafters Company
4401 West Fifth Avenue
Chicago 24, Illinois

Advance dinner reservations are requested as attendance at the dinner is limited to 75 persons. No reservation or notification is required for attendance at the afternoon meeting. Dinner tickets will be held for pickup at the afternoon meeting.

See you at the meeting on 9 October 1960.—73,

Ray, W9GRW
George, W9SPT

—0—



# THE LOOP CONTROL
### or, a Complicated Device to Do a Simple Job

JIM HAYNES, KSKIB-6

In an earlier paper (RTTY, July 1959) the writer extolled the merits of the dc hubbing concept for switching TTY circuits. In this concept the selector magnet keying function is separated from the signal converter function so that switching can be accomplished with dc voltages in the keyer-tube grid circuit. This paper describes the loop control, a piece of equipment designed to connect TTY apparatus to a hubbing switching system.

Standard voltage levels were chosen at 0 volts marking and —40 volts spacing. A 40-volt swing is sufficient to drive practically all of the commonly-used family of keyer tubes from zero-bias to cutoff. Many keyer tube designs require a positive grid voltage to achieve full marking-signal conduction. There are two disadvantages to these designs:

1. Keyer tube grid current flow causes a low impedance to be presented to the hub; the hub must then be able to supply sufficient current into this impedance to maintain the desired voltage at the keyer grid.

2. Secondary means, such as a clamp diode fed from a stiff voltage source, are required to stabilize the marking-signal hub voltage.

These difficulties are avoided with zero-bias operation. It is advisable to design equipment sending into the hub so that a small positive voltage is supplied as a marking signal. Grid limiting in the keyer tube can then be relied upon to produce a satisfactory 0-volt marking signal without the use of an additional clamp.

The —40 volt spacing signal is only a little more than sufficient to produce keyer-tube cutoff. Greater reliability might be obtained with a larger hub-voltage swing and hence a more negative spacing signal. If one wishes to consider transistor designs it is desirable to minimize hub voltage swing, however, since transistors with a collector voltage rating of more than 40 volts are rather difficult to obtain. For this reason the 40-volt hub voltage swing was accepted.

The circuit of Figure 1 is used to produce hub signals from a keyboard or tape reader.

In the writer's system, —120V was the only negative voltage available for generating hub signals. This circuit gives an output of 0 volts with zero impedance marking and —60 volts with 50K series impedance spacing. While the marking signal does not fulfill the reliability requirement of being slightly positive, the zero impedance assures that the marking signal can never be driven negative; thus the marking signal is reliable. The spacing signal comes from a high impedance source, and is therefore made 20 volts more negative than necessary to permit clamping to a stiff —40 volts. Note that some tape readers and keyboards have spacing contacts; in this case both marking and spacing signals can be made stiff and the excess negative voltage is not needed for the spacing signal.

If the circuit of Figure 1 must drive a low impedance load, such as a transmission line, a cathode follower should be used to reduce the source impedance. A suitable cathode follower circuit is shown in Figure 2.

One advantage of the hubbing technique is that it permits all switching connections to be in parallel rather than in series. For this reason, the loop control includes diode logic gates. Figure 3 shows how two keyboards are parallel through the transmitting and gate.

Suppose now that both keyboards are marking. Then a ground is placed on the cathodes of V1 and V2. A ground also exists at the plates of V1 and V2 because of the presence of resistor R. At this point it is immaterial whether V1 and V2 are conducting, as in any case a ground appears on the transmitting hub T.H. Now assume that Kdb 1 goes spacing. This will place —60 volts on the cathode of V1. V1 will then conduct, and if R is large compared to 50K, —60 volts will appear on the TH. at the same time diode V2 is cut off by reverse bias so that the spacing signal on the hub is controlled by Kbd1 in spite of the marking condition of Kbd2. By using diodes in this manner any reasonable number of keyboards and tape readers can be effectively connected in parallel without interference, so long as only one is allowed

to send at a time. Break signals and autostat ringing signals (60 cps reversals) can also be introduced into a hub through diode gates.

Consider now the receiving side of the picture. A lot of good material has been written on the subject of magnet-keyer circuits. The popular practice of connecting the selector magnet in the keyer tube cathode circuit has been shown to be very poor from the standpoint of signal quality. The chief reason for the popularity of this circuit seems to be the fact that it allows one side of the selector magnet to be grounded, thus reducing the probability of insulation breakdown. It is the opinion of the writer that the danger of insulation breakdown from inductive "kicks" is at least as great as that from the B+ voltage; and the back-EMF kicks occur regardless of whether the magnet is grounded. In the loop control, the selector magnet is connected in the keyer tube plate circuit with one end at the B+ voltage. Those who fear the consequences of this connection may resort to an isolated plate supply, as suggested by W4EHU.

Most present-day magnet keyer circuits use beam tetrodes in triode connection. A disadvantage of triode keyers is the very high negative voltage required to achieve cutoff, particularly if the plate supply voltage is poorly regulated. Tetrode connection allows cutoff to be obtained with small bias voltages; but tetrode keyer circuits are notoriously hard to design. At zero bias and 60 ma. plate current, the plate-to-cathode voltage of a tetrode may be quite small. If the screen is supplied from a stiff voltage source the screen dissipation can become quite excessive under these conditions. If the screen is supplied from a high impedance source it is protected, but then it may be difficult to achieve good cutoff, and to achieve full marking current without excessive plate dissipation. The circuit of Figure 4 was designed by trial-and-error, and satisfies the requirements of good cutoff and reasonable dissipation.

In the loop control a diode gate is also used in the receive side, as shown in Figure 5.

It will be seen that here the voltage at the cathodes of V1 and V2 will equal the more positive of the two plate voltages; the diode with the more negative plate voltage will be cut off. Frequently it is desired that a printer or reperforator not respond to hub signals, as when the associated radio receiver is being tuned. Grounding the blind input will place a ground on the keyer grid regardless of the voltage existing on the hub. The printer or reperforator is then "blinded" even though the hub voltage is not disturbed.

Now when the receive hub is connected to the transmit hub, a difficulty arises. This is shown in Figure 6, with keyboards shown schematically by an X.

Because of the presence of the transmit gate, the hub 0 volt marking signal is no longer stiff. As a result the receive gate will pull the hub voltage to −120 V; the keyer then incorrectly sees a space while the keyboard is transmitting a mark. Now if it were known that the number of gates connected to a hub would remain eternally fixed, it would be possible to remedy this situation by connecting a resistor from the hub to a positive voltage source. In a switching system, however, the connection to a hub are continually being changed, so that this technique is not practical.

Another way to overcome the gating difficulty is to stiffen the 0 volt hub signal. This can be done by connecting a cathode follower to either the TH or the RH. A little consideration shows that the RH is the better location. The reason for this is concerned with the transmit gate circuit. Suppose that the transmitting portion of Figure 6 is associated with a single keyboard, and that a similar circuit is connected to a second keyboard. Then by simply connecting the TH leads of the two keyboard circuits together, a multiple-input gate is formed as with Figure 3. If cathode followers were connected in the TH leads, however, this gate would not be formed and the two keyboards would therefore interfere. One might consider connecting a cathode follower between the TH and RH leads of Figure 6. It would then be possible to parallel as many TH leads as desired, and also to parallel as many RH leads as desired, provided that no TH and RH leads were ever interconnected. This method is most economical, since one cathode follower can serve a large number of parallel TH and RH leads. For switching purposes, however, it is rather awkward, since one must hunt up a cathode follower every time a switching connection is made and must be careful not to interconnect TH leads with RH leads. Therefore the most prac-



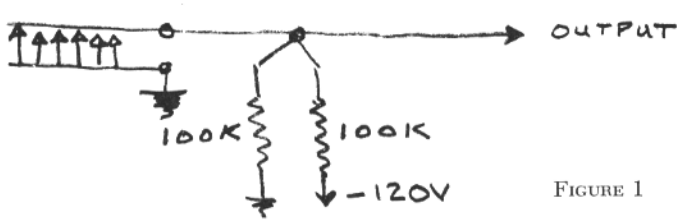


FIGURE 1

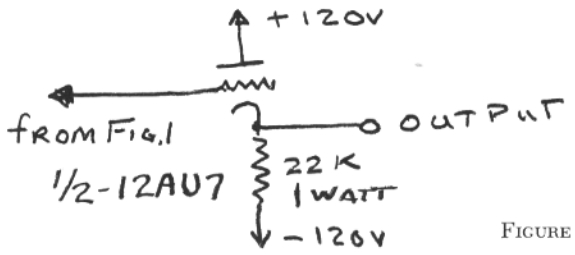


FIGURE 2

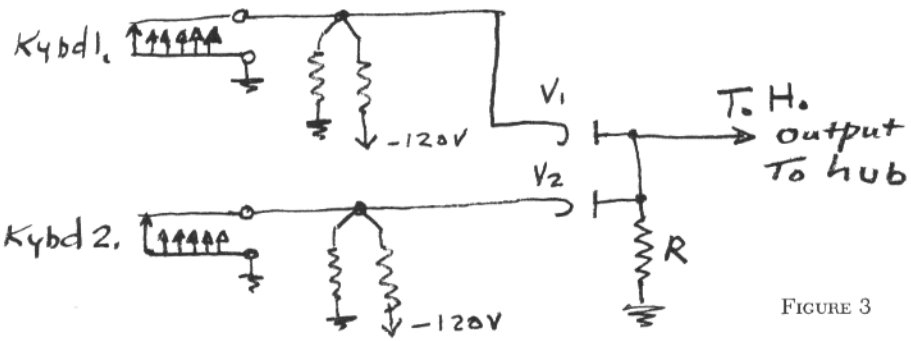


FIGURE 3

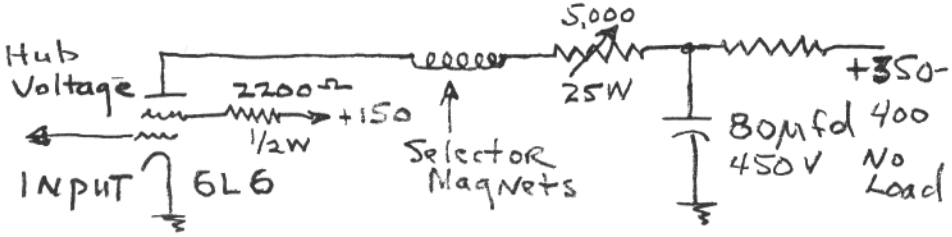


FIGURE 4

tical location for the cathode follower is between the RH and the receive gates.

The loop control incorporates two additional receiving-side circuits; these are a busy line detector and a break detector. The busy line detector is shown in Figure 7.

A cathode follower is connected between this circuit and the receive hub to provide a high impedance input.

When a steady mark is being received, the RH is at 0 volts or a slight positive voltage. V1 is cut off, C is discharged to zero-bias V2, and relay BY is operated. Suppose now that a single spacing pulse appears on the RH. V1 immediately conducts, so that C charges very rapidly toward —40 volts. V2 cuts off, releasing relay BY and causing a busy-line condition to be indicated. When the RH returns to 0 volts at the end of the spacing pulse, V1 cuts off, allowing C to discharge through R toward 0 volts. At a time determined by R-C following the end of a spacing signal, BY will reoperate and cease to indicate a busy line. The circuit is adjusted by varying R so that relay BY remains completely released while a 60 WPM series of LTRS characters is received. In operation, BY will release at the first start-pulse received and will not reoperate until a pause in transmission occurs.

The break detector is quite similar to the busy line detector, and is shown in Figure 8.

Again assuming that a steady marking signal is being received, diode V1 will conduct until C is charged to zero or a slight positive voltage. R1 prevents the grid of V2 from going positive, so that V2 does not draw excessive current if the hub should happen to be slightly positive on mark. Relay BK is normally operated. Assume now that a single spacing pulse is received. V1 will cut off at the beginning of the pulse, so that C will charge toward —40 volts through R. Before C can go sufficiently negative to cut off V2 and release BK, however, the input pulse ends. V1 then conducts and discharges C rapidly toward zero. If a break signal (nominal 650 millisecond space) is received, C will have time to charge sufficiently in a negative direction to cut off V2 and release BK, causing a break to be detected. Contacts on BK ground the blind input of the receive gate when BK releases, preventing the associated printer or reperforator from running "open" on a sustained spacing signal. With this connection made, R can be adjusted by sending a steady space signal to the hub and adjusting R so that the associated printer records three blanks and one LTRS characters. This will correspond to a detection interval of about 520 milliseconds.

The loop control, as constructed by the writer, includes its own plate power supply so that the transients generated by opening and closing the 60 ma. loop are not propagated throughout the switching system. The —120 volt supply is taken from the system, since no transient problem exists here and the use of a common voltage source helps to maintain standard signal voltage levels.

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**RTTY Society of Southern California**

**and is published for the benefit of all RTTY Amateurs and Experimenters**



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W6AEE — Merrill Swan
W6SCQ — Lewis Rogerson
For Traffic Net Information:
W6FLW W6IZJ
For "RTTY" Information:
W6DEO W6CG W6AEE



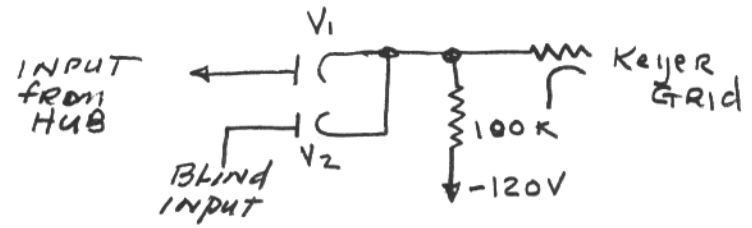


FIGURE 5

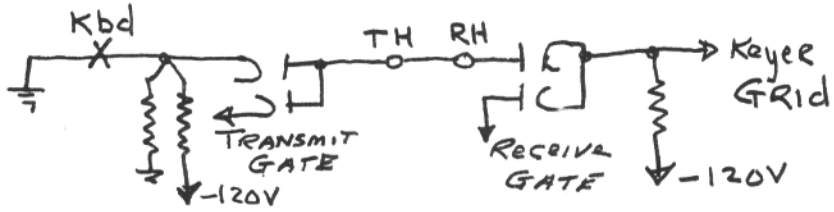


FIGURE 6

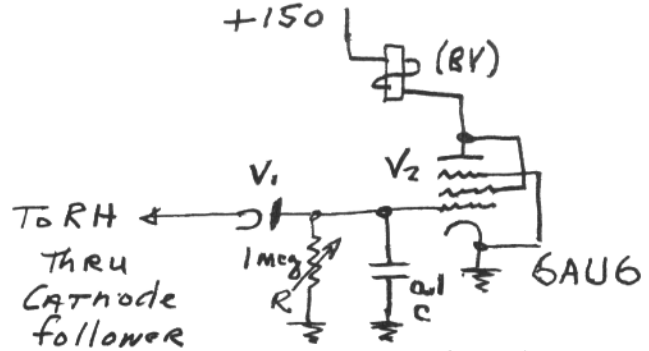


FIGURE 7

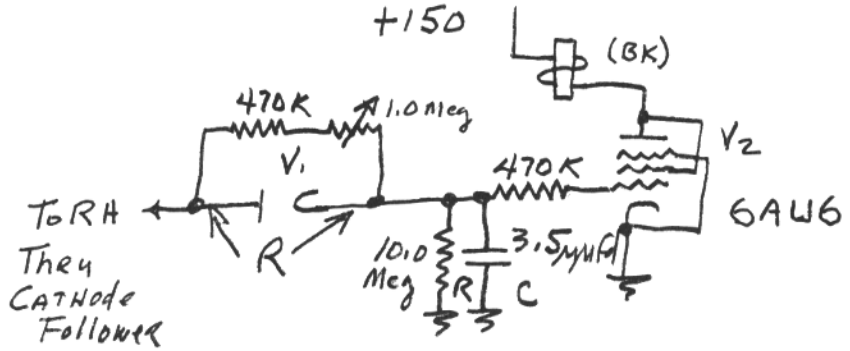


FIGURE 8

# SOLVING A MULTIPATH PROBLEM ON A RTTY CIRCUIT

### Excerpts from a Letter from ERIC FERGUSON, VK3KF

"This time last year I had a particularly interesting problem on my hands – our Townsville to Port Moresby RTTY circuit was unaccountably breaking down in the early mornings just when a large volume of meteorological traffic takes place. Nearly all our RTTY circuits operate on triple frequency diversity, the frequencies depending on the distance to be covered. For the path I mentioned (Townsville to Port Moresby) we use simultaneously 2.5, 5, and 9 Mcs. channels. During the night and early mornings the 5 and 9 Mcs channels are not much good due to skip and overseas QRM but although the 2.5 Mcs signal was very strong, considerable "garble" was occuring, mainly during the period 0300 - 0530 (local time). Initial investigation indicated the trouble to be caused by multipath reception. My problem was to resolve the extent and propagation path or paths of this phenomena. I designed portable direction-finding equipment using twin loops for measuring azimuth and incidence angles and spent a month in New Guinea on the problem . . .

"The result of the investigation was rather difficult to believe (and there are still a few who doubt)—but multiple echoes of the 2.5 Mcs RTTY signal were sustained for up to 16 milliseconds. I proved this by having a 10 KW transmitter pulse keyed, each one-millisecond pulse every 20 milliseconds. Some of my Cathode Ray Oscilloscope pattern photographs showed this one pulse to have as many as 120 echoes, ranging in delays of a few microseconds to 16 milliseconds. The direction finding gear indicated them to all arrive on the one azimuth but at various angles of incidence—the vast majority at angles of 80 degrees or over. Dipole aerials were customarily used for both transmission and reception, and due to the height problem, these antennas were about 1/4 (one quarter wave) above ground, giving them excellent vertical radiation efficiency.

"The problem was overcome by using a quarter wave vertical radiator at the transmitting station. I have mentioned all this mainly to let you know the type of work I do . . .

COMMENTS BY W6NRM:

This is a particularly interesting problem involving multipath effects on a RTTY circuit. Mr. Ferguson has indicated how he solved this problem and in effect cleaned up a particular communications path by using a proper antenna system to concentate its radiation at a certain optimum angle.

Mr. Ferguson's problem is graphically shown in Figure 1, showing what results from employment of (a) horizontal antenna one quarter wave above ground and (b) vertical antenna. The horizontal antenna concentrates its r-f energy mainly in the angles near the vertical, with very little radiation at low angles. Here we see that the signal will now travel to the receiving point over several paths, called one-hop, two hop, four hop, etc. These different paths have different signal-times, hence the multiple echoes that appeared on the oscilloscope. Considerations involving path geometries, attenuations, and antenna radiation patterns would tend to show that the multiple echoes will be more or less equal in signal srengths —as indicated by the relative strengths (thicknesses of dashed lines) of the rays on the diagram. Hence it is very obvious that severe multipath effects result.

Changing to Vertical Antenna, we have a different situation. The antenna now concentrates most of its energy at low angles, and in the diagram (b) we see that the main ray now will travel over the shortest possible path—one-hop—from transmitter to receiver. Paths involving two-hop, etc. are drastically attenuated and their resulting echoes do not disturb the RTTY circuit so much because they are weaker.

Summing up, we see that sometimes we may achieve improvement in communication between two points by proper choice of antenna systems to achieve concentration of signal-energy at certain optimum angles. This not only applies to long distance communications work but also to local work. Citing experience with amateur communications—for instance the RTTY work on 3.5 and 7 Mcs. bands—we may find we are unable to print even local stations located say a few miles away. No matter how we try, our printers seem to print garble on these apparently-strong signals! Most of us use horizontal antenna systems at such frequencies, and they tend to concentrate most of their energy skyward along with some along the ground-wave path. At the receiving point, the skywave combines destructively with the ground wave—both in amplitude *and* time-interval—and thus gives rise to a severe *multipath* effect. The cure is quite obvious—employ vertical antennas for low frequency local work. Here we place emphasis on communication via ground wave.

On intermediate paths, however, we have a different problem. At say over fifty miles, the ground wave has practically disappeared and hence we must depend on skywave propagation for our communications. So we return to our horizontal antennas, placed more or less at quarter-wave length height.

For local work, however, we should try to have antenna system that has a perfect "null" in the vertical diretion yet has a relatively broad beam at lower angles. In this way we would have better chance for satisfactory communications on both local and intermediate paths. This indicates that our horizontal antennas should be placed somewhat nearer the half-wave length height, say about 60 or 70 feet in height for the 7 Mcs. band! Few of us however have the required poles or effort to get our horizontal dipoles that high!

A good compromise would be to employ either a vertical antenna or a horizontal antenna, quarterwave in height—each one selectable by means of a switch for each particular communication path. For medium and long distance work, I have found the HyGain Trap Vertical, model 14AV, to be very satisfactory and is the antenna I use at W6NRM. Again its low angle of radiation makes it effective for local work up to a few miles around in the San Francisco Bay Area.

75-meter mobiles make use of loaded short vertical antennas which seem to be effective for short range communications, with a minimum of multipath propagation problems. Similar antennas would be compact and cheap enough to be useable for local work on the 80-meter band from home-stations. As a matter of fact—before the war, many 160 meter phone stations employed top loaded verticals for their local work, and they had excellent coverage up to hundred miles or so.

BACK TO RTTY PROBLEMS:

We should consider other methods of alleviating multipath effects on RTTY circuits. Mr. Ferguson mentions employment of triple frequency diversity reception on his meteorological RTTY circuits. Provided that signal is present at the receiving point on two or more frequencies most of the time, it would appear that frequency diversity indeed helps matters. However there may be an objection—on such widely different frequencies, propagation paths are quite apt to be much different in time-of-travel, and this would still result in multipath timing interference on the individual components of the RTTY signal.

At W6NRM (and also at W9TCJ), two-receiver diversity systems have been employed with much satisfaction when working over difficult RTTY circuits, operating on one RTTY channel frequency. Improvement in printing quality is quite marked even if the diversity system was of a makeshift nature, as for instance when one receiving antenna is the regular transmitting antenna (connected to receiver during reception, of course) and the other happens to be a random length of bell wire strung out in the yard. Operating the printer off either one such antenna may have numerous hits and garble. However, if both antennas are combined on a 50/50 basis into the printer circuit, copy is much improved and may be virtually landline in quality. This was forcefully demonstrated during times when making copy from W6AEE at W9-TCJ back in the 1950's, and likewise during RTTY traffic schedules with KL7BK-KL7MZ-KL7ALZ. During these Alaskan skeds, signals generally varied from S9 down to the noise, yet continuity and errorless copy was had, with about 300 messages copied and reperffed and directly transmitted to K6GZ without any tiresome repeats and patchup problems.

Before we close, we should discuss at least some of the diversity reception systems. There are three methods—Frequency

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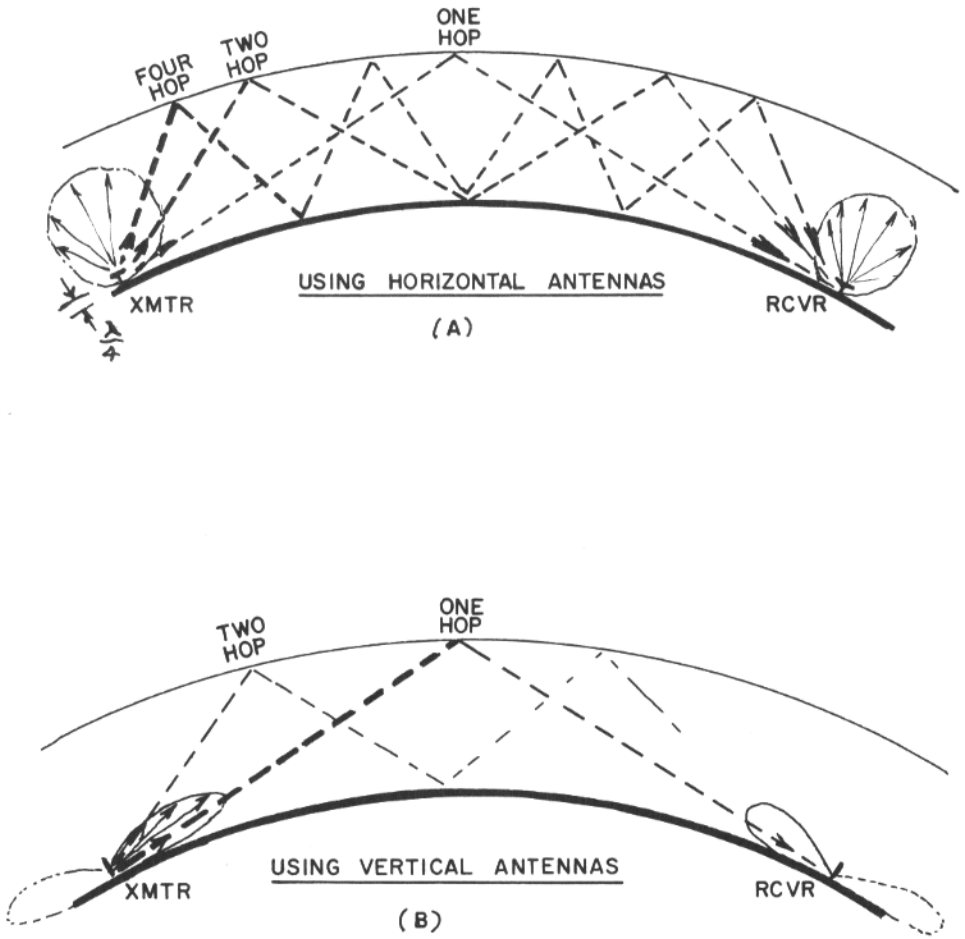


FIGURE 1.



# RTTY DX

**BUD SCHULTZ — W6CG**
**5226 N. Willmonte Ave.,**
**Temple City, California**

Hi Gang: This is usually the month when DX activity is supposed to start on the upswing and DX editors start to breathe new life into the lazy, dormant, wasted body of Ye olde "DX hound." However, on the RTTY scene this is not exactly a true picture of the situation. DX on the FSK mode continues to increase at the same crazy pace that it has maintained all through the summer and at this time overseas RTTY activity is at an all time high.

This month I will try to break the news down into continents in order to maintain some semblance of order and with this in mind let's start with Europe. The publication in the September issue of QST of Doc Gee's IARU report on RTTY in the UK certainly has helped our cause a great deal. Recognition of RTTY by the IARU and the ARRL will go a long way towards "beefing up" our following, both here and abroad. Bill Brennan, G3CQE, in his monthly report, just received here tells of a tremendous increase in European interest. Bill is still very active on all bands (from 144MC thru 3.5MC) and continues to make his share of W contacts whenever the bands are open. G3CQE can usually be found around 21,085 each day from 1600 to 2000 GMT and on 14,090 Kcs. for a short time at 0700 GMT. Bill's newest active cohort is Peter, G3LET. Peter has been very active on both 14 and 21 MC and has made several FSK contacts with the West Coast on both bands. G3LET's operating times and frequencies seem to be about the same as G3CQE's. Peter is well known here as a CW dx'er of no mean ability. Also just about to break out of his shell is G3GNR—according to Bill this lad is really steamed up to get printing and should be well under way by the time this column is in print. Be sure and give him a listen!! In the Netherlands both PAØFB and PAØYG continue their activity and PAØFB has been reported several times on the West Coast during the past month. In a long letter to Jerry, W6TPJ, Ib - OZ9DR says that now that his vacation is over he and OZ5EL are making plans to get on FSK. Ib has been able to print W6TPJ with good results but so far has not tried any two-way work. OZ9DR also reports that during a recent trip to Germany he learned that the DL stations are only authorized to use FSK between 3590-3600 Kcs.!! He further reports that DL1-GP seems to be the most active of the German group. Some of you East Coasters should be able to get into Germany on 3590.(?) I nearly forgot to mention that Bill, G3CQE, dug up a Model 14, typing reperf (not exactly in mint condition—Hi) at a British Junk yard and is in desperate need of a set of keytops and a tech manual in order to get it working. He says he will rebroadcast to the EU hams the NCARTS bulletins and any other news if and when he gets the reperf working. If any of you can help him out in this problem please drop him a line.

The word from Africa is very encouraging. In addition to several fine letters from Henry, ZS1FD and Ossie, ZS6CR your DX reporter managed a fine QSO with ZS1FD on 21,085 this month. Henry now has his Creed 7B and is trying to help ZS6CR to get on RTTY. Both these chaps have had a most frustrating experience trying to get the necessary gear for FSK operation and deserve a big hand for their efforts to put Africa on the RTTY list. Look for ZS1FD near 21,085 KCs around 1700 GMT. G3CQE reports he was unable to locate ZE4JN while the latter was in London so nothing further to report on this one.

South America continues to show up on the paper roll with the old regulars like TG9AD, OA5G, YV5AFA putting in an appearance around 14,100 KCs in the evening hours. Keith has left 0A5G for the States but George is still able to hold down the printer chores there. Keith reports that all the OA5G QSL's have been mailed to date. (Ed. note: I still don't know what happened to mine). Bill, TG9AD reported thru Bill Gates that he would be off temporarily

# RTTY DX

Continued

due to the political situation in that country.

Activity from Asia seems confined to occasional forays by HL9KT and KR6GF on 14,090 around 1400 to 1700 GMT. Nothing further reported from VS6AZ in Hong Kong. Here's one that will really whet your appetites!! OD5EL reported to PAØFB during a recent SSB QSO that he had a Model 28 and a new 100V transmitter and was only waiting for a commercial TU from the States to arrive before going to town on RTTY!! The latter item will take about three months.

RTTY from "down under" is going along at a dizzy pace. With the likes of ZK1BS, VK3KF, ZL3HJ and old reliable ZL1WB showing up on both fifteen and twenty nearly every day. Eric, VK3KF, now has a fixed quad on twenty (pointed at NYC) and puts in a fabulous signal on both bands. He reports a snag in obtaining his 14MC FSK permit from the authorities but doesn't anticipate too long a delay. In the meantime he has been using MAB on 14MC and FSK on 21 MC. Eric says that VK2AAB in Sydney has a Creed 7B printer and hopes to be on shortly and that VK2EL in Sydney is also planning an RTTY set-up. Alex, ZL-3HJ, still busy with his sheep ranch finds time to type a few QSO's each week and is anxiously awaiting his Model 19. Bruce, ZL1WB can be heard nearly every night on 14,090 as early as 0300 GMT. On a recent Saturday evening a giant five-way QSO was achieved on 21,085 Kcs. Here at W6-CG the keyboard chores were taken over by W6AEE, W6NRM and W6TPJ and on the other end of the "line" was VK3KF, ZK1BS, ZL1WB and ZL3HJ. The contact lasted nearly three hours with almost perfect copy at both ends. This QSO proved a testimonial to the fact that it's still a bit early in the Sun spot cycle to write fifteen meters off the DX spectrum. If you are interested in DX give fifteen a try—at least on weekends.

Thanks to all who sent in news and letters of encouragement and hope to CU all next month.—73

Bud W6CG

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## COVER PHOTOGRAPH

RTTYers are indebted to the Navy for their part in Armed Forces Day exercises this year. The cover photo shows a group at NSS. All of the names are not available, however included are Captain Grange, W4-HZ, Captain Veasey, W4ABY, Phil Catona, W2JAV and Floyd Ziel, W2RUI, who operated NSS Ratt.

The cover photo shows W2JAV and W2-RUI tuning up the gear. Phil writes that they had heavy thunder storms for hours, which made operations somewhat difficult.

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# BILL, G3CQE

**Contd. From Pg. 15**

Diversity, receiving the same signal on two or more separate frequencies; Space Diversity, using one frequency and two similar antennas separated at least several wave lengths apart; and Polarization Diversity, using horizontal and vertical antennas at any convenient distance apart and connected to receivers and combiner. The first method, Frequency Diversity, requires separate transmitters for the several frequencies as well as separate receivers, whilst the other two methods only require at least two receivers to receive signal from the one transmitter. Obviously the latter methods are most economical in transmitter power and frequency spectrum. However there are logistic problems, and they lie beyond our consideration in this article.

R. H. Weitbrecht—W6NRM.

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# NEWS - NEWS - NEWS

Your suggestion about sending the tapes that are used on the net of the NCARTS is an excellent one and I am certain that the fellows here in the East will be apprciative of any information that you can send our way. I am also looking forward to receiving the art work tapes that you mentioned in your letter. Enclosed is a tape that you might send on the net that may be of some humor to some of the fellows. I wrote it up as the result of a QSO beep and I had on the matter one time last winter. . .

Well now about the short shift party. I have never taken it upon myself to organize anything such as this before and I feel that it would be taken quite lightly if I were to put my name to it as being any of my doings. Since you are the spark plug so to speak of the West Coast gang I should think that it would be fitting for you to announce the date and any rules. Beep used to pick March for the narrow shift party and it ran on the week ends so perhaps it might be nice to stick to the same time. As I told you when I met you in Boston it seems that for some reason there is such a sorry lack of interst in anything here in the East. More and more new RTTY stations are coming on the air. But sad to say you or rather we cannot seem to get up the interest in joining the Net or taking part in other activities as you fellows in the West. I don't know what it is. We seem to be so cut off from what is going on in other parts of the country and if it were not for your publication we would truly be in the dark. I spend a great deal of time on the air evenings and have been trying to stimulate interest in narrow shift by using it and refusing to change to wider shift when I contact someone. So far have a number of fellows interested but need more than one guy trying to do it all alone. The other night I worked W8CAT using narrow shift and he told me that he had his SX-1Ø1 Rcvr selectivity control on the .5 KC position and was getting perfect copy from me through QRM whereas If I had been using wider shift he was sure that he would be having considerable trouble in printing me. At the time I was only using about 4ØØ cycle shift. I think that narrow shift is to our advantage Merrill and perhaps some day with the increasing congestion on the bands it won't be too long before the FCC might require it. The advantages as I see it are: It occupies less spectrum space, we can use the maximum amount of selectivity in our receivers, the input band pass filter can be made narrower, more RTTY stations in the same amount of space, less susceptible to selective fading of mark and space signals, and there may be a few more advantages that I can't think of. So what do you think?

I am compiling a list of the new stations that are on the air and as soon as I get them all I will send it in to you so that you can bring your files up to date. There are a number of stations on in Vermont and at present operating on two meters. The SCM of Vermont whose call is W1VSA is active and calls into the net almost every Wednesday night. There are also some in New Hampshire on the air. Most of the activity here in the East is on eighty meters on 362Ø KC. Forty meters is too fouled up on the old freq. due to Russian jammers and foreign BC stations so think perhaps that we consider a new freq. for forty meters. Don't hear much activity on twenty or fifteen meters. Occasionally hear some one on twenty but it has been a long time since I have heard anything on fifteen. Most of the time the twenty meter band is dead here in the evening. Have stayed up at night to see if I could hear Bruce but no deal as the band would be dead.

I have a circuit here which I copied out of the service manual on the Navy's TU by Hoffman Radio Type CV-89A/URA-8A. The circuit is called the axis restorer and is supposed to vary the DC level of the incoming signal so as to favor the fading mark or space pulse. In other words when the mark or space signal fades it introduces bias into the signal and what this circuit does is to correct for this by weighing the fading signal and restoring the equilibrium of the incoming signal. If the mark signal is fading the circuit favors the mark signal and restores proper bias. The output of the circuit then goes into a flip flop electronic keyer. If you are interested for your own possible use and if it is permissible I can redraw the circuit and send it along to you for posible inclusion in one of the RTTY Bulletins for interested RTTY'ers to try. Wish we could get some more fine technical articles on TU's and other facets of RTTY by Don Wiggins or Bob Weitbrecht. If you should talk to Bob ask him to dope out a design for sending CW from the keyboard of the machine. There is a firm here in Stamford that designed and manufactures a

unit that will copy Morse Code off the air and operate a printer. It only uses about 115 tubes to do it. They have a static rejector unit that is used in conjunction with the converter that will literally take a signal that is so deep in the noise level that you can barely hear it and regenerate the signal so that when you listen to it in the output of the rejector it is as clean as though coming from an audio oscillator. It works on the principal that noise rides on top of a signal and by detecting the slight increase in amplitude of the noise level that is riding on a signal they recover the intelligence. Incidentally the Morse Code Converter has a sale price of $14,ØØØ. I talked to one of the engineers about designing a teletype to Morse converter for ham radio and he said it would not be too hard to do especially if relays were used instead of electronic circuitry. But I can just see this thing. Hi. Hi.

Getting back to the narrow shift party and what this letter started out to talk about Do you think that it should be formal or informal I think that if it is informal the interest won't be as keen. What do you think about scoring it on the same basis as the Sweep Stakes contest. How about a sort of title for it such as "WØBP Narrow Shift Contest" or something like that? Also perhaps a short technical article pointing up possible advantages and easy ways and means of temporarily modifying ones TU to accommodate narrow shift. All of this to appear in RTTY and CQ if not too late. If it is done on as big a scale as the SS contest it should turn out to be very interesting and informative. Since you are the real expert on getting these sort of things underway I feel that you should take charge of it. You are the oldtimer in RTTY and more of an expert on it than I am.

Well, what started out to be a short letter turned into a novel size publication. So thanks again for all your help and I sincerely appreciate your interest. Best wishes.

73,

GORDON, W1OUG

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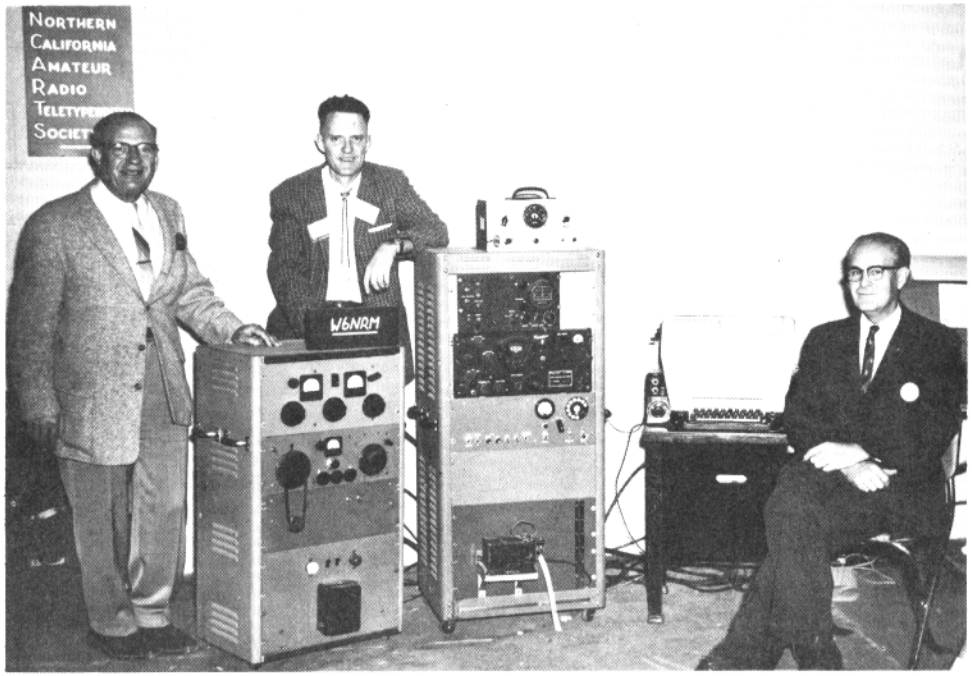
# RTTY Exhibit

## SAN MATEO ARRL Convention






# NCARTS BREAKFAST SAN MATEO ARRL

### PACIFIC DIVISION CONV.

**Photos by W6NRM**