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: MANUABLS, few each of a large variety, especially Model 28. Original Teletype copies. Write for list. Also complete gear guide for all Teletype equipment. $1.75 pp. Wiring diagrams, write your needs. Model 14 typing reperf; as is, complete $40. Same, checked and working $55.00. W2-BVE ., 834-R Palmer Avenue, Maywood, N.J. 07607.

TRADE: Model TT-63A/FGC Teletypewriter repeater for model TT-204/FGC-39A or similar reperf using wide tape. W5-BLX, 5904 N.W. 49th Street, Oklahoma City, Okla. 73122.

FOR SALE: Model 26 complete with table, waiver required. Can not ship, local pick-up only. $75.00. K9RUK, 2922 Vinton Avenue, Rockford, Illinois 61103.

WANTED: Collins mechanical filters for 75A4, 500, 1000, or 1200 cps. KL7BAJ, Airport and Dale Roads, Fairbanks, Alaska 99701.

FOR SALE: Model 14 TD, mint condition. K2MTW, 230 Westminister Avenue, Buffalo, N.Y. 14215.

WANTED: Source of parts for Kleinschmidt TT-4, LPC-4 to LPC-7 type cabinet for Model 28. 60-75-100 wpm gear shift for 28KSR. Also past issues of RTTY. WA6SWA, 3345 18th Street, #7, San Francisco, California 94110.

FOR SALE: Model 28 KSR console machine, like new with factory paper winder. Model 28 KSR console cabinet complete, good shape. Model 150 Kleinschmidt like new. Model 14 typing reperf all set to go. K6PZT, 9337 Gotham Street, Downey, Calif. phone TOpaz 9-3292.

FOR SALE: Model 26 printer in immaculate condition. Complete with dark finish wood table. PS. included if desired $60.00. H.B. AFSK 2125/2975 with Polar and P.S. on Mini Box $20. Transistorized W2JAV TU (ESSCO) with polar and P.S. also on mini-box $30. K0GXL, 509 Des Moines Street, Ankeny, Iowa 50021.

WANTED: 14 Trans-Dist, #15 Teletype complete. Collins 70H-12 oscillator for R-390A. Cash, or trade for new ham equipment. W1AFN, Box 19, Boston, Mass. 02101. Phone 617-742-0048.

FOR SALE: Complete model 15 in almost new condition. John Gregson, K6OEK, 9508 Las Tunas Drive, Temple City, Calif.

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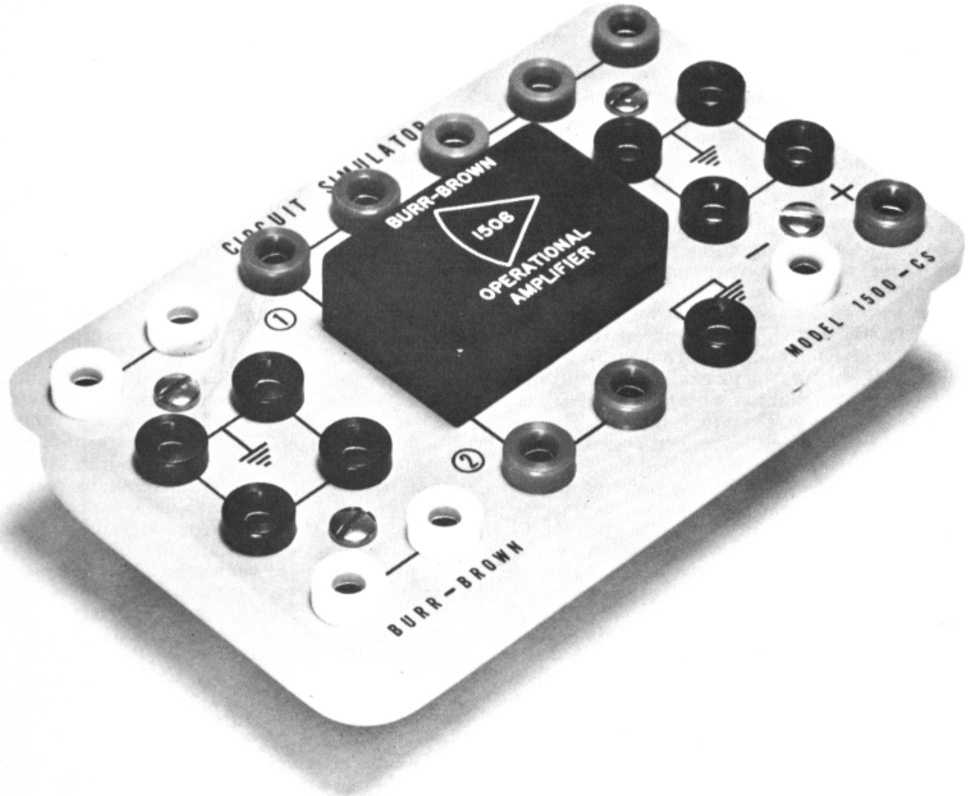
RTTY



A SIMPLE, SOLID STATE, VARIABLE BANDWIDTH TUNABLE AUDIO FILTER

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A SIMPLE, SOLID STATE, VARIABLE BANDWIDTH TUNABLE AUDIO FILTER

THOMAS B. PERERA, 410 Riverside Drive, New York, N.Y. 10025

Selective, audio filters have, due to their reliance on inductors and capacitors, been hard to tune across frequency. In addition, if they were tuned by varying one of their elements, their bandwidth changed radically. The circuit described below allows the center frequency as well as the bandwidth to be separately adjusted.

There are several factors which detract from the usefulness of the filter in its present form, which will hopefully be overcome as more experience is gained with this type of filter. The filter is usable in its present form, however, the driving and driven circuit impedances must not vary and certain constraints must be placed on the input signal level as well as limiting how narrowly the filter is adjusted in order to keep within its stable region. Tuning the frequency of the filter will vary its bandwidth, but adjusting the bandwidth will not vary the frequency to which it is tuned. Therefore, the filter should be tuned to a given frequency and then adjusted for the desired bandwidth. Several stages may be combined using buffer amplifiers to obtain practically any shape factor desired.

A full discussion of the operation of the circuit is beyond the scope of the present article. However, excellent booklets on: *Operational Amplifiers, and Operational Amplifier Active R. C. Networks,* are available for the asking from Burr-Brown Research Corporation, International Airport, Industrial Park, Tucson, Arizona, 85706. High, low, and bandpass filters, voltage comparators, integrators, differentiators, and many other operational amplifier circuits are covered in these booklets.

In this circuit which is described in detail and which originated from the latter publication, the traditional L. C. Networks are replaced by R. C. Networks whose elements are made equal. Thus, an inexpensive ganged potentiometer may be used to cary the center frequency, while fixed capacitors of equal value compete the network. The operational amplifier acts as an active circuit element and multiplies the Q of the R. C. Networks according to its gain setting. Since the Q of the circuit determines its bandwidth, varying the gain control potentiometer in the feedback circuit of the amplifier varies the bandwidth of the filter.

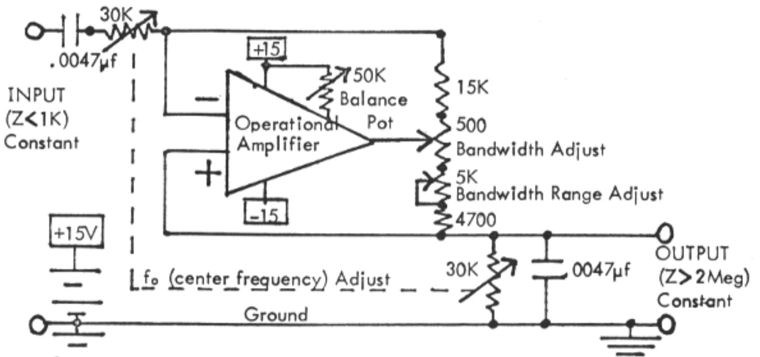
The gain control pot should be about 500 ohms or less with limiting resistors on each end to prevent the circuit from being set at such a high gain that oscillation occurs. Since an adjustment of only a small percent of the total resistance of the gain control resistor will take the filter from wide bandwidth to narrow bandwidth and finally into oscillation, a small resistance pot is suggested for this adjustment with fixed resistors on each side of it to effectively provide stops, and to spread the range of adjustment over a full rotation of the pot. The 5K pot will bring the gain control pot into the desired range.

When the filter is set for narrow bandwidth (say less than 50cps between 6db points) the amplifier gain will be found to be so high that the circuit will continue to oscillate for a few cycles after the exciting frequency has stopped. This gives a few milliseconds distortion at the end of a teletype pulse. However, this problem disappears at 6db bandwidths over 100cps.

Some method of input level control such as a pot or other attenucator should be used, since the circuit has a finite dynamic range. If a 1.6volt (peak to peak) output voltage is exceeded the amplifier will go into saturation; that is, no further increase in output voltage will occur as the signal is tuned closer and closer to the center frequency of the filter. This condition will produce flat topping of the response curve as shown in figure 2 by the dashed lines. The solution of this problem is to adjust the input level so that it will not drive the amplifier into saturation under normal operating conditions.

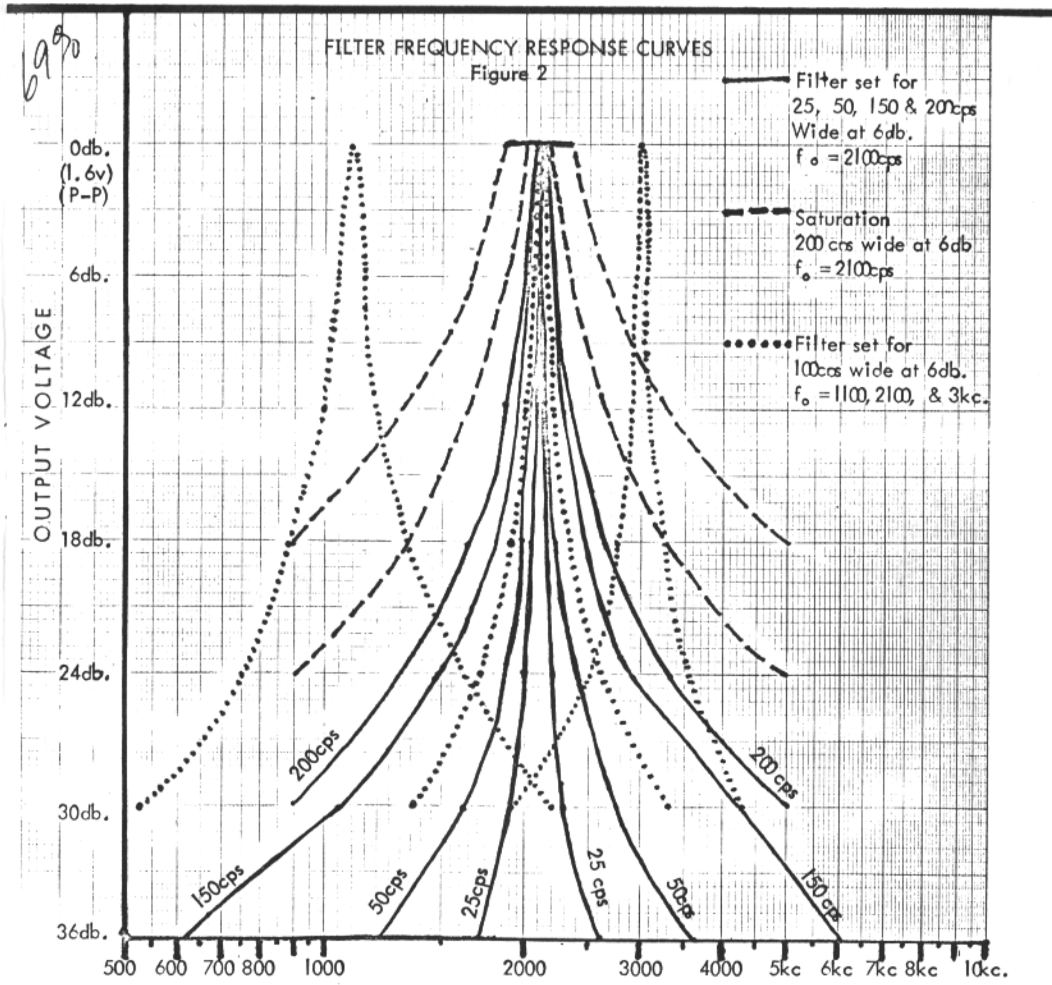
Figure 2 shows the frequency response of the filter when set for 100 cps bandwidth at 6 db attenuation for three center frequencies of 110, 2100, and 3000 cps. (dotted lines). The solid lines show the response curves when the filter is set for 25, 50, 150, and 200 cps widths at 6 db attenuation. The slopes are quite different for these conditions. Unfortunately, at 25 and 50 cps settings, the filter is not stable. The dashed lines show the effect of increasing the input voltage above the saturation voltage of the filter. The filter was set for 200 cps bandwidth at 6 db down. The skirt slopes are not changed but merely displaced upwards.

The input impedance of the circuit is high and it may be driven by any relatively low impedance source of from around IK ohms down. This driving impedance should remain constant. Either a transformer secondary or some constant impedance attenuator may be used so as not to change the circuit characteristics. The output impedance, however, is very high, which means that it should not be used to drive a low impendance load with-



Operational Amplifier active Bandpass Filter

Fig. 1



FILTER FREQUENCY RESPONSE CURVES

Figure 2

A SIMPLE AUDIO FILTER (Continued) . . .

out auxiliary amplification or isolation. It may be used to drive the high impedance of a typical triode grid or other high impedance stage directly through a two or more meg ohm series isolating resistor. Attempting to drive a load of less than 2 meg ohms impendance will result indegredation of the bandwith of the filter. For this reason, if it is desired to gang several of these filters or drive a low impendance load, a high input impedance, unity gain buffer amplifier should be used. Figure 3 shows such an amplifier which will easily drive a 600 ohm load.

The center frequency of the filter is determined by the equation $f_0 = 1/2\pi R\,C$. A pair of .0047 μfd. condensers has been found suitable for the typical RTTY frequency range of from 1 to 3 KC. A ganged 30 K pot will take the center frequency down to about 1100 cps and allow it to be adjusted over the range mentioned. Equations describing the operation of the circuit are given in the references. No improvement in the shape of the frequency response curves was found with values from .025 to .0005 μfd. So, the best way to improve the shape factor seems to be to use several stages.

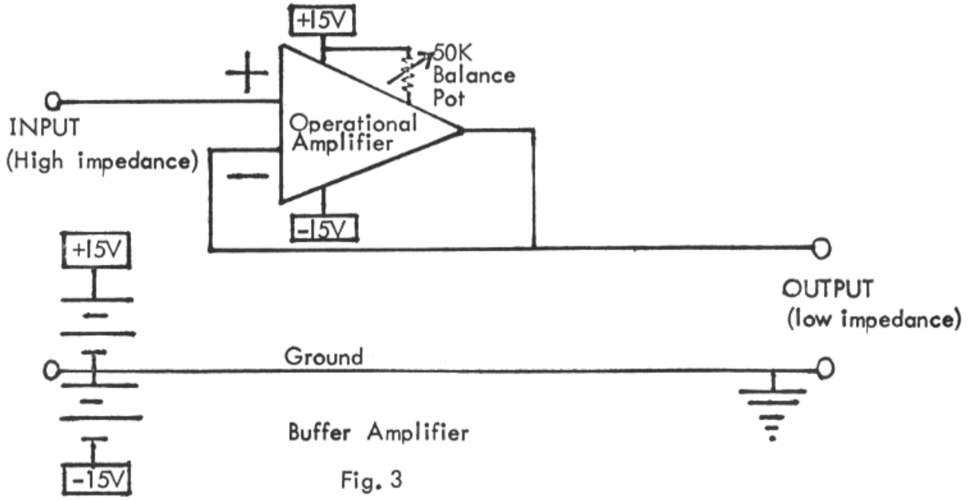
The balance control on the amplifier is adjusted, with both of the input terminals shorted to ground, for zero D. C. voltage at the output terminal. It is not a critical adjustment in this circuit and need not be changed after the initial setting. The amplifier should be removed from the circuit for this adjustment.

It is important that the input be connected to the—(or inverting) amplifier input. The circuit will not operate properly if the input is connected to the +(or non-inverting) amplifier input.

Power requirements of the circuits under actual working conditions are from 8.5ma. with no load to 12.5ma. with full load for both the positive and negative 15 volt sources. Mercury batteries are probably the least expensive sources of power and will last for hundreds of hours. A Mallory TR 235R and TR 236R in series will give 14.85v and last voltages is important and it is for this reason about 300 hours. Regulation of the supply that mercury batteries are suggested although a regulated power supply is the ideal source of power. Tiny companion regulated power supplies are available from the manufacturers of operational amplifiers.

Small, solid state operational amplifiers as well as tube type operational amplifiers are made by many manufacturers. Burr-Brown brakes an excellent one with a much larger dynamic range than the one tested here. It is their model 1506 which sells for $95. Data Device Corporation, 240 Old Country Road, Hicksville, N.Y. 11801, sells their budget-priced and burnout-proof model D-6 for $18. Philbrick tube type units can often be found on the surplus market but require plus and minus 300v.

It is hoped that this review will stimulate further investigation of this type of filter. Anyone with a scope or VTVM and audio oscillator can try modifications of the basic circuits and, since this is a relatively new concept in filter design, there is plenty of room for improvement.



Buffer Amplifier

Fig. 3

A PHOTOELECTRIC TAPE READER

WILFRED VAN HEDDEGEM, ON4HW — Kortrijkstraat 40, Oudenaarde, Belgium

The tape reader treated below is an extension of the "Electronic teleprinter code generator" (RTTY, March 1966). Some preliminary modifications to the original circuit of the latter were described in the article "More about the Electronic TP code generator" (RTTY).

This TD is a semi-electronic device. Reading of the information punched into the tape is accomplished photoelectrically. The tape is moved by means of a mechanical system actuated by an electromagnet.

The Actual Reading Circuit (Fig. 1)

This circuit is analogous to the basic circuit shown in fig. 2 of the last-named article.

To prevent an unwanted start of the TD in case one operates the keyboard and forgot to change over S1 from position 2 to position 1, the "keyboard common" is disconnected from Q35 in the two tape reader positions of this switch (S1A). After an "automatic stop" (pos. 2 of S1) the TD can be started by pressing the button PB, which is more practical than putting S1 in position 3 for a moment, at least if an automatic stop is desired at the next "blank."

The reader contacts of the basic circuit were replaced by transistors operating as switches (Q46 to Q50). These are driven by RD1 to RD5 respectively. These circuits are identical, so only RD1 is shown in detail.

The BPYO10's are silicon photovoltaic cells designed for use in tape and card readers. The short-circuit current of these cells relates linearly to the light intensity and amounts to 7.5 micro-amperes at 500 lux at an ambient temperature of 25°C. Sensitivity is best at a wavelength of 8000A. At 6500A (visible red) the response is approximately 50 p.c. of the maximum. The maximum permissible inverse voltage is 1 volt.

In darkness Q36 is conducting due to the base current supplied through the 2.2 megohms resistor. In these conditions the base voltage is about 0.6 volts. When the cell is illuminated, it drives Q36 in cut-off. Q36 is the inexpensive planar silicon transistor BC108. It provides far better temperature stability than a germanium transistor. A second transistor stage (Q37) serves merely as an inverter. This stage can be eliminated when using a hi-beta PNP silicon transistor for Q36, but these were not available at a reasonable price.

The upper part of fig. 4 shows some mechanical details of the reading system. The five photovoltaic cells (F) are mounted under the fixed part of the tape guide (E) with the sensitive areas looking through holes of 1 millimeter diameter. A luminous field of appropriate characteristics is created by two 6 volts 0.1 amps. bulbs (A). The globes are of clear glass. The bulbs are mounted side by side on the movable part of the tape guide (B) in such a manner that the filaments are parallel to the tape, right opposite to, and at a distance of roughly 1.6 centimeters from the cells.

The voltage applied to the bulbs can be adjusted by a 20 ohms variable resistor (see fig. 3) to the lowest value that still provides reliable operation of the reading system, taking into account possible mains voltage fluctuations and temperature variations. In the case of the reader used by the writer, 4.5 volts has proved to be a good value. This way the life time of the bulbs is considerably increased.

For the sake of completeness it can be added that too high a luminosity might also cause unreliable operation. Indeed, there can be reached a point where the light shining through the paper is sufficient to make the cells turn off the transistors to which they are connected.

If there appears to be too much difference in the sensitivity of the five channels, e.g., due to an unequal amount of light received by the cells, a wide correction is possible by modifying the value of the 2.2 megohms base supply resistors of one or more of the input transistors (Q36, Q38, etc.). A higher resistor value will increase the sensitivity and vice versa. It should not be made too large however, or insufficient temperature stabiilty will result.

Contrary to what some readers may fear, supplying the bulbs with a.c. is not harmful to the system reliability. It is true that in this case the light intensity varies at a rate of twice the mains frequency, but one should remember that 22 milliseconds (at 60 w.p.m.) are available for read-in; in this space of time the maximum light intensity is reached at least twice.

In position 2 of S1 the tape reader will obviously stop when the movable part of the tape guide is lifted up. Not so obvious is that when putting the tape guide back in the normal position the TD will start automatically, provided that anything else than a "blank" is facing the photovoltaic cells of course. The interesting part of the case is that this occurs only if a.c. is applied to the bulbs and not when d.c. is used. It can be explained as follows. When the bulbs are approached to the cells there will be a point where the light intensity variation caused by the a.c. makes the switches Q45 to Q50 turn on and off. Due to the high overall amplification of the reader circuit, the turnover is sufficiently

Continued . . .

A PHOTOELECTRIC TAPE READER (Continued) . . .

sharp to initiate read-in of the row facing the cells and hence to start the code generator.

The Tape Feed Magnet Driver (Fig. 2)

At the end of the start element of the teleprinter code signal, which is also the end of the read-in period, the positive going voltage step appearing at the collector of Q33 (line D) turns on the one-shot multivibrator (MMV). The latter produces a pulse which is amplified by Q53 and Q54 to energize the tape feed electromagnet (K).

The magnetomotive force of the magnet is 500 ampere-turns at 34 volts. This is amply sufficient to actuate the tape feed mechanism; in fact it still works with half as much. The silicon diode 1N2070 in series with the 150 ohms resistor shunting the magnet coil limit the "flyback" peaks to the maximum permissible collector voltage of Q54 (—60 volts). For normal speeds the diode can safely be put directly over the coil. The magnet has a laminated core and armature; this is likely to make it work faster than one having a solid core.

The optimum length of the MMV cycle depends on the attack time of the magnet coupled to the mechanism. It need not be much longer than this attack time; it can even be slightly shorter. The length of the MMV cycle is proportional to the value of the base resistor of Q51 and also to the value of the capacitor between the base of Q51 and the collector of Q52. With the values shown on the circuit diagram it amounts to 18 milliseconds. The attack time of the magnet in normal operating coditions has been measured as 16.5 milliseconds and the release time as 22 milliseconds. A simple calculation reveals that in these conditions the TD will keep up with speeds of up to 1500 characters per minute; that's what it really does. Although other mechanisms, even if built along the same lines, will undoubtedly yield different results, the above measurements show that the normal amateur speeds are by no means a problem.

The power supply of the tape reader (Fig. 3) is classical and needs no explanation.

The Tape Feed Mechanism

Although such a mechanism is simple enough for home construction the writer decided to use the tape feed mechanism of a Creed autohead, as this was available. It could be adapted easily for magnet drive. It is shown in fig. 4 just to give an idea of how such a mechanism can look like.

For those among the readers who have the disposal of, or can lay hands on the same or a similar mechanism, here are some additional comments and tips.

The steel partitions of the window (D) of the movable part of the tape guide (B) were removed to make room for the light rays of the bulbs. Two properly shaped pieces of bronze wire (C) were added to keep the tape sufficiently close to the photovoltaic cells (F). Care should be taken that these wires do not throw a shadow on the cells.

The tension spring pulling the roller (G) against the ratchet wheel is not on the place shown. It is merely a matter of simplifying the drawing. No modification of the original mechanism is necessary in this respect.

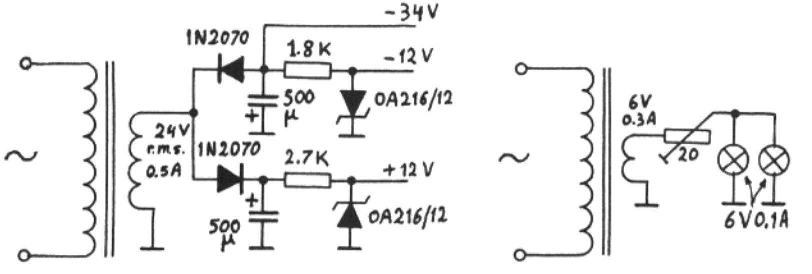
Coupling of the magnet armature to the mechanism is accomplished by means of a steel spindle (M) soldered to the lever (N) and fitting loosely in the hole (I) of the bell-crank (H). This hole was originally used to secure a tension spring.

The magnet is mounted on the back plate of the autohead casing. The lower hole of this plate is filed out a little to make room for the spindle (M).

Fig. 4 also illustrates how to determine the right position of the spindle (J) of the magnet armature. It should be on the bisector (a) of the angle α described by the centre of the hole (I). The length of the lever (N) should be chosen so that in the position of rest the distance between the rightmost end of the armature and the core is approximately one millimeter.

To adjust the mechanism, first bend the lever (N) until the mechanism is in the position as drawn in dashed lines when the magnet is in the energized state. Then release the armature and bend the brass strip (L) so as to obtain the right position of rest (solid lines).

The writer will be glad to give any further information to interested readers.



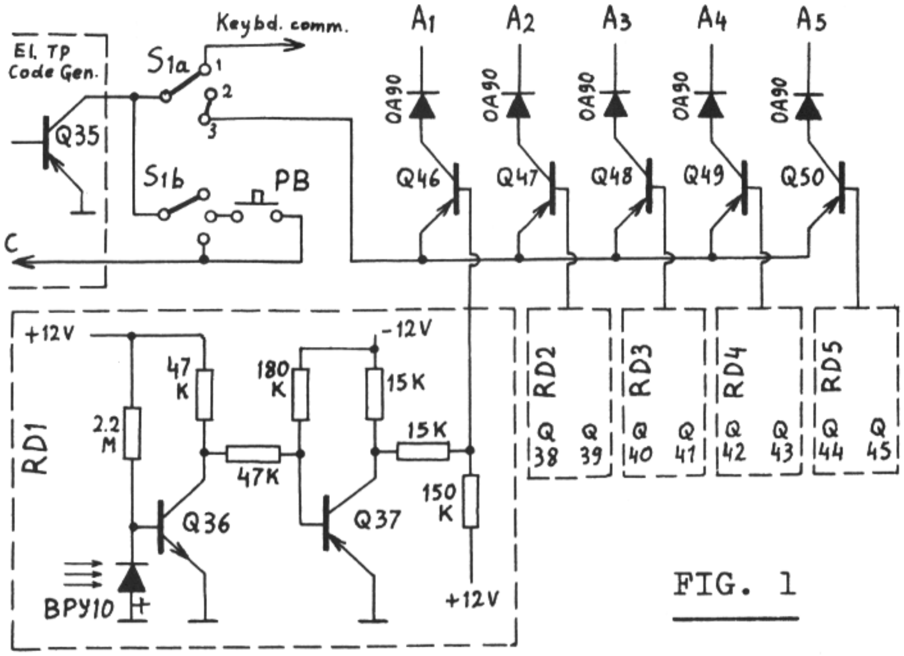


FIG. 1

Q36, Q38, Q40, Q42 and Q44 : NPN silicon transistors BC108 (beta : 100 to 600)

Q37, Q39, Q41, Q43, Q45 and Q46 to Q50 : PNP germanium transistors OC71 (beta : 30 to 75)

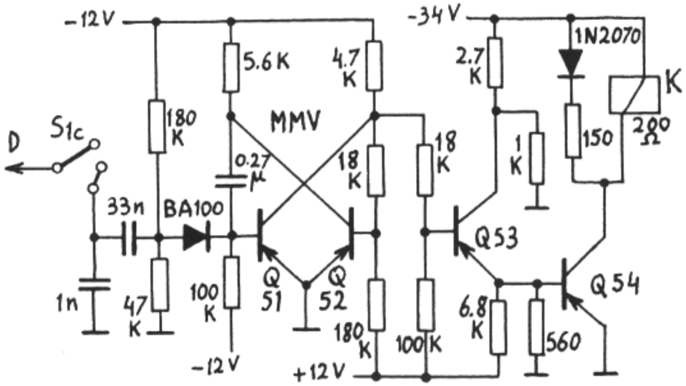


FIG. 2

Q51, Q52, Q53 : OC71

Q54 : medium power germanium transistor OC77; $-V_{CE}$max = 60 volts

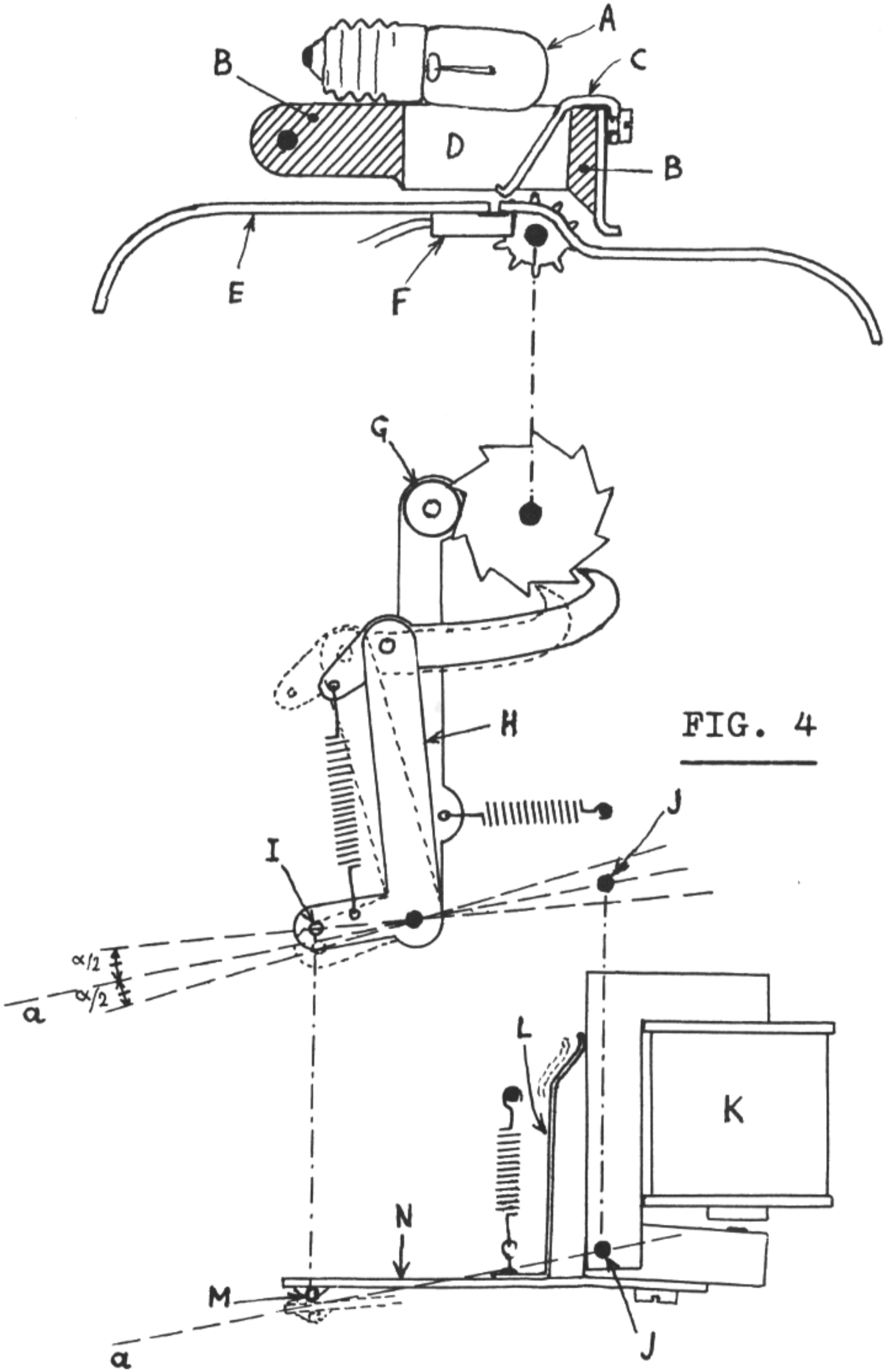


FIG. 4

ARMED FORCES DAY 1966 COMMUNICATIONS TEST RESULTS

The annual Armed Forces Day communication tests conducted by the Departments of the Army, Navy and Air Force on 21 May 1966 successfully demonstrated to the world the close partnership and mutual respect enjoyed between U.S. radio amateurs and the U.S. Department of Defense.

This year several military radio stations participated in the communication tests which included military-to-amateur crossband operations and receiving contests for both continuous wave (CW) and radioteletypewriter (RTTY) modes of operation.

CROSSBAND RESULTS

Military radio stations WAR, NSS, NPG and AIR had a combined total of 7008 QSO's during the twelve hours and forty-five minutes devoted to the military-to-amateur crossband portion of the communication tests. Commemorative QSL cards have been mailed to all contacts that could be identified in the Spring 1966 issue of the Radio Amateur Callbook Magazine. Any amateur who has not received a QSL card confirming his contact should address a request for clarification to the Armed Forces Day Contest, Room 5A522, The Pentagon, Washington, D.C. 20315. This request must include the amateur's call sign, the station worked, time of contact and the frequency utilized by the military station.

CW RECEIVING CONTEST RESULTS

There were 482 perfect entries for the 25 WPM CW broadcast message originated by the Secretary of Defense. The complete text of the 25 word per minute International Morse Code message is printed below and followed by the call signs or names of individuals who received a Certificate of Merit for submitting a perfect contest entry:

"THE 17TH ANNUAL OBSERVANCE OF ARMED FORCES DAY AFFORDS ME THE OPPORTUNITY TO EXTEND MY BEST WISHES AND PERSONAL THANKS TO ALL AMATEUR RADIO OPERATORS PD WITHOUT YOUR HELP AND DEDICATION DASH YOUR TRAINING AND PREPARATION DASH THE RELAY OF MESSAGES ON MARS AND AMATEUR CIRCUITS TO AND FROM OUR MILITARY FORCES THROUGHOUT THE WORLD AND ESPECIALLY IN VIET NAM WOULD NOT BE POSSIBLE PD THE THOUSANDS OF MESSAGES HANDLED EACH MONTH BY THE MILITARY AFFILIATE RADIO SYSTEM AND AMATEUR RADIO OPERATORS ACROSS THE COUNTRY CONTRIBUTES IMMEASURBALY TO THE MORALE OF OUR MEN OVERSEAS AND BRINGS THEM A LITTLE CLOSER TO HOME PD YOUR ACCOMPLISHMENTS IN PERFORMING THIS SERVICE REFLECT CREDIT UPON THE ENTIRE AMATEUR RADIO FRATERNITY SGD ROBERT S MCNAMARA CMM SECRETARY OF DEFENSE"

RTTY RECEIVING CONTEST RESULTS

There were 541 perfect entries for the 60 WPM RTTY broadcast message originated by the Secretary of Defense. The complete text of the 60 word per minute radioteletypewriter message is printed below followed by the call signs or names of the successful participants who received a Certificate of Merit for submitting a perfect contest entry:

"I TAKE THE OPPORTUNITY AFFORDED ME BY THE 17TH ANNUAL OBSERVANCE OR ARMED FORCES DAY TO EXTEND MY PERSONAL THANKS AND BEST WISHES TO ALL AMATEUR RADIO OPERATORS. IT IS WITH YOUR HELP AND DEDICATION—YOUR PREPARATION AND TRAINING – THAT RELAY OF MORALE MESSAGES ON MARS AND AMATEUR NETWORKS TO AND FROM US MILITARY FORCES THROUGHOUT THE WORLD AND ESPECIALLY IN VIET NAM IS POSSIBLE. AMATEUR RADIO OPERATORS ACROSS THE COUNTRY AND THE MILITARY AFFILIATE RADIO SYSTEM ARE HANDLING THOUSANDS OF MESSAGES EACH MONTH. THIS CONTRIBUTES IMMEASURABLY TO THE MORALE OF THE MEN AND WOMEN IN OUR MILITARY FORCES AND BRINGS THEM A LITTLE CLOSER TO HOME. I CONGRATULATE YOU ON YOUR ACCOMPLISHMENTS IN PERFORMING THIS SERVICE. THE AMATEUR AND MARS OPERATORS INVOLVED IN THIS ACTIVITY REFLECT CREDIT UPON THE ENTIRE AMATEUR RADIO FRATERNITY SGD ROBERT S MCNAMARA, SECRETARY OF DEFENSE"

K1AAA
K1CLF
W1EFF
WA1FWQ
W1GKJ
K1GZH
JA1GZY
W1HJP
K1IOW
W1KOT
W1MCG
K1OCS
W1OMN
K1OOZ
W1OQC
K1PLP
W1QP
K1YZG
W1ZJL
W1ZLS
K2AGI
W2BLV
W2BVE
W2BXW
WB2CTU
WA2CUB
WA2EMB
WB2FYB
WB2FYW
W2GOR
W2GQN
WA2GTH
WA2HDP
K2IF
W2JAV
WB2JRU

WA2JSW
K2JTU
W2KCX
W2KLD
K2LEQ
WA2LKF
W2LUW
K2MZP
W2NCA
W2NVB
W2OAP
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K2OWD
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WA2QMC
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W2ROB
K2ROI
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W3MHD
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W3NSI
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W3YPI
W3ZN
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WA4CJV
W4CVQ
WA4DPQ
WA4DQE
K4DSI
K4EPM
WA4EPZ
WA4EVU
K4FPW
W4FR
K4FVO
WA4FZD
W4GJY
K4GLQ
W4GMT
WA4GOC
K4GXJ
K4GXO
WA4HCI
W4HHH
K4HTM
W4HNF
W4HT
W4IJA
W41MZ
W4IRZ
W4ISF
W4IU
WA4IUU
W4IYT
WA4JOF
W4JWG
K4JXG
W4KIS
WA4KNO
W4KR
W4LDB
W4LPR
W4MDS
W4MHS
WA4MZZ
DL4NK
W4NTE
W4NTK
W4NWK
K4PGV
WA4QKQ
K4QOE
WA4RMX
W4SCF
W4SKX
WA4SSB
WA4TFF
WA4UDB
W4UHA
K4UMK
WA4UYT
W4VBD
K4VDM
W4VEY
WA4VYZ
WA4WND
W4WPI
W4YBT
W4YLO
W4YSU
W4ZAG
W4ZBA
K4ZBG
W4ZXI
W5AJG
W5ANH
W5ARK
K5AYX
W5BOT
WA5BPM
K5BQA
WA5CON
W5CUD
K5DKR
WA5EIB
W5EJV
K5EPO
W5FCP
W5GMM
W5GRT
K5GRV
W5HFN
W5IDZ
W5IFH
W5IHP
K5JCQ
W5JPC
W5JUM
W5KVM
WA5LMG
W5LNG
K5MBB
K5MCM
W5NBI
K5PIM
W5QFA
W5QJD
W5SAW
K5SDM
K5SVC
K5TPU
K5TUP
W5UJF
W5USA
K5UTE
W5UY
K5VHM
W5VJ
K5VQU
K5WAC
K5WBN
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W5YCQ
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WA6AGA
WA6AHF
W6AJJ
KH6AO
KG6APD
WB6AQR
WA6AWD
W6AXV
WA6BBG
WA6BBL
KH6BGW
K6BHF
W6BHG
W6BIK
K6BPI
W6BTV
W6CBF
WB6CMN
W6CVV
WB6CWZ
W6DNT
W6DOU
KH6DQW
WB6DRY
K6DYX
WA6ECE
WB6EGH
W6EGZ
K6EPT
W6EV
W6FB
WA6FFW
W6FLW
WB6FRC
WA6FRS
W6GC
K6GKX
W6HTO
W6IAB
W6IWE
W6IWO
WB6JAL
K6JFP
WB6KCH
W6LDG
K6LFM
W6LIP
W6LVQ
WA6LZB
WB6LZX
WB6MHO
W6MJD
K6MLI
K6NCG
W6NRK
WA6NUA
W6OJF
W6PSW
K6PWD
WA6PYE
W6RCR
K6ROR
K6RTS
W6SAW
W6SCQ
W6SCR
WA6SEY
K6SHZ
WN6SIJ
WA6SJM
WA6SJZ
WB6TCL
K6TFT
WA6TQJ
W6TZJ
W6TZK
DL6UK
W6ULX
WA6USU
W6UUO
WA6VGE
WA6VGJ
WA6VGZ
W6VHF
K6VIT
WA6VPG
WA6VVR
K6WBC
W6WLI
W6WPF
W6WXX
W6YLH
WA6YSE
W6YUH
WA6ZCQ
K6ZJS
W7AAI
F7AH
W7AHW
KL7BAJ
W7BEG
WA7BEU
W7BIF
W7CUR
WA7CVI
W7EJD
W7FEN
W7GVG
W7IAN
W7IE
W7JMH
W7LI
W7LMZ
W7LPM
W7MC
W7MCU
W7MEV
K7MLO
K7NHO
W7PAE
W7PBV
W7PHG
K7PHP
K7PLR
W7PQJ
W7PRG
W7PRM
K7PTQ
K7QOM
W7RQQ
W7TYR
W7UKH
K7UXS
K7VJF
W7VKO
K7VTY
W7WHE
K7WQJ
W7YKN
K7YQM
W7ZI
K8ACC
WA8ADL
K8AIZ
K8AQA
W8ARP
K8AVY
W8AYT
W8BEK
WA8BOT
W8BTW
W8BXA
W8CJD
W8CLL
K8CTI
W8DFA
K8DGV
W8ELU
K8EQN
WA8FCN
W8FEU
WA8FYF
K8GJL
W8GKQ
W8GMX
K8GVY
W8HPR
W8HYG
W8IJV
K8JDJ
W8JM
K8JZW
WA8KPN
W8KPT
W8LEX
W8MBB
W8MGA
K8MUZ
K8MYF
WA8NQE
W8OMY
W8ORD
W8PSK
K8RKE
WA8RYG
K8SDQ
WN8SLJ
W8UFN
W8VMP
W8WXM
W8ZEP
K8ZPR
W8ZUA
W8ZYW
W9AFD
W9AZW
K9BRL
W9BUF
W9CAV
W9CBE
W9CHD
K9CYZ
WA9CZS
W9DVJ

WA9EMK
W9EPT
W9EWC
K9EWV
K9GSC
W9GYQ
W9HHX
K9IUG
WA9KEJ
W9KJ
K9MNZ
W9OJY
W9PU
W9QKE
K9QNV
W9QVQ
W9RDJ
W9SUF
K9TKW
W9TQ
W9WKM
W9WUH
W9ZBY
W9ZDI
W9ZFA
W9ZGC
K0AQO
K0BEC
K0BLH
K0CCV
WA0CXY
W0DHA
WA0DYU
WA0EII
W0EUS
K0FAT
K0FLK
W0FWD
K0GVY
W0HFP
W0HHS
K0HPQ
K0HZO
K0IEB
K0IIE
K0IPC
K0IQR
W0ITX
W0JAY
W0KIS
W0KUJ
WA0LCK
W0LDO
K0LFI
WA0LUM
K0MDS
W0OGC
K0OJQ
K0ORC
W0PHM
W0RSP
W0RWH
W0RX
W0TBL
K0THG
K0TLQ
K0TNP
W0WHE
W0WWI

ANDERSON, Robert R.

ARNOLD, Kenneth C.

BEAVER, G. S.,
RM1, USN

BROTHERMAN, J. O.,
RM1, USN

CLIFFORD, J. P.,
RM1, USN

COOG, G. R.

EVANS, Harry H.

FELLER, Albert, Jr.

FREEMAN, C. P.,
RM1, USN

GEISLER, M.

GOODMAN, D. J.

GROVER, E. J.,
RMCM, USN

HAJDU, F. L.

HASKELL, S. W.

HERSEY, G. G.,
RM1, USN

HUGHES, P. M.

HUNTER, J. E.,
RM1, USN

IVERSON, Ronald K.

LENZ, W. E.

LUSSIER, D. E.,
RM3, USN

MALME, Glenn, Jr.

MASSEY, Adrian F.

MAYER, R. D.

MENADIER, P. T.

MOORE, William M.

RADKE, L. W.,
RM2, USN

RAIN, C. F.,
RM2, USN

ROBERTS, C. E., Jr.

SHORTWELL, C. M.,
RM2, USN

STEVENS, Ross W.

VOLT, R. V.

BASE MARS STATION
England Air Force Base
Alexandria, Louisiana

USS CHARLES R. WARE
(DD-865)

USS FORT MANDAN
(LSD-21)

Orig.: R. E. Mickley, LCDR,
USNR, OP-945N, Room
5D564, Pentagon,
Ext. 71219

C.A.T.S. MEETING

The Chicago Area Teleprinter Society will hold its twelfth annual "CHI-RTTY" meeting and dinner on October 2, the Sunday preceding the National Electronics Conference, in Meeting Room 7 of McCormick Place, Chicago. As usual, no admission will be charged for those attending the meeting. Further details and dinner reservations may be obtained from Robert Paculat, W9JBT, 1327 N. Hamlin Ave., Chicago, Ill. 60651.

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ADDRESS FOR RECIPIENTS OF MAIL FROM ANARCTICA

127

Mrs. George H. Wilson
c/o Sullivan
1341 Meridian Road
Bellingham, Wash. 98225

———o———

It is with regret that RTTY reports the death of one of our early members, Al Browdy, W6NSS.

———o———

TELETYPE STATIONS OPERATING AT 60 WORDS PER MINUTE

Station	Frequency
WFA-37	7737.5 KC
WD-54	14,741.775 KC
WWA-65	5247.5 KC
WWA-76	6875 KC
WWA-87	7682.5 KC
WNA-67	7745 KC
WNC-21	11115 KC
WNC-64	15537.5 KC
WNE-33	23355 KC
WFD-66	16207.5 KC
Carribean Station	14395 KC

———o———

SIXTH ANNUAL WORLD-WIDE RTTY SWEEPSTAKES

This is a competition between all stations throughout the world to determine their ability to exchange messages via two-way radio teleprinter.

1. Test period:
   0200 GMT—October 22nd to 0200 GMT October 24th, 1966.
2. Bands:
   This test will be conducted in the 3.5, 7.0, 14.0, 21.0 and 28.0 mcs. amateur bands.
3. Exchange points:
   (A) All two-way contacts with stations in one's own zone will receive two points.
   (B) All two-way contacts with stations outside one's own zone will receive the points stated in the exchange points table.
4. Stations may not be contacted more than once on any one band. Additional contacts may be made with the same station if a different band is used.
5. Multipliers:
   A multiplier of one is given for each country contacted, including their own. The same country may not be claimed more than once, even if a different band is used.
6. Scoring:
   Total exchange points times number of countries worked.
7. ARRL country list—except that KL7, KH6 and VO to be considered as separate countries.
8. Messages:
   Stations will exchange messages consisting of:
   (A) Message number.
   (B) Check (RST).
   (C) Time in GMT.
   (D) Zone number.
   (E) Country
9. Logs:
   Logs should contain: Band, number, times sent and received, call signs, zones, countries and exchange points claimed.
10. Certificates will be awarded to the ten highest scorers.
11. Logs and score sheets should be received by RTTY, INC., 372 Warren Way, Arcadia, California, 91006, by November 30, 1966.

RTTY, INC., wishes to thank the RTTY/SSB Club of Italy for permission to use their exchange point chart.

AN OPEN LETTER TO RTTY SUBSCRIBERS

The December issue of RTTY will be the last one published by the present Editor. There are several reasons for this decision, lack of personal time, lack of suitable material at times, rising costs of publication, coupled with a high cost of supplying "Free copies of RTTY," "Free Xerox copies of past (out of print ones)." These latter items add up to an expense which is not covered by subscriptions and born by the editor personally.

In past years there has been a need for exchange of written information, circuits, Teletype equipments, repairs and sources of purchase of Teleprinters. After fourteen years this need still exists to a degree. However, some of the larger amateur publications have started printing such information to a limited degree. One has dropped its regular RTTY column. It has been reported that one reason for such limited publication of RTTY articles was due to the small number interested in RTTY. The past year has been a change in this policy to the extent that some good articles have been printed. The question has been asked many times how many RTTY operators are there currently? The best answer that can be given is approximately 5,000 in the United States and another 1,000 outside of the states. If growth of interest can be judged by the volume of mail received by RTTY, these numbers will increase rapidly.

Currently, two to three hours an evening (six days a week) are required to answer the RTTY mail each day, which consist of questions on circuits, equipments, past issues of RTTY, in addition to new subscriptions and renewals. An additional four to six hours is required each month to get material together for the Typesetter and another three to four hours pasting up material after it comes back from typesetting. After RTTY is received from the printer another four to five hours addressing and stamping for mailing some 1,700 copies. Then another hour to take them to post office in Pasadena for mailing. The mailings have run as high as 1,800 and as low as 1,200 copies. Plenty of work and no pay, Hi.

If there is any clubs or readers who would like to assume the publication of RTTY, with the above in mind, any serious offers will be given careful consideration, please enclose SASE. —30—

EXCHANGE POINTS TABLE

YOUR zone	CORRESPONDENT zone																																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	2	14	10	13	16	18	22	20	25	30	36	37	39	21	22	19	20	17	11	25	29	29	22	22	16	28	25	31	39	35	14	36	25	29	34	39	40	47	44	15
2	14	2	15	8	7	16	16	12	16	23	24	30	30	12	14	16	19	20	19	19	25	31	26	30	28	35	35	40	50	50	25	47	14	21	21	28	33	36	37	6
3	10	15	2	8	11	9	13	14	18	21	28	28	30	26	28	27	29	27	21	32	37	39	32	31	24	37	33	40	43	35	11	32	29	35	35	42	48	50	52	20
4	13	8	8	2	3	8	10	8	12	18	22	25	27	19	21	23	26	26	22	26	33	37	32	34	30	40	38	44	52	44	20	40	21	28	26	33	40	41	44	14
5	16	7	11	3	2	9	9	6	10	17	20	24	25	18	20	22	26	26	24	35	32	38	33	35	31	41	40	45	54	46	22	41	19	27	24	31	38	39	42	13
6	18	16	9	8	9	2	4	7	10	12	19	19	21	27	29	31	34	33	29	34	40	46	40	40	33	46	42	49	47	38	17	32	28	36	30	37	44	43	48	22
7	22	16	13	10	9	4	2	4	6	8	15	15	17	26	29	31	35	36	33	33	40	47	42	44	38	50	46	53	49	40	22	34	26	34	26	33	40	38	44	22
8	20	12	14	8	6	7	4	2	5	11	15	18	19	22	24	27	31	32	30	29	35	42	38	42	37	47	46	51	54	44	24	38	21	30	23	30	38	36	41	13
9	25	16	18	12	10	10	6	5	2	8	10	14	15	23	25	29	33	35	34	29	35	43	41	45	41	50	50	55	52	45	28	38	21	30	20	27	35	32	38	21
10	30	23	21	18	17	12	8	11	8	2	9	7	9	31	33	37	41	43	41	36	42	51	49	52	45	58	52	54	44	37	28	31	28	36	24	29	38	31	38	29
11	36	24	28	22	20	19	15	15	10	9	2	9	7	26	28	33	36	41	43	30	34	42	45	51	52	49	55	49	42	41	37	35	22	29	16	20	28	23	29	27
12	37	30	28	25	24	19	15	18	14	7	9	2	3	35	37	41	45	49	48	39	42	49	53	58	50	52	52	48	37	33	32	27	31	37	34	27	33	27	33	34
13	39	30	30	27	25	21	17	19	15	9	7	3	2	33	35	40	43	48	49	37	39	46	50	56	53	50	52	46	34	34	35	29	29	34	21	24	30	24	30	34
14	21	12	26	19	18	27	26	22	23	31	26	35	33	2	3	6	10	14	18	7	14	21	19	25	27	27	30	32	42	49	34	55	5	10	15	19	21	26	26	6
15	22	14	28	21	20	29	29	24	25	33	28	37	35	3	2	5	9	13	18	6	11	18	17	23	27	25	29	30	39	47	36	54	6	7	15	18	19	25	24	8
16	19	16	17	23	22	31	31	27	29	37	33	41	40	6	5	2	4	8	13	6	10	15	12	18	22	21	24	26	36	42	33	49	10	9	20	21	21	27	25	9
17	20	19	29	26	26	34	35	31	33	41	36	45	43	10	9	4	2	5	12	7	8	12	8	14	19	17	20	22	32	38	32	45	14	10	22	22	20	27	23	12
18	17	20	27	26	26	33	36	32	35	43	41	49	48	14	13	8	5	2	7	12	12	12	6	11	14	15	16	20	30	35	29	40	13	15	27	28	24	31	27	14
19	11	19	21	22	24	29	33	30	34	41	43	48	49	18	18	13	12	7	2	18	19	16	10	10	9	16	15	20	30	32	21	36	23	21	33	34	30	38	33	16
20	25	19	32	26	35	34	33	29	29	26	30	39	37	7	6	6	7	12	18	2	6	14	14	20	26	21	26	25	34	43	39	49	8	3	15	16	15	22	20	12
21	29	25	37	33	32	40	40	35	35	42	34	42	39	14	17	10	8	12	19	6	2	9	11	17	24	16	21	20	28	37	40	43	14	6	18	16	11	19	15	19
22	29	31	39	37	38	47	46	42	43	51	42	49	46	21	18	15	12	12	16	14	9	2	6	10	18	17	13	11	21	29	36	35	22	14	26	22	15	22	16	24
23	22	26	32	32	33	40	42	38	41	49	45	53	50	19	17	12	8	6	10	14	11	6	2	6	13	8	12	14	24	30	31	37	22	16	29	26	21	28	22	20
24	22	30	31	34	35	40	44	42	45	52	51	58	56	25	23	18	14	11	10	20	17	10	6	2	8	6	6	10	20	24	26	30	28	22	35	33	25	32	25	25
25	16	28	24	30	31	33	38	37	41	45	52	50	53	27	27	22	19	14	9	26	24	18	13	8	2	13	9	15	23	30	18	27	32	28	41	40	33	40	33	25
26	28	35	37	40	41	46	50	47	50	50	49	52	50	27	25	21	17	15	16	21	16	7	8	6	13	2	6	5	16	22	31	29	29	21	33	29	21	27	20	29
27	25	35	33	38	40	42	46	46	50	52	55	52	52	30	29	24	20	16	15	26	21	13	12	6	9	6	2	7	15	18	25	25	34	27	40	35	27	32	26	30
28	31	40	40	44	45	49	53	51	55	54	49	48	46	32	30	26	22	20	20	25	20	11	14	10	15	5	7	2	10	17	31	24	34	25	36	30	22	26	19	34
29	39	50	43	52	54	47	49	54	52	44	42	37	37	42	39	36	32	30	30	34	28	21	24	20	23	16	15	10	2	9	15	32	42	33	39	31	24	24	20	44
30	35	50	35	44	46	38	40	44	45	37	41	33	34	49	47	42	38	45	32	43	37	29	30	24	30	22	18	17	9	2	24	7	51	42	47	40	33	32	29	48
31	14	25	11	20	22	17	22	24	28	28	37	32	35	34	36	33	32	29	21	39	40	36	31	26	18	31	25	31	15	24	2	22	39	42	46	53	52	56	51	28
32	36	47	32	40	41	32	34	38	38	31	35	27	29	55	54	49	45	40	36	49	43	35	37	30	27	29	25	24	32	7	22	2	57	48	47	42	38	34	33	50
33	25	14	29	21	19	28	26	21	21	28	22	31	29	5	6	10	14	18	23	8	14	22	22	28	32	29	34	34	42	51	39	57	2	9	10	14	18	22	23	10
34	29	21	35	28	27	36	34	30	30	36	29	37	34	10	7	9	10	15	21	3	6	14	16	22	28	21	27	25	33	42	42	48	9	2	13	12	12	18	16	16
35	34	21	35	26	24	30	26	23	20	24	16	34	21	15	15	20	22	27	33	15	18	26	29	35	41	33	40	36	39	47	46	47	10	13	2	7	15	15	19	20
36	39	28	42	33	31	37	33	30	27	29	20	27	24	19	18	21	22	28	34	16	16	22	26	33	40	29	35	30	31	40	53	42	14	12	7	2	8	8	11	24
37	40	33	48	40	38	44	40	38	35	38	28	33	30	21	19	21	20	24	30	15	11	15	21	25	33	21	27	22	24	33	52	38	18	12	15	8	2	7	5	28
38	47	36	50	41	39	43	38	36	32	31	23	27	24	26	25	27	27	31	38	22	19	22	28	32	40	27	32	26	24	32	56	34	22	18	15	8	7	2	6	32
39	44	37	52	44	42	48	44	41	38	38	29	33	30	26	24	25	23	27	33	20	15	16	22	25	33	20	26	19	20	29	51	33	23	16	19	11	5	6	2	32
40	15	6	20	14	13	22	22	18	21	29	27	34	34	6	8	9	12	14	16	12	19	24	20	25	25	29	30	34	44	48	28	50	10	16	20	24	28	32	32	2

DX-RTTY

BUD SCHULTZ, W6CG

5226 N. Willmonte Avenue
Temple City, California 91780

Hi DX'ers:

Whatever happened to summer? Here it is the beginning of the Fall DX season and I haven't had my vacation yet! The mail bag is starting to fatten up again which means that many of you are back on the hunt once more. A good one to look for as a starter is UQ2KAX. Several of the gang have had good contacts with him on 20. By way of W8CQ and W6ZH comes word from DJ6ZBA that there is an expedition expected to operate RTTY from the Isle of Sark. The calls given for this sortee are GC3OUF and GC3PLX. There is some confusion over the dates of this operation and it could very well be over by the time this gets in print but I hope not. Jean, FG7XT, tells me that I1CQA will be on RTTY from San Marino from the 8th to the 15th of this month. No info on the call to be used. Jean also advises that VS9ATH is about to become active on FSK. If these are not alluring enough for you how about trying for UP2CG? Several of the gang have reported working or hearing him with fine signals in the States. Mario, YV3LD, was telling me the other day about a proposed RTTY DXpedition to Martinique but I have no details on this one. Its supposed to be this month, however.

I promised to give you a report on how my Buddy, K3GIF, did while operating my junk here at Dx headquarters, so here is the sad news. He worked two new ones for me, namely—VS5 (Brunei) and a VU2—but I'm sorry to relate that both were CW contacts! Nary a new one on RTTY but I can't blame ol Ed—the bands were really bad during his stay here. He really tried hard and you can't rule a man out who tries. I am sure that by now he wouldn't trade DX locations with me!

Arnold, KW6DS, writes that he has left Wake Island to return to his home in Honolulu where he will sign KH6COY so his old friends can be on the lookout for him from Oahu. To those of you who sent me QSL cards for Joe, HL9TM, I want to explain that all the cards and envelopes have been forwarded to his Stateside QTH. He will take care of the situation as soon as he gets home. Anyone wanting to contact Joe by mail can write to his home call—WA2SPL. I am also taking care of the RTTY QSL chores for Eric, VK3KF, and will forward his cards as soon as they arrive from Australia. Congrats this month to Peter, K8YEK, for his WAC-RTTY Award nr. 79! He also received his QCA award this month. Nice going, Peter!

Reports are still coming in on Leo, EI6D, so evidently he is cutting quite a swath across the States. Arthur, ON4BX, reports working EI6D and also UQ2KAX, UB5WJ, CP1BX, and W7HH/YN6—all on RTTY! This is a mighty imposing list of goodies and should raise a few eyebrows amongst you DX hunters. Arthur (ON4BX) writes that he now has 43 countries worked but only 22 confirmed. This is surely a sad state of affairs and one that we should talk about for a few paragraphs. My mail each month contains letters complaining about the poor percentage of confirmations from many of the RTTY group. For some reason the teleprinter group seem to be the most lax of any of the Ham modes to confirm contacts. It does get mighty frustrating to find yourself unable to confirm a new country after spending hours—maybe days—chasing him. However, it should be remembered that everyone is not interested in chasing awards and to many of these stations exchanging QSL cards is not important and may even be considered a nuisance. The swapping of confirmations is one of the oldest traditions of Ham radio and to most of us is still a very important part of our hobby. To those of you who are not confirmed "QSL Haters" but may just be putting off the job of answering those cards that have been piling up on the desk, I suggest we make September "QSL Month" and get the chore cleaned up. I would also suggest that if you are one of those who do not care to exchange cards it would be much easier if you would indicate this to the fellow on the other end of the line at the time he asks for a QSL. This would clear the air, save him a lot of time and postage and make it easier for yourself. There's nothing wrong in telling a chap that you do not QSL—the problem arises when you assure him that you will send a card just to get him out of your hair. Another thing to remember is that many of the rare DX stations work so many fellows seeking cards that the postage can become a mighty important item, so don't expect a direct airmail reply unless you furnish IRC's or some way to reimburse him. Finally, keep a current envelope at your QSL bureau and be patient and keep your fingers crossed. This problem is as old as ham radio and will always be with us, so let's do what we can to try and improve it a bit. It might also be fitting to mention that you should be patient with QSL managers for DX stations. Sometimes it takes a bit of time for the manager to get the necessary info and the cards from the station he is helping. Speaking of

Continued . . .

DX-RTTY (Continued) . . .

QSL managers—WA2OHK is taking care of this chore for EL2F.

Now for a bit of late news that just arrived before we put this issue to bed. Bob Nolan, WA6WGL, informs me that YV5ABI (Armando) and LU8DR (Adolfo) are two new ones he has just caught up with. Bob also notes that PJ2MI has been showing up on 20 around 0200 with a good signal. Just received a letter from Jim, VP9BY, and he worked the following in a little over a week: XE1BI, I1CTE, I1CQD, UA4KED, F3LL/P, KP4BKS, YV3LD, OE2SI, OE2FUL, EI6D and KH6EM! Jim is really cutting 'em now and has all his tty gear going strong. He promises some photos of his layout in the next month, so if he doesn't let me down I'll get the boss to print 'em for you.

Don't forget that next month is the Sixth Annual RTTY Sweepstakes and you will note the similarity of the rules to the last Volta Contest. Hope all of you will approve, but if not I'm all set for the static. The committee decided on the change to the Como rules after a lot of research and palavering. The Como SSB and RTTY Club gave us permission to use the Zone chart that they worked out for the last Volta Contest. Hope all of you will show up for the Fall Jamboree!

Well, Gang, that's thirty for this month, but send your news in and help keep this thing going. Next month Ed, K3GIF, will take over the DX column chores while my XYL and I take a vacation trip through the hinterlands, so send your info to ED in Bethesda and keep him busy.

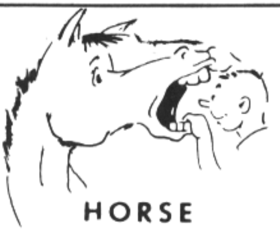
73

BUD, W6CG

P.S. Just heard from Jean, FG7XT, and he says he has worked 62 countries but has only received confirmations from 45 of them. Maybe I should have made my QSL paragraph a bit stronger; hi.

FOR SALE: Teletype roll paper, standard 8½" yellow, packed 10 rolls per case, new $8.00. 11/16" oiled perf tape for model 14-28 etc., 10 rolls per case, new $3.00. Model 14 typing reperf, sync motor, excellent, $40.00. HQ 180, late with spkr., $275.00. Model 14 Tee-Dee $35.00. TWOers with DC $35.00. Valiant like new $175.00. WANT – D-104 Mike, HT-37, 2B or GPR90. List for stamp. W2DLT, 348R Essex Street, Stirling, N.J. 07980.

SERVICE: Cleaning and repair of Teletype machines. Have in stock every part for Model 14, 15, 19s and many parts for 12, 26, 28, 32, 33, 35s, can obtain any parts needed. Manuals for 14, 15, 28s and many oddballs. Teletype machines all models in any style and all special features/Must sell: 11/16" reperf tape, 10 rolls to box, $2.00. 40 rolls to case, $7.00. Call or write Martin Geisler, 213-892-0685. 8926 Kester Avenue, Van Nuys, California 91402.



HORSE TRADES

FOR SALE: RTTY Converter model CV-71 (for 50 kc IF) with extra IF input (for 500 kc IF) from CV-57 TU. like new, in exceptionally good condition, $195.00. W2BSA/1, River Road, RFD 1, Essex, Conn.

FOR SALE: RTTY converter, Model RT-1, designed by Don Stoner, W6TNS, Mission Ham Supplies, 3316 Main Street, Riverside, California. Phone 683-0523.

FOR SALE: 1Z2 rectifier tubes used in CV-57 and CV-89 TU's, 2.00 each. W8MSG, 3479 Kersdale Road, Pepper Pike, Ohio 44124.

FOR SALE: All set for RTTY operation, Viking and FSK'd VFO, 1460 watts like new $40.00. 1962 model teleprinter, Kleinschmidt, like new $100.00. W6OJF, 9337 Gotham Street, Downey California, phone TO 9-3292.

FOR SALE: Wide selection of Teletype and Teleprinters, also many parts, send SASE for list. W6VPC, 1067 Mandana Blvd., Oakland, California 94610.

FOR SALE: CV-89A $175.00. Scope tuning unit from CV89, new, 30.00. Boehme RTTY repeater, new 35.00. Model 14 typing reperf S-R sync motor E.O.L. indicator 75.00. SSIR receiver 525.00. 75A4 and 3.1 kc filter-speaker, all factory modifications 370.00. W3LST, 228 Plummer Street, Oil City, Pa. 16301.

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