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VOL. 1 OCTOBER, 1953 NO. 10

Getting Started On RTTY on a Good Foundation

BY FRANK WHITE, W3PYW

Here is some very good information, regardless whether you are an "Old Timer" or a Beginner.

—Editor

About three years ago, I found out that there was a fellow (W4JCV) on RTTY about fifty miles from me. He had been on RTTY for about a month and had been trying to get someone interested in RTTY. He had prevailed on W3NL to get on RTTY so my first acquaintance with ham radio RTTY was hearing two audio tones singing to each other on the high end of the two meter band. That was it; I was going to get **on the air** on RTTY.

Back in those days, and mind you this was only three years ago, all you had to do was drop John Williams $60.00 and in thirty days your model 12 arrived! Nobody wanted teleprinters, just to use on two meters—that is, no one but a few eager beavers, and I was one of them.

I will never forget the day it arrived. What a hunk of junk! There was a three inch coating of grease and crud on all of the working parts. I was horrified. Was this RTTY?

About six hours later, after going to work with a clean rag, a paint brush and some cleaning fluid, a machine emerged. By golly, even the paint looked pretty good. The type was not badly beaten, and the rubber platen could be recovered down town for only three dollars. Now the show was on the road.

I had built up my converter (terminal equipment) from instructions I had purchased from W2BFD and had added a few of my own innovations. Of course there was "auto start."

(Continued on Page 2)

RTTY

NEWS OF AMATEUR RTTY

HORSE TRADES

This page of the Bulletin is for use of amateurs who have teletype equipment for sale or trade and for those looking for equipment to buy or trade. It is a free service and may be the means of getting some one on the air.

For Sale—Model 12 with Sync Motor W6ILW
For Sale—Sync motor for 14 or will trade W9LKK
For Sale—Model 12 complete, sync motor, A. C., Printer ..... W6KNI or W6EV
Wanted—Model 12 Sync motor and gears W9LKK
Wanted—813, will swap 215A relay or dual vib pack 300v at 150 ma. Or collectors items (Japanese radio equipment) W5ENH
Wanted—Terminal Unit or T. U. Kit W6TQY
Wanted—Keyboard for model 12 and sync motor for model 15 ..... W6DTZ
Wanted—Tape Gear ..... WØCIH
Wanted—AN/FGC-1 Manual W2VDM
Wanted—Keyboard for model 12 ..... W9SPT
Trade—12TT with keyer for 15 printer W6HFK
Wanted—Model 14 Keyboard and Base
WØLQH, 1134 Mill St., San Luis Obispo, Cal.

RTTY SOCIETY OF SOUTHERN CALIFORNIA
3769 East Green Street
Pasadena 10, Calif.
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GETTING STARTED ON RTTY on a Good Foundation

(Continued from page 1)

Since I intended to get on two meters with "AFSK" (Audio Frequency Shift Keying), I had built an audio oscillator which the keyboard of the Model 12 keyed (thru a 6H6 or 6AL5 diode) from 2975 to 2125 cps. So I had the two tones there to feed directly into my converter to get **local copy and test the converter in any way.**

That is what we call getting started on the right foot. We had a good audio oscillator standard so we spotted the two tones pretty well. Then also, W4JCV had a set of tuning forks so I put the tones right on the snoot! The audio oscillator circuit I used had adjustments for both the mark and space tones.

See Figure One, which shows the diode keyer. You should use the best possible inductance for the oscillator. Ideally, it should be a toroid of about 500mh. Most of the felllows use a Miller inductance (Miller #961; 150 mh.) which is a little small for the job since it takes a lot of capacity to get it down to mark (2125 cps.) and the output drops off. Modify the inductance by adding a powdered iron slug to set the 2975 frequency. If you can promote a toroid (I finally did) you can really build a better oscillator.

Later on we decided we wanted to have a REAL standard which we could use to set the audio tones EXACTLY. The way to do this is to build a 425 cps. tuning fork standard. This takes a Saturday morning and costs you about $8.00 if you have to buy all the parts. Why 425 ? Well, 5 times 425 is 2125 and 7 times 425 is 2975: grab it? If you are musically inclined you can feed the 425 cps. from your audio oscillator into headphones or or a speaker and adjust the 2125 and 2975 cps. tones to zero beat, assuming they were close to begin with. The best way is to use a scope and adjust to get the correct lissajou pattern (1x5 and 1x7).

The fork for the job can be obtained for about $2.00 at a music store. Buy the 440cps. fork and grind it at the base between the tines until the frequency moves down to 425. Add and remove solder to adjust frequency exactly. The circuit for the fork oscillator is shown in Figure 2. How do you know when you get to 425 cps? There are several ways. Here in Washington there are several multiplex circuits. The repetition rate of these circuits is 425, plus or minus a cps. Also, we have furnished a number of stations a dictaphone memobelt which has both 440 from WWV and 425 from my fork recorded on the belt. The fellow borrows h's steno's playback machine and adjusts the speed of it until the recorded 440 and WWV are zero beat. Then the 425 is correct. We have several of these memobelts which we mail out to the fellows for the purpose. They always come back to me with profound thanks. We get a big kick out of loaning them. Here is another way to set to 425. This one is for fuss pots—the fellow that wants it within a fraction of a cycle. It requires the availability of a stable, tuneable audio oscillator, a scope and the ability to count. Here is the theory. WWV modulates it's carrier with an audio frequency of 600 cps. every alternate five minute period. Five sevenths of 600 equals 428.570 cps. The difference between 425 (desired) and 428.570 is 3.57 cycles per second or 214 beats per minute. You can count 214 beats per minute very easily. If the count is off by sixty, say 214 plus 60, your fork oscillator is low by 1cps. To set up, follow these instructions: Tune your receiver to WWV and wait for 600 cps. tone. Feed receiver output into one set of scope plates. Set up 5x7 lissajou pattern. Remember this will require the audio oscillator to be slightly higher in frequency than the fork driven oscillator. Before the audio oscillator has a chance to drift, feed it into a speaker or headphones together with the output of the fork driven oscillator and count the number of beats that occur in a minute. If you are off by 60 beats (say low) your fork is one cps. high. Use a bit of solder on the end of the fork to lower it's frequency and file solder off to raise it. A trick to help count the beats is to count in batches of ten, and mark a piece of paper for each ten counts. We have used this method also to set up a series governed motor on 368 operations per minute; it's easy.

Now let us review; we have decided to key a two tone audio oscillator with our keyboard to generate the mark and space tones. We can set tones as accurately as we want by using an audio oscillator, borrowing a memobelt, or building a tuning fork standard. The two tone audio oscillator will be switched into the converter to obtain local copy for testing, or when transmitting. If we used AFSK (two meters) this gives us a complete layout. The same audio oscillator is used to feed the transmitter speech amplifier. If you wish to use FSK we must create it using a diode keyer, or any suitable method. We use a polar relay in series with the one that keys the printer to key regular 150 volts into a potentiometer which is used to set the frequency shift of the transmitter. Figure 3 is a block diagram with details of the parts under discussion. If you use no polar relays and in leiu thereof use a flip flop to drive triodes to create the FSK voltage and also drive an electronic keyer, these parts substitute for the polar relays. Refer to Page 9 of the April issue of RTTY for details if you do not wish to use polar relays. Since we have audio tones available for 2125 and 2975 cps., we can easily set up the frequency shift of our transmitter oscillator. To do this we turn on the vfo, and tune the receiver to the high side of the carrier until a 2125 cps. note is heard. Use the 2125 cps. tone from the audio oscillator to beat against. We have a "space" button on the keyboard to "open" the circuit from the keyboard to create a steady space tone. It is used at this point to allow us to feed a steady space signal (2975) into the converter. This drives the FSK polar relay to "space" and the Frequency Shift Adjust Potentiometer is used then to set the VFO frequency to obtain a 2975 cps. tone. Easy; simple as falling off a log.

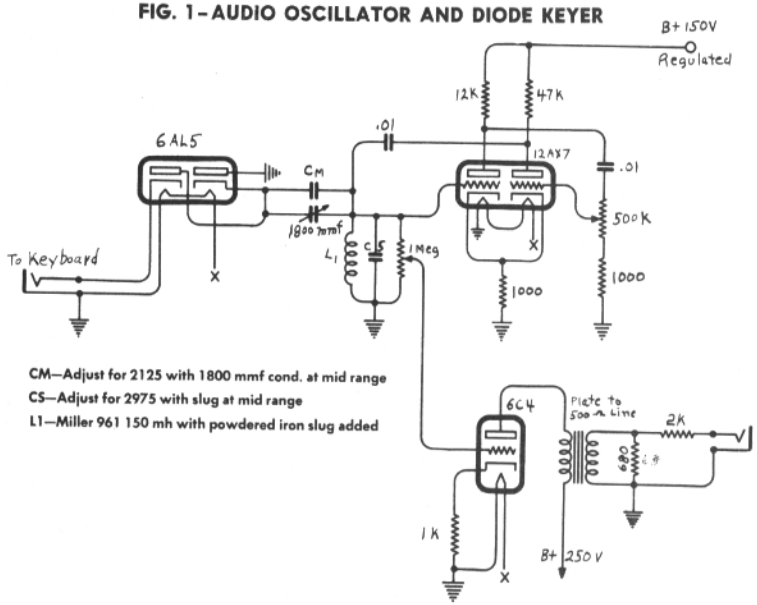
You will note on Fig. 3 that the input to the converter control switch is labeled "From Receiver to Patch Panel." Let us carry that lead back to a patch panel and get into discussion of teletype systems layout. The foregoing part of the article is a "build up" to what to what to follows now. We are a firm believer in what we call the "audio" concept of teletype systems layout. It means that when you patch in tape signals, or patch from unit to unit, you patch audio, insofar as it is practical. For example, when we obtained tape equipment we used the tape distributor to key a polar relay that in turn keyed a separate audio oscillator that became the "tape signal output". When we have trouble with the tape gear we plug into the output of this oscillator and can listen to what is going on. A dirty tape distributor is easily spotted, and so on. We leave unit on "autostart" plugged into the output of the VHF receiver. All of this plugging is done, using a simple patch panel, shown by Figure 4.

If you don't like a patch panel, use a multi-position switch. We prefer the patch panel since it gives us the availabilit of the circuit for listening with headphones or plugging in other circuits for various tests.

We can sure hear the voice of some die-hard in the backround saying, "but you get the tape signal by going all the way through the converter". Yup! that's right, we do. We find that the range of the signal out of the FSK diode is still 10-90 so what are we worring about?. If your range is poor you have trouble in your converter. What is range? We are surprised that more fellows on RTTY do not know what RANGE means. Perhaps this should be the subject of another article. What do you think?

Circuit Diagrams are shown on pages 4 and 5.

FIG. 1 – AUDIO OSCILLATOR AND DIODE KEYER



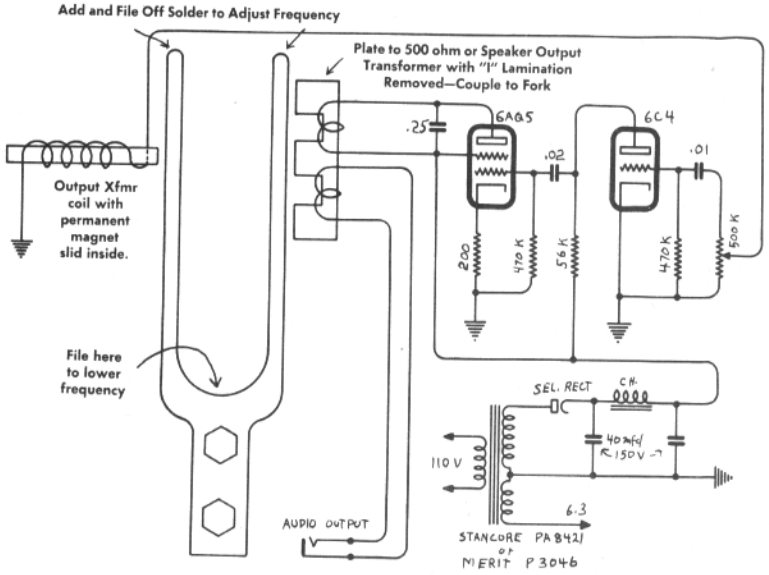


FIG. 2 – TUNING FORK OSCILLATOR

FIG. 3 – BLOCK DIAGRAM FSK KEYER - CONVERTER - AUDIO OSCILLATOR

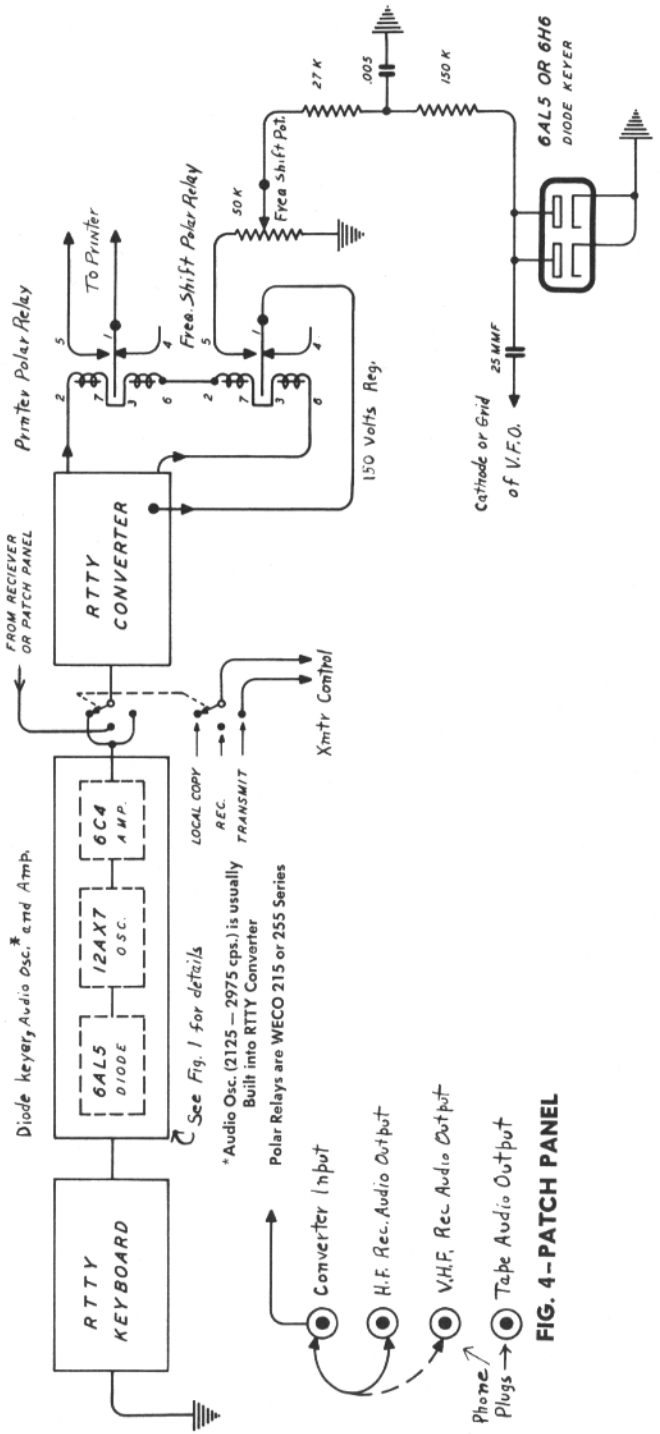


FIG. 4 – PATCH PANEL

TELETYPE News

Published monthly for the employees of the Teletype Corporation. Main Plant, 1400 West Wrightwood Avenue, Chicago 14, Illinois.

Section 7013 Dan Mulcahy, *Editor* Mack Hamblen, *Assistant* Ext. 587

PAGE 2 AUGUST 15, 1953

SCRAP EQUIPMENT, purchased in search through war surplus stores, was cleaned up, overhauled, and adapted for receiving Teletype signals by radio. Ray Morrison, seated, demonstrates equipment to Steve Janiszewski (1210).

400 'Hams' Take to Air Via Radio-Teletype

General Bach, Admiral Ammon and General Blake, Army, Navy and Air Corps communications' heads, recently issued over the air a joint message to all radio-Teletype "Hams" complimenting them on their ingenuity and enthusiasm.

The message went out coast-to-coast to approximately 400 hams who have entered the field of amateur radio-Teletype, now only ten years old.

W9GRW, call letters of Ray Morrison in Skokie, was one of the three stations in the Midwest area to record the message perfectly—word for word.

A ham radio operator for many years, Ray's knowledge earned him a commission in Naval communications in World War II.

After the war, Ray's enthusiasm for amateur radio-Teletype communication led him to searching war surplus stores for Teletype equipment. Several years of shopping netted him a Model 12 machine and associated equipment, all in need of repair. Months of sanding contacts, improvising part replacements and adapting for radio finally paid off — radio-Teletype station W9GRW was on the air.

Practically all the radio-Teletype hams are using 12's which have been used commercially for 25 to 30 years, but a few — very few — are operating with 14's, 15's, 19's and 26's.

"Our No. 1 problem is getting equipment," explains Ray. "Besides the 400 now on the air, we have another 400 hams in the United States with partial equipment and still another 1200 who will get into the radio-Teletype field as soon as they can get surplus equipment at reasonable prices."

Radio Teletype Adapter

"The enclosed brochure was copied from a Navy publication and as far as the Navy is concerned, the information contained therein may be reproduced, with no objection."
Lt. Richard (Dick) Ferree, WØOYS

The reception of radio-teletype signals can be accomplished with standard Ham receivers through the use of an adaptor which may be made small in physical size and which requires only minimum of parts, most of which are found easily obtained. The receiver adaptor to be described here includes its own power supplies and associated circuits. It should be noted that the unit is designated to operate into a teleprinter line operating on a neutral basis, the d-c resistance of which does not exceed 250 ohms.

All of the components are assembled on a single aluminum chassis. The first model constructed being quite small, the chassis size was 7¼x5¼x3 inches. Placement of parts and the available chassis will determine the final size in every case. In no instant, however, are there any critical construction requirements except for the observation of the polarity marking on the crystal diode and the placement of an 0.01 uf capacitor directly between the plate pin and ground of the cathode follower. The cathode of the diode should be connected to the grid of the first section of the d-c amplifier. Leads to the 0.01 uf capacitor should be kept as short as possible to eliminate any tendency for the output stage to oscillate.

The schematic for the adaptor is shown on a following page. The full-wave positive d-c power supply, comprising T-101, V-104 (5Y3), L-101, C-106, and R-108, R-109 and R-110, supplies 200 volts at 70 milliamperes. This supply is used as plate and screen voltage for the output cathode follower and operating current for the teleprinter line relay. The half-wave, negative d-c power supply, consisting of one half of the secondary of T-101, V-103 (5X5), and an RC filter composed of R-107, C-107 and C-108, delivers a negative 140 volts at 10 mills. All voltages are measured with respect to ground and are more than sufficient to provide optimum operation of the unit. R-111 is used as a voltage-dropping resistor and also serves to protect the winding of T-101, should a heater to cathode short develop in V-103.

The signal converter-amplifier portion of the adapter consists of a germanium crystal diode used as a clipper, CR-101 (1N34), a two stage d-c amplifier, V101 (6SL7), and an output cathode follower, V-102 (6Y6). Bleeder resistors, R-103, R-102, R-104, connected across these resistors establish the operating points for both sections of V-101. The cathode of V-101A is held at 138.5 volts below ground for an effective negative grid bias on this section of 1.5 volts. The cathode of V-101B is held at 95 volts below ground. These cathode potentials remain stable since the total current through both sections of V-101 is much less than the 7 mills drawn by the voltage divider bleeder.

The negative 1.5 volt operating point for V-101A was chosen so that the plate of this section, connected to the grid of V-101B, would draw sufficient current thru R-105 to cause the potential on the grid of V-101B to be equal to or slightly more positive than the cathode potential. Since the cathode of V-101B is held at a negative potential of 95 volts, this zero or slightly positive bias causes V-101B to draw maximum plate current thru R-106. Under this condition, the plate of V-101B and the grid of V-102 connected together, assume a negative potential of 75 volts. Since the cathode of V-102 is returned to ground the negative 75 volts on the grid of V-102 holds the cathode current of this tube at approximately zero.

When a signal, normally consisting of pulses of 1000 cycle audio energy, is fed into the input of the signal converter through capacitor C-101, the germanium diode CR-101 clips the negative alternations from these 1000 cycle pulses. The remaining positive alternations are then applied to the grid of V-101A to cause an increase in plate current of V-101A and an increased voltage drop across R-105. The grid of V-101B, connected to the plate of V-101A, therefore, assumes a negative potential of 135 volts because of the increased voltage drop across R-105. The grid of V-101B at this point has a negative bias voltage volts volts because its cathode voltage is still 95 volts below ground. This bias is far in excess of that necessary to reduce the plate current of V-101B to zero. Thus there is no current thru R-106, and the grid of V-102, connected to the plate of V-101B, is at ground potential and V-102 conducts. Capacitors C-102 and C-103 are used as filters to remove some of the 1000 cycle a-f component from the dc pulses.

Current requirements for a normally connected teleprinter do not exceed 60 milliamperes. Initial adjustment of the line current to this value is made by adjusting the screen voltage of V-102 with potentiometer R-109 while holding closed the spring-loaded switch, S-102. As can be seen from the schematic, S-102 shorts resistor R-106 to ground, grounding the grid of V-102. This essentially the same condition that is obtained when a mark signal is being received. Since a mark signal is delivered to the unit in the form of 1000 cycle audio pulses, conversion of these pulses from a-f to d-c is accomplished.

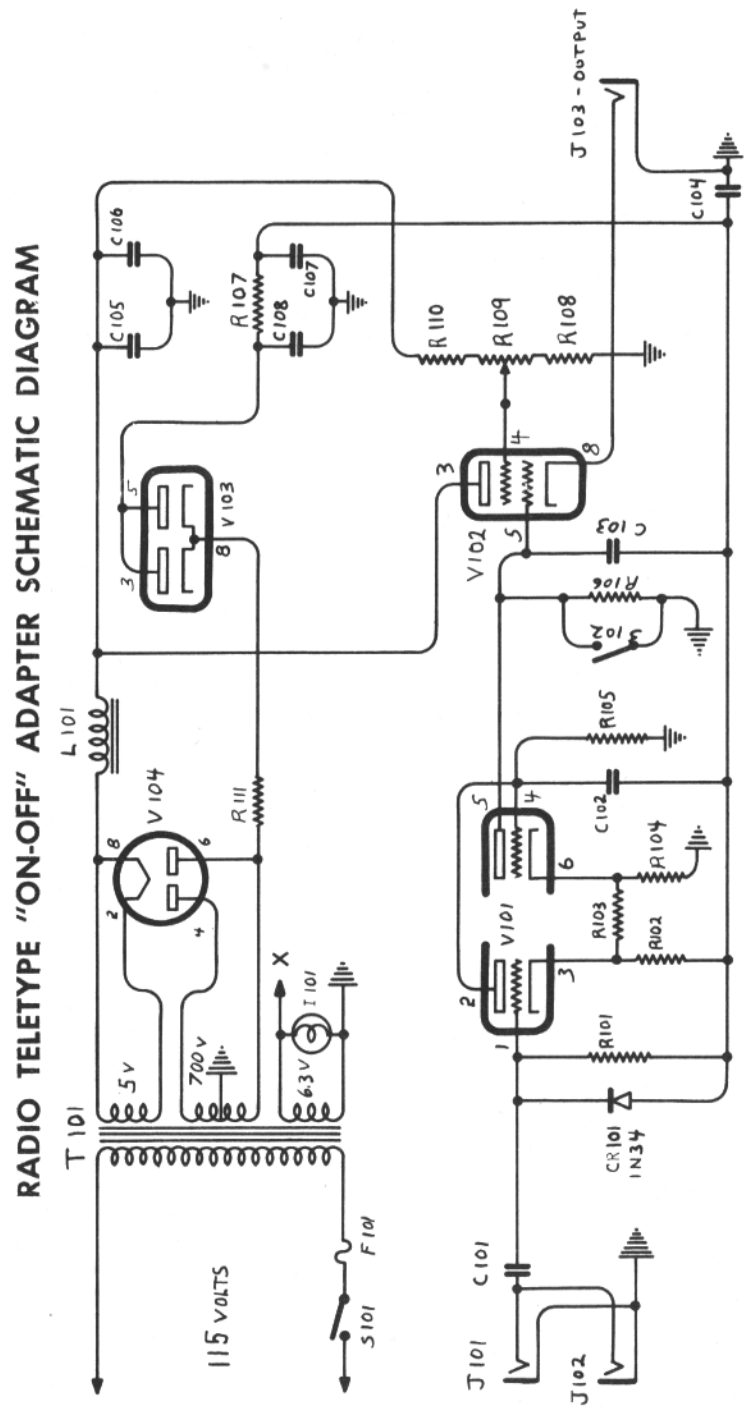
Any receiver equipped with a beat-frequency oscillator can be used with this adapter. Better results will be obtained however, with a receiver which also employs an audio filter. Receivers of this type are the numerous. The audio output of the receiver should be connected to the adapter input jack J-101. If the output is obtained from the receiver headset jack, the monitor jack on the adapter, J-102 provides a convenient point to monitor receiver tuning. The adapter output jack J-103 provides a connection for the receiving teleprinter. The tip contact of the jack is positive, and, as an aid to proper teleprinter operation, a 100 milliampere d-c meter should be connected in series with one of the leads to read teleprinter line current.

The procedure for receiving radio-teletype signals is the same as that used for the reception of c-w signals. If the receiver used has no audio filter, the b.f.o. should be tuned to zero beat with the frequency shift space signal. The mark signal then will appear as a beat tone which will operate the adapter. If the receiver has an audio filter, however, the b.f.o. should be tuned until the mark signal falls within the pass band of the filter. The gain control of the receiver is used as a threshold control and should be set midway between the two extremes of those settings which give faulty operation of the teleprinter. Such an adjustment is one that will produce an a-f signal of between 0.6 and 1 volts r.m.s., at the adapter input. (Too great receiver gain will result in blocking the adapter and continuous holding of the teleprinter on "mark," while if the sensitivity of the receiver is too low, the teleprinter will print erratically). No further receiver adjustments, except those necessary to compensate for frequency drift, will be required.

The only adjustment to the adapter is the depressing of S-102 and the adjusting R-109 to obtain a teleprinter line current of 60 milliamperes. No further adjustment of the adapter unit is required unless the teleprinter is moved to a new location or th adapter tubes are replaced.

It must be emphasized that the adapter will perform satisfactory only on a solid circuit. It is not intended to replace regular fsk converters, but only to provide an additional radio-teletype circuit under certain operating conditions.

RADIO TELETYPE "ON-OFF" ADAPTER SCHEMATIC DIAGRAM



C-101, 102, 103, 104—.01 uf, mica, 500v
C-106, 105—16 uf, elec., 450v
C-107, 108—16uf, elec., 250v
CR-101—Germanium crystal diode, type 1N34
F-101—Fuse, 250v., 1 amp.
I-101—Pilot Lamp, 6.3 v., 0.25 amp.
J-101, 102, 103—Phone Jacks, standard
L-101—Choke, 10 henry, 85 mills.
R-101—120,000 ohm, 1 watt, 20%
R-102—180 ohm, 1 watt

R-103—5,000 ohm, 1 watt
R-104—15,000 ohm, 1 watt
R-105—1 megohm, 1 watt, 20%
R-106—150,000 ohm, 1 watt, 20%
R-107—5,000 ohm 5 watt
R-108—10,000 ohm, 5 watt
R-109—5,000 ohm potentiometer, 2 watt
R-110—5,000 ohm, 2 watt
R-111—10,000 ohm, 10 watt
Resistor tolerances 10% unless otherwise stated

S-101 Toggleswitch, single pole, single throw
S-102—Switch, SPST, spring loaded normally off.
T-101—Transformer, Power, Pri. 115v 60 cps.,
Sec. 5v 2 amps., 6.3v 2.5 amps.,
700v, 85 mills, center tap.
V-101—6SL7
V-102—6Y6
V-103—6X5
V-104—5Y3
X-101, 102, 103, 104, Octal Sockets

Reduction of Transmitted Distortion from Keyboard

COURTESY OF JOHN WILLIAMS, W2BFD,
VHF Teletype Society

Distributors using cam-operated contact pairs reduced Telegraph Company maintenance considerably by elimination of the carbon or gauze brushes. They are also much more compact. Unlike the segmented disc-type distributors they can, and frequently do, introduce distortion into the transmitted signal unless they are initially properly adjusted. With sufficient brush contact pressure and a tight clutch spring (to prevent slippage) a disc-type distributor may be considered distortionless.

Cam-type distributors are now used in a large variety of telegraph printer equipment but the most common is the sending keyboard of such models as the Teletype Models 12, 14, 15, 19, 20, 24, 26, 28, 31 and the W. U. 100 Series and all Kleinschmidt Machines.

It is quite common for RTTY operators to receive a report of perfect copy on tape but garbling on manual keyboard operation. It is the purpose of this bulletin to demonstrate a method of measuring and eliminating this distortion without access to a distortion meter set as used by the commercials and which costs many thousands of dollars. The job merely requires a few minutes longer.

The measuring device may be any receiving device capable of being "ranged" while receiving signals. The Model 12 Printer does not fall into this category but any single magnet printer or reperforator such as the Models 14, 15, 19, 24, 26, etc. will serve for the test or, better yet, a disc-type distributor such as the combination send-receive distributors obtained through the VHF Teletype Society, in conjunction with any five-magnet printer such as the 12 (typing unit) 21, 25 or 5-magnet reperforator. The distributor alone may be used with 5 neon bulbs, connected to its segments, may be used as a measuring device if no five-unit multimagnet equipment is available.

TEST PROCEDURE

(1) With an RY tape in the tape equipment (either owned or borrowed) check the sending-relay contacts for as near zero bias as possible with an ohmmeter. On repeated "RY" signals the meter, connected between relay marking and armature contacts, should indicate a hair to the marking side of the mid-scale (it would be mid-scale were the "stop" pulse not 42 percent longer than the other six pulses).

(2) Transfer the ohmmeter to the contacts of the receiving polar relay with the tape still sending "RY." Make sure there is no bias here and that the meter reads same as on the sending relay. From this point on do not touch any relay or bias adjustments.

(3) On the receiving device find the high and low extremes of the printing "range." (The point where at least two solid lines of RY can be received without error). Note these extremes. The mid-point is halfway between these two extremes.

(4) On the keyboard (or other cam-operated device to be tested) the letters "RY" should be typed. (The tape equipment should be off, of course) the two extremes of the range should now be located exactly as before. It is possible that two conditions will be noted, (1) the range is not as wide as from the disc-type distributor faceplate and (2) the mid-point between the two extremes will be either higher or lower than the midpoint of the tape sending. Accepting the range from the faceplate as being essentially distortionless a lower "midpoint" from the keyboard cam indicates that the start-stop contacts are not breaking soon enough. (This is the rearmost of the six-contact-pairs on the keyboard sending distributor). The remedy for condition is to bend the outside (left hand) rearmost contact slightly to the left, which causes the right hand contact to part company with it a trifle sooner on the down-slope of the cam-lobe. A high "midpoint" indicates the reverse trouble and the remedy is to bend the contact in.

(5) In most cases the foregoing will be all that is required to eliminate the reports that the keyboard does not produce as good copy. For the perfectionist the number 1, 2, 3, 4, and 5 contacts can be checked by comparing the tape-sending range on the letters "E," "Line Feed," "Space," "Carriage Return" and "T" with the ranges obtained from sending the same code symbol on the keyboard. Bending of the outer member of the corresponding contact-pair on the keyboard will correct each one. However the Start-Stop pair lengthens the Start pulse at the expense of the Stop pulse duration. At the receiving printer the "sampling" takes place too soon and thus lowers the range and the "midpoint."

(6) Homemade keyboards do not have this trouble as most of them use the disc-type distributor associated with their tape equipment to "double-in-brass" for their keyboard. With electronic distributors of the multivibrator type distortion similar to cam-contact maladjustment can occur due to wrong timing but can be measured and eliminated by the foregoing technique quite easily. The timing potentiometer on each multivibrator, in this case, bears a close relationship to the contact "dwell" of the cam-contacts.

(7) An oscilloscope can be employed for measuring distortion if it possesses a linear sweep capable of operating near 6 cps. Better displays can be had with circular or spiral sweeps employing gear-wheel or dotted patterns. In order to synchronize the Teletype equipment with the 'scope, a pulse can be taken from the sending distributor to "trigger" the sweep. In the case of the circular or spiral sweep it is simpler to trip the keyboard clutch permitting it to send repeatedly than to attempt to generate a circular or spiral sweep from a "Start-Stop oscillator. (Not impossible but rather difficult). The "Start-Stop" oscillator must start and stop without transients or it will, in itself, introduce distortion into the trace by lengthening or shortening some pulses.

(8) A great deal of distortion is, unwittingly, introduced at the receiving printer by neglect of the lubrication of the reciving distributor felts (in all models except the new 28). Dry felts increase the clutch friction to the point where it may damage the selecting mechanisms and, as the range is set with the felts properly oiled, will result in a bad range. On all models felts are oiled by merely prying the clutch metal discs apart and applying oil. Discs should be kept separated until oil has saturated the entire felt. The model 12 machines require this at approximately one-month intervals. Both front and rear felts should be oiled. IMPORTANT! No attempt to measure or correct for distortion should be made if series-governed motors are used unless the speeds have been checked. Sending shaft speed should be as close as possible to 368.1 r.p.m. and the receiving brush or cam should turn at 420 r.p.m.

Comment on Adjustment of Distributors

BY TED SWIFT, W6CMQ

The following is offered as a possible alternate method with the thought that once the equipment was assembled it could be used again and again, and could be used via radio to check distortion in cam operated distributors of others. Once the equipment was in operation the check would be simpler and faster than by the method previously described.

Build a resistance-capacity type audio oscillator adjusted to approximate sync with the No. 14 Transmitting Distributor. Feed output through resistance-capacity phase splitting network to oscilloscope to give a circular sweep.

Arrange to increase voltage output of audio oscillator from pulses generated by the 14 Transmitter Distributor as the brush passes across each break in the commutator. This should give pips on the scope extending outward from the circular sweep.

Arrange to decrease voltage output of audio oscillator from pulses generated by the cam-operated distributor to be tested. This would give pips on the scope extending inward from the circular sweep.

Compare the length of arc from each pulse to determine which contact requires how much adjustment in which direction.

NOTE—RTTY reprinted Issue No. 2! A card will bring anyone a copy wishing them. Chokes are still on hand, however not too many—Ed.

Regular Meeting of Society

The Regular meeting of the RTTY Society of Southern California was held at the home of William Driml, W6NAT, on Saturday, October 1, 1953 with 17 members and 1 visitor present.

W6FLW, Emile Duval, again acted as Chairman and W6SCQ, Louis Rogerson, Secretary.

The meeting was crowded with discussions on various subjects relating to our activities on RTTY, with the low frequencies getting a lot of attention.

Emile Duval gave his report on Net activities and it appears that the Net is now getting down to a smooth routine.

Appointments for Net Control Stations were assigned to the first of the year, following an alphabetical listing, so that members can expect to know just about when it is their turn without refering to any list.

W6ZBV, Cecil Crafts, brought along a tape recorder and after playing a tape he received from Wayne Greene, W2NSD, which sent greetings to the Western amateurs from individual members ofthe Eastern group assembled at their club meeting, requested that our gang re-record the tape in a like manner and the fellows all came up to the mike and gave their comments to the Eastern RTTY gang.

After the meeting was adjourned, the host brought out the goats milk and the other usual refreshments.

Those present were:

Art Addaway	W6MYC
W6ILW	W6EV
W6BWQ	W6KNI
W6IZJ	W6SCQ
W6JAU	W6FLW
W6IIV	W6ZBV
W6NAT	W6CL
W6PNW	W6UPY
W6OQB	W6YGC

STATION INFORMATION ON W6AEE

Equipment consists of a pair of BC-348 receivers, one for the vertical antenna and one for the horizontal antenna, (Used for diversity reception) Terminal unit (converter) is similar to the one described in December, 1952 CQ, with the modification described in the September RTTY. A home asssembled Model 15 is used for page copy, and a model 14 typing reperforator is used with a Model 14 Transmitting distributor. The small unit to the right of the receiver is a Standard Coil TV tuner modified for 15-10-6-2 meters. All the transmitting equipments are remote controlled. An ARC-5 VHF with MD-7 modulator is used on two meters. A pair of 304TH's in the final feed a 66 foot vertical antenna. The top of it is 82 feet above the ground. Provisions are made to operate on the higher frequencies by adding a feeder which is parallel to the main radiator. The vertical series tuned to ground is used on eighty. The Vibroplex on the desk in the photograph is for appearance only. Hi.

. . . . W6UPY de W7IAB in cold northern Seattle. Well ole thing, guess we will have to call it a night here also."
(This was copied off Attu Island)

* * * *

. . . . So wonder if you will mind if I QRT for about half an hour and will be around later on and perhaps Merrill out in Pasadena, Calif. will be on. W1 BGW de VE3GL, Toronto, Canada.

* * * *

We are a little short of space again this month so we will have to cut this a little and try to get more in next month.

* * * *

. . . . W6UPY Rolling Hills signing off with W6WYH and standing by for W6 GFI . . . .

* * * *

. . . . I think I will lie down on the couch here and see how close to midnight I can awake, hi. Then Ham for a few hours then I can retire again. So 73 to you two nice gentlemen and will see you both later. W6KNI, W6EV de W6FLW, Whittier signing off and clear.

* * * *

. . . . You might comment on the oil biz. W6CLW de W6NWM GA.

. . . . RYRYRYRYRY W1BGW, VE3GL de W3PYW RYRYRYRYRYRYRY. Just finished breakfast you counted me in at the precise correct moment Jack, Hi! Dont know how long you are going to be able to stick around Rube. Your XYL up yet??? Breakfast was good. Two great big flap jacks, Canadian style, with maple syrup and a double "pop" sized cupa coffee. Well Rube you still with us?? VE3GL with W1BGW de W3PYW.

* * * *

. . . . W6UG W6UG de RTNET W6IZJ, GA will tune for you, give a long call.

* * * *

. . . . CQ CQ CQ de W5WAT, W5WAT, Lubbock, Texas.

* * * *

. . . . W1BGW de W1AW, Swell again Jack but want to tell you that when you tried to ring my bell here I got this ' ' ' '

* * * *

. . . . RTNET de W6CYR in Santa Ana, No Traffic . . . .

* * * *

. . . . W6SCQ de W6ICS, Fine and solid copy Louie, thanks for the QSO. . . . .

* * * *

. . . . W6NYF de W6IZJ. I am all fouled up here Roy. Some local interference.

* * * *

. . . . W6IZJ de W6CLW kill the last, listening on two . . . .

* * * *

. . . . CQ CQ CQ de WØNME, WØNME. Stratton, Nebr.

* * * *

. . . . W1BGW de W1FGL Belmont Mass. Hello Jack how are you copying me tonight? You are coming thru here pretty well with some pretty bad QSB at times for some reason. How are the Six Dusky Madens doing over there? . . . .

Comments from Readers

"The List of members follows: W7 AVC, W7BA, W7CO, W7CBE, W7DET, W7EJD, W7FNA, W7GHW, W7HLU, W7HRC, W7JNC, W7KBM, W7KV, W7 OMQ, W7OYO, W7PWQ, W7QSX,W7 RPZ. Among the above are some dog-gone sharp fellows. Some like myself can only follow where others lead, but by far and large I think they are a good bunch."
—73, Harold (W7HRC, Hot-Rod Charlie)

"Your interesting circuit in the August issue of RTTY seems to be fuel for the fire (Make and Break RATT). Should you wish to correspond further in regards to this matter of on/off keying, MAB, I would be delighted to hear from you, or from any others you know who would care to discuss circuits or practice. Regards."
—Bruce, WØHZR

"Liked the pictures in the latest issue. Think photos of the gang really go to fill out a publication like that. Take up lots of space but they tell a big story. Will send you one when I get a good one. Sure would like to see more pix of the west coast and their layouts."
—73, Jack, W1BGW
(Send in your photos and a brief write up—Ed).

RTTY is the Official Publication of the

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W6CLW—Ed Simmons
W6AEE—Merrill Swan
W6SCQ—Lewis Rogerson

For Traffic Net Information:
W6FLW W6IZJ

For "RTTY" Information:
W6CL W6CLW
W6DEO W6AEE

Traffic Net News

EMILE DUVAL, W6FLW

The Southern California Radio Teletype Society Net operates every Tuesday evening at 7:30 p. m. on 147.85 mc.

Activity for the month of September:

September 1—W6NWM, N. C.—9 Check

W6BWQ	W6IZJ
W6CLW	W6NWM
W6DEO	W6RL/6
W6EV	W6CL
W6FLW	

September 8—W6FLW, N. C.—12 Check

W6AEE	W6NAT
W6BWQ	W6NWM
W6CAP	W6RL/6
W6CL	W6SCQ
W6EV	W6FLW
W6IZJ	W6ZBV

September 15—W6FLW, N. C.—18 Check

W6FLW	W6IZJ
W6AEE	W6NAT
W6CL	W6NWM
W6CLW	W6PNW
W6DEO	W6RL/6
W6EV	W6SCQ
W6EZP	W6ZBV
W6CAP	W6WYH
W6CYR	W6SCK

September 22—W6SCQ, N. C.—10 Check.

W6FLW	W6KNI
W6AEE	W6OQB
W6CL	W6NAT
W6CYR	W6SCQ
W6EV	W6RL
W6IZJ	W6ZH

September 29—W6RL, N. C.—12 Check

W6CL	W6KNI
W6CYR	W6NWM
W6DEO	W6NAT
W6EV	W6RL
W6FLW	W6EZP
W6IZJ	W6ZBV