

RESULTS OF THE SIXTH SS CONTEST

The 1958 RTTY Sweepstakes contest was surely not just another SS contest as reported last year. Nearly two hundred stations were active during the thirty hour period. RTTY was QRMing RTTY all over the various RTTY frequencies, with a slight spreading out of stations at times. Top honors go again to Jim Hepburn, VE-7KX, with a total of 9212 points for 49 sections worked, and 94 stations worked and copied TWO WAY. Close behind

Year	SS	Top Score	Station	Points	Stations on 29 sections
1953	SS	440	W3PYW	12	
1954	An. SS	840	W2JAV	16	
1954	SS	2262	W3PYW	30	
1955	An. SS	2800	W2BDI	32	94
1955	SS	1720	W3PYW	24	
1956	An. SS	3968	VE7KX	32	
1956	SS	5500	VE7KX	37	
1957	An. SS	2376	W2RUI	22	
1957	SS	5500	WOBP	34	87
1958	An. SS	6039	W2RUI	47	
1958	SS	9212	VE7KX	55	200
1959	An. SS	???	???	73?	300

Fifty-five of the seventy-three ARRL sections took part with New Zealand, Australia and Okinawa also active. Missing sections were North Dakota, Tennessee, Western Mass., Vermont, Maine, Nevada, So. Car., West Va., Wyoming, Western Fla., West Indies, Canal Zone, and in Canada, Maritime, Ontario, Manitoba and Saskatchewan.

Station	Sections	Stns.	Pts.	Scores
W1AW	11	17	34	374
W1BDI	22	34	68	1496
W1BGW	9	20	38	342
W1ZXA	11	15	30	330
K2HHH	14	27	54	756
W2JAV	34	85	170	5780
K2OBJ	15	30	60	900
W2PE	10	10	20	200
W2RUI	38	100	200	7600
W2TKO	35	80	160	5600
W3CRO	15	20	40	600
W3MHD	13	17	31	349
W3PYW	26	68	135	3510
W4AYV	10	14	28	280
W4EHU	5	5	10	50
K4RRG	32	80	160	5120
W5BOT	17	26	52	884
K5SPU	9	10	20	180

were, W2RUI, Skipper, 7600; WOBP Beep, 7326; W2JAV Phil, 5780; W2TKO Roy, 5600; K4RRG Bert, 5120; W6FYM Howard, 4466; KH6IJ Nosey, 4050; W9ROQ Brownie, 3840; and W5YM Jim, 3720. These top ten are not new to amateur RTTY and have been in most of the past contests.

A recap of the past contests is as follows:

Station	Points	Stations on 29 sections
W5TVG	8	8
W5YM	31	60
W6AAN	1	1
W6AEE	25	45
W6CCG	26	45
K6CHR	15	24
W6FKQ	3	3
W6FLW	15	17
W6FYM	29	77
W6GDO	27	62
K6HHD (YL)	4	5
W6HIF	1	1
W6JCK	23	40
K6JPR	6	6
W6LFF (YL)	8	10
W6LIP	10	12
W6MTJ	25	57
K6NAR	16	29
W6NRM/6	23	54
K6OWQ (YL)	11	15
W6VPC	6	9
W6WIS	16	26
K6ZBL	7	14
W6ZBV	17	37
W6ZNU	7	10
W7CBE	1	1
W7CSC	6	10
W7HRC	4	4
W7IE	13	34
W7LPM	21	54

W7RQQ	18	34	68	1224
W8CAT	10	12	24	240
W8LEX	10	15	30	300
W8QMI				70
K9BRL	17	28	56	952
W9ROQ	32	60	120	3840
W9VMG	10	15	30	300
WOBP	37	100	198	7326
WODW	3	3	5	15
WOFQW	21	36	72	1512
WOJHS	3	3	6	18
WOKXB	6	12	24	144
WOYMB	5	5	10	50
WOZWN	6	6	12	72
KH6IJ	27	75	150	4050
KR6AK	9	14	28	252
(operated jointly with W6KUY/MM)				
VE7EP	11	15	30	330
VE7KX	49	94	188	9212
KL7BK	12	17	34	408
KL7MZ	26	42	80	2080
ZL1WB	Two Way			15
	Receiving only			132

Other stations taking part, but no logs received were:

W1MB, W1OUG, W1GNS, W1IYU, W1NCL, W1OSY and K1GAD; W2s, GWL, QFR, KTX, PBG, JCM, AWL, RGO, PAT/2, TOX, OEM, PAU, FBS, IHE/2, K2USA and WIDHJ/2; W3s GEN, PRQ, K3EKP; W4 IYP, K4MEH, K4UJH; W5sCEZ, ETX, K5KWB, K5LQL; W6s, OWK, CQI/6, DEO, PHS, ASJ, IWA, QMO, PW, NKP, RPR, FNC, GFI, LDF, OUL, ONQ, K6GN, K6QLT, K6-ICZ, K6KRH; W7s, EBQ, ETD/7, BDK, HPH, GLZ, GQM, VKZ, VMN, HZC, FYM, BEG, SFK, PHG, NMK, NAP; W8s, BL, AXT, FEU, GIG, JS, MNZ, MUK, OCC, RTZ, TLW; W9s, BMV, SPT, YT, FXV, GRW, GPL, QMU, LMX, KOY, LDH, QIX, UMU, PRX, K9AAJ, K9ODR; W0s, FMK, EIQ, DGA, BDZ, ERB, AIS, ITX, LFH, HJX, NNXXJP, KOORK; W4-IFW/KH6, KL7AUV, KL7ALZ, VK3KF, VE6HM, VE8AN, VE8PB, VE7AIK.

How many did you work, and how many did you hear that could have been worked if there were more or better gear? The 1959 Anniversary Contest will be held starting Friday February 13th at Six PM E.S.T. and run for thirty hours, ending at midnight E.S.T. on the 14th.

Messages shall consist of message number, originating station call, check or RST report of two or three numbers, ARRL section of the originator, local time (0000-

2400 preferred), date, and band used (Meters or Megacycles).

Scoring will be one point for a msg sent and received for entirely by RTTY, and one point for a message received and acknowledged by RTTY. Relaying or repeating by a third station disqualifies the message. The total message points is multiplied by the number of ARRL Sections worked to compute final score. 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. ARRL Sections are as listed in QST (usually page 6) covering Canada, U.S.A. and some possessions. Each foreign country not included as a section but regarded by ARRL for DXCC credit is treated as a new section for RTTY multiplier credit.

Entries to the contest must be mailed within 15 days of its close, and must contain a tabulation of complete message data required by paragraph above both for messages sent and received. It should clearly indicate each new section worked, total section multiplier, total message points, computed score claimed, and a signed statement that all rules have been complied with. At the suggestion of any amateur (or on its own initiative) the judges in the contest may request the original printer copy from any contestant, it being interpreted as record message communication within the meaning of FCC Reg. 12.136 (h) to be retained one year.

Certificates of award will be issued to the highest scoring station in any state in which there are 3 or more contestants. However an exception may be made where home state or country competition is not available provided the applicant specifically requests the award and makes a satisfactory showing of operation at least one quarter of the contest time and his score is above the lowest one-fourth of the contestants. The decisions of the judges are final.

Contest hours may be changed from time to time. Currently they are: Start; Friday 6 PM EST, 5 PM CST, 4 PM MST, 3 PM PST. End; Saturday 12 M EST, 11 PM CST, 10 PM MST, 9 PM PST.

As the contest nears the date Feb. 20th commemorates the anniversary of FSK authorization, only F-1 emission will be used in this contest on bands between 3.5 and 30 Megs.

Getting on the Air with RTTY

By Merrill Swan, W6AEE

So, you now have a model 26 Teletype*. Where do you connect it to your receiver and transmitter? Should be a jack for those two plugs somewhere on the gear. No, don't seem to find the right jack anywhere. Guess it must take something else. Wonder just what?

Well to start out, the printer and associated keyboard were designed to operate on a wire line connecting two or more stations. The keyboard and printer are connected in series in the same manner as a normal telegraph circuit, and then a source of DC to operate the magnets. If a second station is to be operated, a wire line connecting the two together must be added with a polar relay in series with the line instead of the printer magnets. Then an additional DC supply was added to operate the printer magnets from the polar relay contacts. To operate these teleprinters on radio, a means of developing DC from the Radio signals must be provided. The most obvious method is that of supplying a carrier which can be demodulated and used to control a local source of DC to operate the printer magnets. This method is widely used to provide DC amplification for telemetering and other similar services. Prior to the FCC authorizing FSK for amateur operations, use was made of transmitting one frequency and demodulating it by use of the BFO in the receiver to provide an audio output. RTTY signals could be transmitted by using the equivalent CW key down condition to represent the condition when the keyboard was not operated. This is the same as the key closed

*Registered Trade Mark of the TELETYPE CORPORATION.

condition for telegraph. At the receiver, the BFO was set to provide 1000 cycles and when the key was opened or the keyboard operated, then pulses of 1000 cycles would be received. This audio tone was then rectified and the resulting DC used to control a polar relay which in turn would control the printer magnets. Of course the reverse of this, ie; no tone when the key or keyboard was open, would then provide a tone when the key was up or keyboard open. The main disadvantages of either type of operation is the presence of noise when the keyboard or key is not operated. This would cause DC to be generated when there was no signal being transmitted. The use of two frequencies which are separately rectified and used to control the polar relay overcome much of the noise problems.

Like normal radio reception, there are many ways in which to recover the intelligence which is transmitted. Normal half wave detectors, full wave detectors, discriminators, and various forms of phase detectors are all used in recovering the DC component from the RF carrier. This difference in methods of recovery of the DC from the radio frequency is the subject of many discussions on Terminal Units and Converters. Other variations are those which use different types of frequency selection, R-C, L-C, filters, of high or low impedance; limiters or use of Automatic Gain Control; DC restorers and so on.

The use of a carrier to recover the DC requires that both the receiving and

transmitting equipment should be very stable, frequency wise. As a shift or drift in frequency is the same as a small change in DC. To overcome this, use is made of Automatic Frequency Control in some equipment. Other commercial services use diversity reception, either frequency or space diversity.

At this stage of the problem many of the amateurs are ready to give up the idea of RTTY operations. But it is not quite as difficult as it seems. First, the receiver should be stable for good CW operations, and like-wise the transmitter should be stable frequency wise, to avoid troubles from QRM. So lets see what is so difficult.

We know that the printer requires approximately 60 mils to operate with the magnet coils in parallel, or 20 mils with the coils in series. The 215-A polar relays requires the same current, except that for polar operation the coils have to be in series. Then when the keyboard is not operated, the relay should make contact so that the external DC supply will give either 60 or 20 mils thru the printer magnets. Then when current flows thru the other coil of the polar relay, this contact opens and the DC current thru the printer magnets will be zero. Many of the amateurs are now using the printer magnet coil in either the cathode or plate circuit of a DC amplifier. Use of the printer magnets in the DC amplifier circuit avoids the RF noise which can be removed by filtering across the polar relay contacts. One thing to be remembered when providing a DC supply for either the polar of the printer magnets, is this, it should be a constant current source. Which means it should be a higher voltage than would be computed by multiply-

ing the 20 or 60 mils by the printer or relay coil resistance. In land line operations usually several hundred to a thousand ohms is used in series with the DC supply to minimize the difficulties from the back EMF. For this same reason the DC detector which drives the DC amplifier, must not have transients which would cause the same errors in operation of the relay or magnets.

You say, why worry about the back EMF kicks? Well, each character of the Teletype code is made up of the presence or absence of five pulses in addition to the Start Pulse and the Print Pulse. Each pulse is 22 mil-seconds long except the Print Pulse which is 31 mil-seconds. In other words, every letter, figure, punctuation, or stunt (line feed, carriage return, bell etc.) is the same length in time. In contrast to the normal CW code used by amateurs, in which the "E" is the shortest and the figure 0 is the longest. Again these times vary with speed. The RTTY code for a given WPM requires every character to be of the same length. One hundred sixty-eight mil-seconds. Next, every character starts with an open keyboard condition, as the first pulse sent. Then if the next 22 mil-second pulse is a closed keyboard condition, and the following four 22 mil-second pulses are open keyboard condition, the letter "E" will be received. One essential part of the operation is that both the sending and receiving equipment operate at the same speed to sample the pulse at the same times as they were sent. For an example, if the transmitter is running much slower than the printer, the pulse which would normally cause an E to be selected, the pulse could extend into the next 22 mil-second period and cause an A to be selected. That is the same as a one and two

pulse transmitted. The other case would be when the transmitting unit was faster than the receiving printer, the closed pulse would occur the time which the start pulse was being used. Either no letter would be printed or a non operation would occur for this one letter.

By use of synchronous operation of all of the printer selectors on a given circuit, a simple code can be used. Only five 22 mil-second pulse are required to give 32 separate characters. That is 2^5 (two to the fifth power). Then if three or four of these are used for the stunts of Figures and letter keys, carriage return, line feed and bell, then fifty-eight different characters or operations can be had for the five pulses either on or off. And last but not least every operation takes the same length of time which is necessary for sync operation.

Much effort was spent in determining the best amount of shift in the two frequencies, which represent the open and closed keyboard condition. At first it would seem that any two frequencies would do, but then what about the second harmonic of the tones. This eliminates any frequencies which are related by a two to one ratio. Next there should be no frequencies generated by the presence of the two frequencies as either products or differences between them. And so on. The two frequencies which were selected for a shift of 850 cycles which is the FCC requirements for amateur operations, are 2125 for the marking (closed) and 2975 for the spacing condition (Open keyboard). Many other frequencies are used for different shift amounts in other services. Shifts as low as twenty cycles are used very successfully.

So, to set down what is required, a

stable receiver with a BFO which can off-set tuned to provide 2125 and 2975 cycles from the output. Next the audio in the receiver should not discriminate against either of the frequencies unequally. Then an AVC or Limiter to provide a constant audio input to the frequency separation portion of the TU before detection. The filters or discriminator should be selective enough to give reliable operation of the DC amplifier which follows the detectors. Between the detectors and the DC amplifiers should be a low pass filter to smooth out the ripple or noise components which are not a part of the signal itself. Normal frequency for cut off is about three hundred or five hundred cycles. Then for means of minimizing the effects of drifting signals either at the transmitter or receiver, a DC restorer can be used which gives a constant DC off condition to the DC amplifier when a spacing signal is received. Then a DC clamp circuit can be used to hold the current to a fixed value. Too much current thru the magnets causes a hold over of the magnets pull and causes false operations.

For the transmitter, a means of shifting the frequency of either the crystal or the VFO, by a fixed amount is needed. The keyboard keys the FSK means in and out of the circuit to cause the five selecting pulses to be transmitted properly. The start and print (or stop) pulse are always sent regardless of what selection is being sent for a letter. Frequency can be shifted by coupling an equivalent inductance or capacity across the frequency determining device. This is common practice in TV receivers to hold both the vertical and horizontal in sync. Relay switching can be used but offers other distortion possibilities in the transmission of the pulses if incorrect adjustment or sticky operation is had.

Mention was made above to sync, and the whole proper operation of a teleprinter depends on it. Even with correctly adjusted shift, and correctly designed

TU's poor copy will be had if sync is not held. Many of the earlier printers had a governor motor to enable one to adjust for sync operation. However most of the later machines have sync motors and hence poor copy is not usually obtained from this source. Another source of trouble in copying when everything else is adjusted correctly is that which comes from bad adjustment of the sending contacts on the keyboard. Closing too soon or too late. Best advise is to leave them alone unless one is prepared to do a somewhat lengthy job. Then normally special equipment is required. To correct for slight mechanical incorrect adjustments a range adjustment is provided on the later printers which can correct for some errors in the sending speed etc.

Well, this will give you some idea of what you are going to have to do in order to operate your new Teleprinter. RTTY will carry more information on the selector mechanism and the range adjustments at a later date. The reference given below should help with design and construction of the terminal equipment as well as the FSK exciter.

An excellent article on design and construction of a terminal unit will be found in the October issue of RTTY, by Bill Gates of the Don-Lee TV Engineering Department.

REFERENCES — RTTY

- Freq. Shift the Easy Way. Feb. '53
- Method of FSK etc. April '53
- Little Gems, etc. April '53
- Adapting ART-13, etc. May '53
- Make and Break, etc. June '53
- Semi-Diversity, etc. August '53
- Getting Started on RTTY. Oct. '53
- Radio Teletype Adapter. Oct. '53
- W6UPY Converter. Nov. '53
- Freq. Shift Keying, etc. Jan. '54
- W6OWP RTTY Receiving. Feb. '54
- Gated Beam RTTY Conv. Mar. '54
- FSK for 32-V XMTR. May '54
- Freq. Meter TU. May '54
- Taming the FSK on Viking. June '54
- Mod. VFO, Viking VFO. July '54
- Simplified FSK. July '54

Behind The Green Keys

DON WIGGINS, W4EHU

FLORIDA ACTIVITY . . .

The Florida gang must be too busy working RTTY to sit down and drop me a card as I don't hear much to report! Glad to hear that Nat, W4AYV has his rig back on after losing a power transformer . . . W4DFU, the Gator Amateur Radio Club at the University of Florida now has available a Model 19 and should be going strong on RTTY.

W4AHA is spark plugging the project . . . W4BI, Brownie, has ordered a Model 26 to use while getting his 15 going! Many of the fellows in the state with printers put them to good use during the recent hurricane threats by keeping tuned to the Miami weather station which sends periodical advisories and bulletins on the storm's progress. Jesse, A4OVO always had the last-minute dope for the MARS net each night. Hope to see the Florida gang on for the big RTTY Sweepstakes the end of this month (See Oct. QST for details) and that we will have a lot more news for next issue!

CHICAGO RTTY MEETING . . .

We had the pleasure of attending the Chi-RTTY meeting Oct. 12, which is held coincident with the National Electronics Conference each year. Over 75 green key punchers attended and we enjoyed meeting WOBP, ole Beep, probably the most active RTTYer in the country, and Byron, W2JTP, who writes the RTTY column for CQ mag. Beep had grown a scraggly looking bear, since he has been referred to as "the old goat" and wanted to look the part! We added to the general confusion by giving a talk on converter design and managed to start a few arguments! Knowing that many of the Florida gang are looking for printers, we queried the group and asked that anyone wishing to sell gear to let me know. Found one good Model 26 in Cleveland for \$60 FOB so will be glad to pass along the dope to anyone interested. Also, if you want a Model 15, Ray Morrison, W9GRW can supply it at \$150-\$250 depending on condition, etc. He builds them up from surplus, replacing all bad or missing parts with new ones. Drop him a note for details.

SOME ADJUSTMENTS ON THE MODEL 26

By R. H. WEITBRECHT, W9TCJ, Williams Bay, Wisc.

A model 26 machine was received by the writer and immediately placed into service at W9TCJ last winter. Over an initial period of several months the equipment developed trouble in both the typing unit and the keyboard to the extent of causing strike-overs, double pulsing, and misprints. The causes of all these troubles have been found and corrected, and the details follow.

THE TYPING UNIT

In the typing unit there is a vertical shaft in the rear; this has the typewheel on its top end and connected thereto is

a "stop-arm" lever which swings over the stop-pins cage. One stop-pin, when selected, stops this lever and positions the typewheel for typing the selected pallet onto the paper. The shaft does not rotate continuously, it only rotates over different angles for successive characters. The other end of this "typewheel shaft", down near the bottom, has a clutch containing two felt washers pressed together against both sides of a fiber driving gear, as shown in Figure 1. The gear rotates all the time being driven by the motor, and the clutch thus "slips" when the typewheel shaft is not rotating.

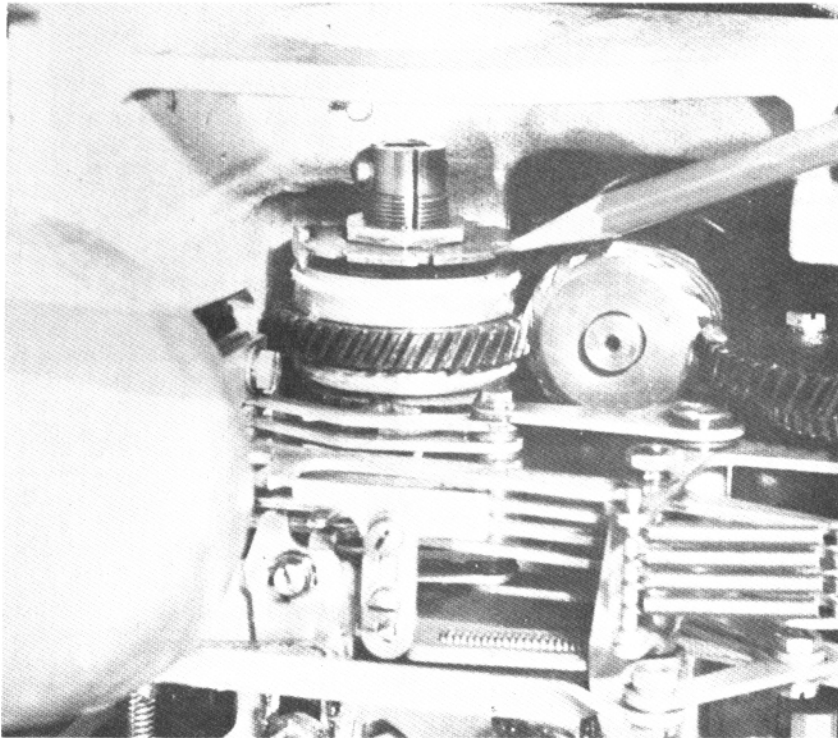


Fig. 1—Typewheel Clutch

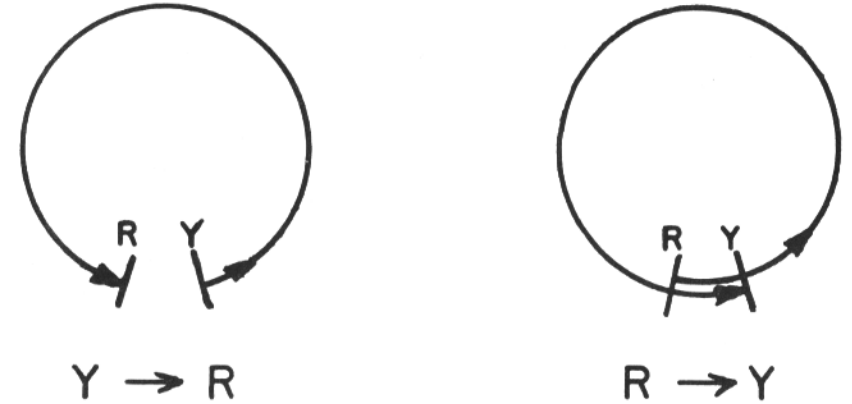


Fig. 2—Typewheel Positions for YR and RY

Thus it is of great importance that this clutch be working properly or else it will give trouble.

Figure 1 shows a pencil pointing out the capstan (notched) nut. This nut forces a special spring onto the whole of the clutch assembly, thus placing a frictional tension in it. Now, suppose this spring tension is weak. This will cause an inertial lag in the rotation of the typewheel shaft to its next selected stop-pin. In other words, the shaft will be slow in picking up rotational speed.

There are certain character-pair combinations on the typewheel where nearly full-rotations of the typewheel shaft are required to select either of these two immediately adjacent pallets. Examples are the RY and YR combinations. As shown in Figure 2, signal transmission of Y and then R will cause a selection and typing of Y, and then the shaft rotates almost one complete turn to the R stop-pin, and the R pallet is next struck. On typing for Y, next, the shaft turns just a bit more than full-turn to the Y stop-pin. There, if the typewheel shaft is

slow in picking up rotational speed, the subsequent operating cycle of the typing unit will hit some other pallet against the paper, rather than the desired one. This results in "strike-overs", near misses, and misprinting.

The obvious remedy is to tighten up on the clutch tension. This is easily done by loosening the small jam-nut bearing against the capstan nut, and rotating the latter one or two notches to the right to increase the spring tension. Afterwards the jam-nut is tightened up. One or two notches should be plenty, and more places an unnecessarily tight tension upon the clutch felts. During this clutch adjustment the shaft should be supported so that its stop-arm lever does not bear against any stop-pin while the nuts are being loosened or tightened. The typewheel clutch should now be tight enough for proper action. The two felts must be kept supplied with oil, as will be referred to in lubrication hints.

THE KEYBOARD

Occasionally the striking of one key on the keyboard caused the printer to

perform two operating cycles. The first cycle would result in the typing of the desired character, and the next cycle consisted of a "LTRS" selection. Investigation of the transmitting cam system showed it to be operating properly, performing one revolution, and no more, for each key operation. An oscilloscope was hooked up to the output of the keyboard, with a battery in series, and the waveforms were inspected. Severe contact bounce or chatter was observed, thus mutilating the individual "bauds" (properly "units") of the signal. Especially the cause of the double-pulsing of the printer was traced to the bouncing sixth-pulse contact; it then setting up a short "false start-pulse" at the end of

the previous keyed signal cycle.

The remedy, and an effective one, consists of placing an "anti-chatter back-stop"* against the row of stationary contacts on the transmitting cam assembly. This is shown in Figure 3, with pencil pointing to the back-stop. It is a great aid in dampening out the vibrations in the "stationary" contacts.

It is easy and simple to make up one from a piece of tin, a piece of cardboard, and some Scotch No. 33 tape. The cardboard is placed under the tape for a cushioning effect against the backs of the stationary contacts. The tin is bent as required so that the cushioned surface rests solidly against all of the

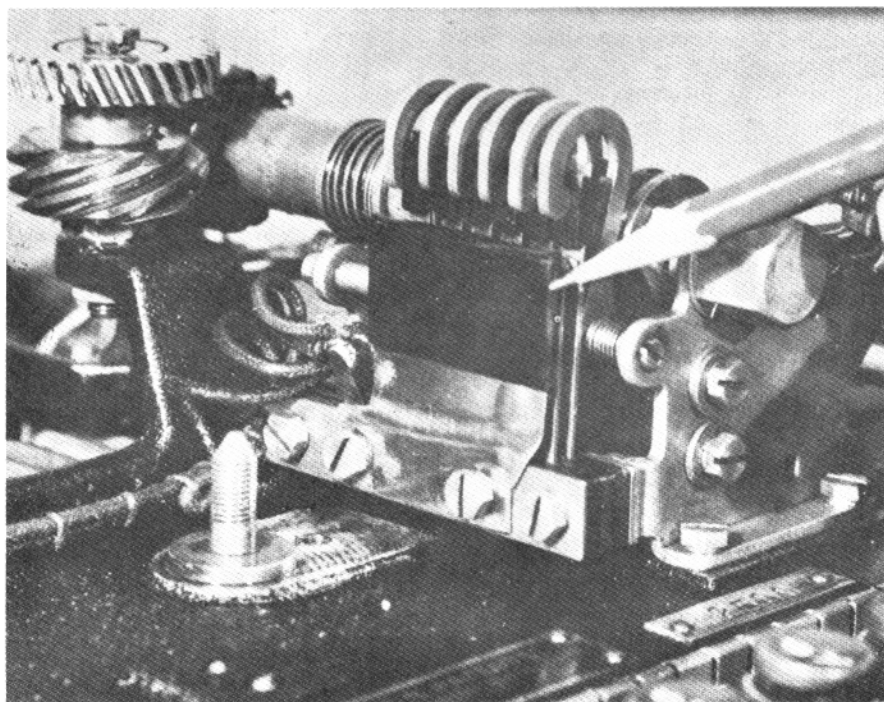


Fig. 3—"Anti-Chatter Back-Stop"

six contacts. Holes were drilled in the tin in such places for the two machine-screws to hold it on the overall assembly.

Several years ago this same treatment was given another Model 26 keyboard which had been mechanically modified to fit on a Model 12 machine set-up. Both keyboards now generate clean teleprinter signals, free from chatter, and have been operating properly ever since these "backstops" were installed. Several other Model 26 owners had the same trouble and the same curative treatment was applied with complete satisfaction reported.

*This term by courtesy W9GRW who states that such items are used by Teletype repairmen.

SOME LUBRICATION POINTS

Some hints will be given only briefly and reference is made to the Model 26 maintenance manuals for the other lubrication points.

The four felts—two on the typewheel shaft clutch and two on the middle shaft, right in the selector unit—must be kept well oiled for proper action. Just pry apart the clutch with a screwdriver blade, and squirt in some oil to saturate each felt. Once a month seems sufficient unless the printer is in really constant use, and then possibly more frequent lubrication will be needed.

In oiling the selector unit felts, and for that matter, the whole unit itself, care must be taken not to allow oil upon the selector magnet armature. Any oil on it causes it to stick to the magnet pole-pieces by molecular adhesion and thus upsets the selector timing, with obviously unfortunate printing results.

Should this occur, it is necessary to clean up the armature and the magnet pole-pieces, and this can be done by wiping them with blotter paper placed between magnet and armature.

CONCLUSION

This covers all the troubles the writer had with his model 26 and all the causes were corrected early last year. The machine has been turning out errorless copy for many months now, with good signals applied thereto, of course.

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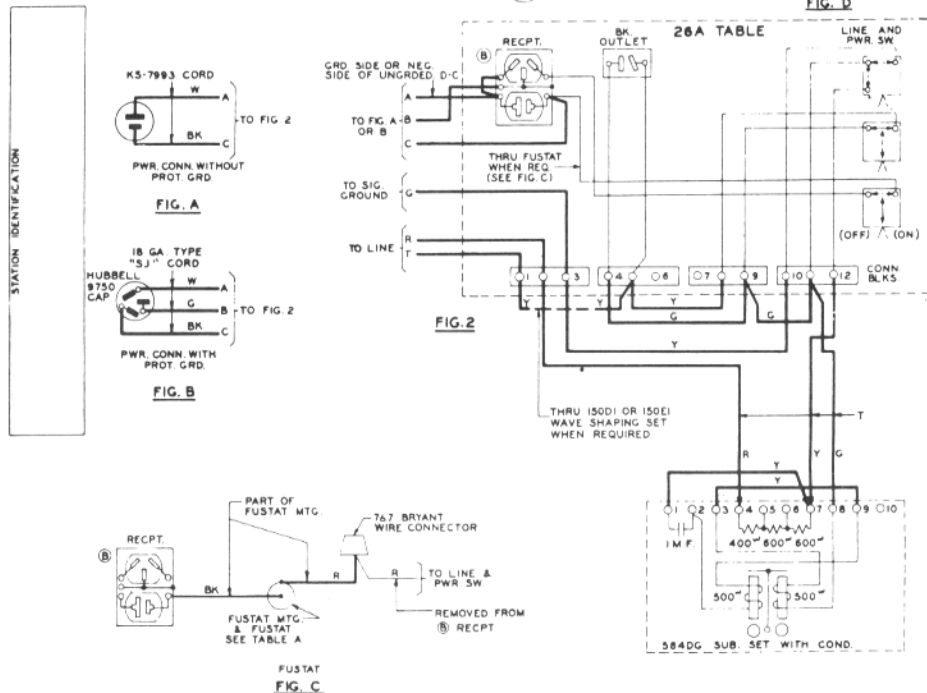
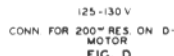
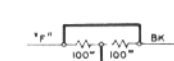
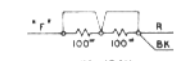
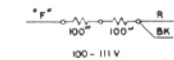
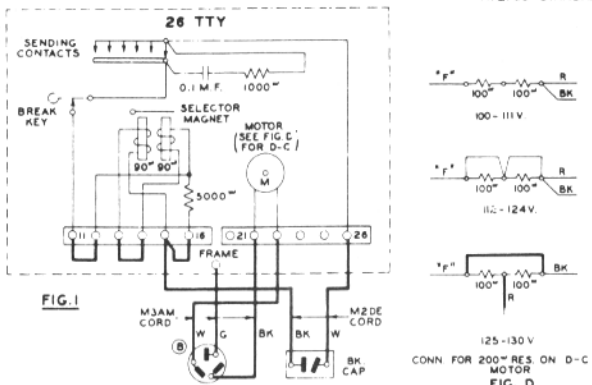
W6AEE — Merrill Swan
 W6SCQ — Lewis Rogerson
 For Traffic Net Information:
 W6FLW W6IZJ
 For "RTTY" Information:
 W6DEO W6AEE

BELL SYSTEM PRACTICES

TELETYPEWRITER STATION INSTALLATION AND MAINTENANCE

MOTOR	FUSTAT	FUSTAT MTG
A-C SYNCH.	9025	BL-0N032
A-C SERIES	9016	BL-0N016
D-C	9008	BL-0N016

TABLE A



26 TTY-26A TABLE
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115V A-C OR D-C

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WIRING DIAGRAM FOR MODEL 26 TABLE
(For those who did not get one with the machine)

FSK UNIT FOR THE 32-V TRANSMITTER

WØJRQ, WØWRO, DENVER, COLORADO

With apologies and much thanks to W9TCJ and W6ZNU who came up with the excellent article in May 1954 RTTY, here are a few changes and I believe simplifications on the method of obtaining the necessary shift and as far as I can see may be used with any TU whereas theirs had to be used with a particular TU to drive it.

The variations from the original circuit are mainly that the signal from the keyboard and the HV is introduced at a different point and the B plus and filament voltage are taken from the can to the front of the Collins VFO unit, making it unnecessary to remove the transmitter from the cabinet and it is a relatively small job to take these voltages out of the can thru a small hole that is drilled in the top center of the square can.

Within this can is a 4 terminal jack block reading from left to right, facing the front of the transmitter, terminal No. 2 in the box is the B plus. Terminal Number 4 is the filament voltage. Both of which of course are used in the 6AL5. Usually there is no lead running up from the actual connection of the 4th terminal so it is necessary to run a small wire up to it so it is easily available in top for the lead out wire.

Our experience proved that particular care must be used in selecting the variable condenser. It should be a good one and must be carefully insulated from

the chassis or from the platform. Walt came up with the idea of mounting the entire unit on a thin piece of bakelite and shaping it to fit around the back of the oscillator tube can in such a manner that the leads are very short.

Also the 100K pot should be a good one and it can be mounted in the case in the end of the transmitter so that adjustments are easy to make.

The shift is first adjusted with the condenser for the correct shift on 80 meters and from then on all adjustments are made by the pot when changing to the higher frequency bands.

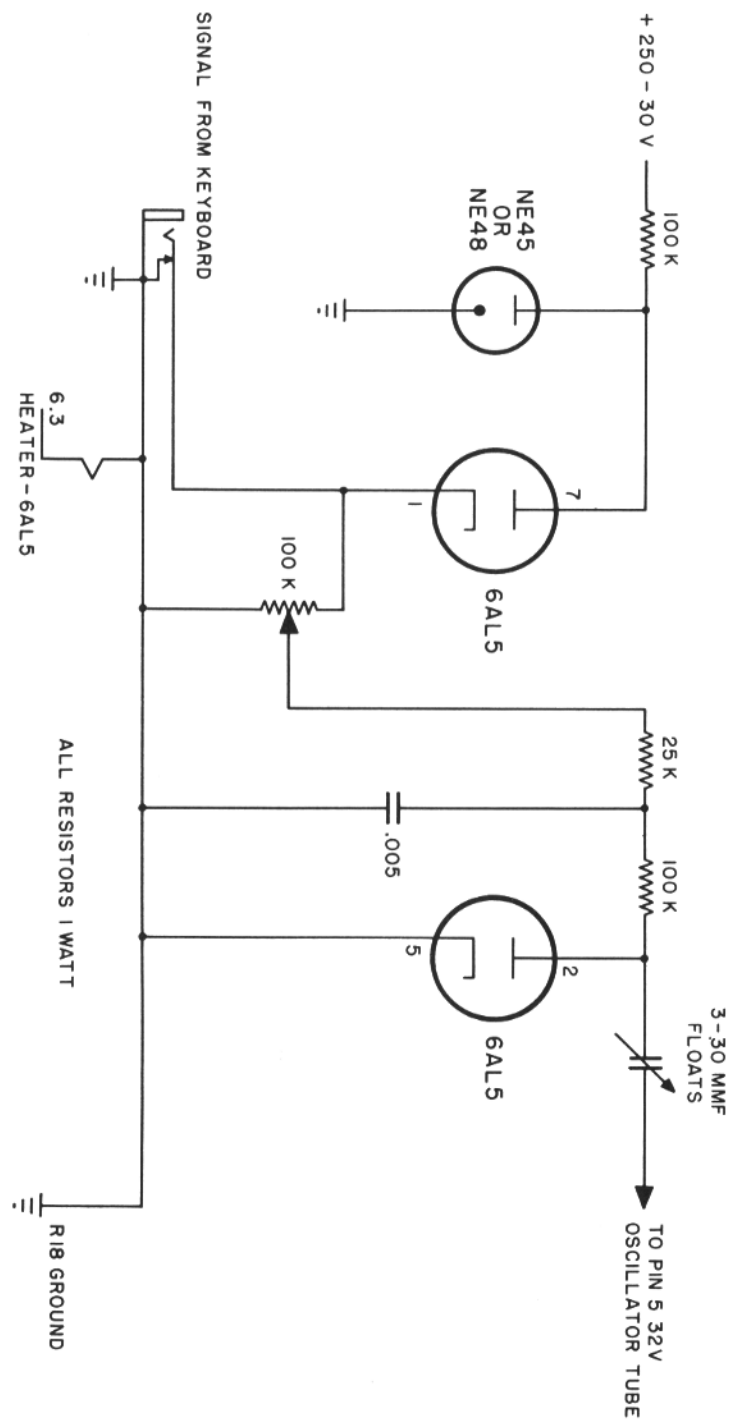
Needless to say, the lead from the oscillator cathode thru the condenser to the plate of the correct section of the 6AL5 must be as short as possible, as well as the lead from the cathode of this tube. The reason of course so as not to upset the calibration of the transmitter.

The other wires can be as long as a well rope.

It makes a nice unit and they seem to give no trouble after installed.

Please understand the changes cast no reflections on the original circuit's ability, but would not work with the Gates TU. It is thought that some of the boys could save a little time by using this modification.

(Diagram on next page)



FSK For The Viking Ranger

Phil Catona, W2JAV, Hammonton, N. J.

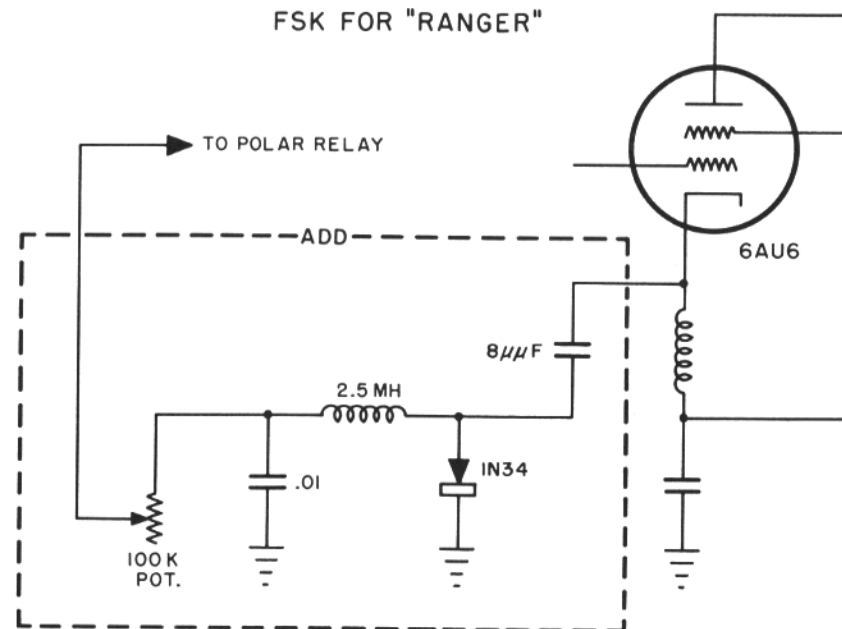
In order to provide drive to a pair of 304-THs in Class B,I purchased a Johnson Viking Ranger to have a simple and effective shift for all bands. Contrasted to some of the other popular VFO's on the market, the Ranger has the VFO and regulator tubes in the same compartment. Also in the same space are some of the resistors for the VFO. Drift due this placement of parts can be helped by moving some of the resistors. Another source of drift lies in the capacitor used to tune the VFO. The bearing are not as good as one would wish.

The circuit of the shift network is shown below. It works very well. All

of the parts are contained in the base of the VFO compartment, that is except the adjustment potentiometer and the keying jack. The pot is mounted in place of the "dummy" Jewel on the left hand side of the front panel. The jack is on the rear chassis skirt in place of the "Ground" post, (enlarged hole) thus the resale value of the rig should not be effected. The shift is keyed in reverse and I like it, that way . . . with an inductance in the circuit, it might reverse the shift when changing bands.

Operation has been quite good, and hope to have a photograph of it later for you . . . 73 Phil.W2JAV

FSK FOR "RANGER"





This month, RTTY is reprinting various circuits from issues, which are no longer in print. These are of such general interest, that this means is being taken to make this information available to our newer readers. A complete index of all technical material which has been printed in RTTY in the last six years will form a portion of a future issue.—Ed.

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All of you will be very busy I am sure, working out the results of the SS and so my comments will be brief and *no answer needed*.

I did get on during the SS but it rather scares me. I did work just one station though, gave W6MTJ a call and exchanged messages but I am not going to submit a log. The next one I should be in the swing and I hope able to give a few of the fellows another figure on their score.

Don, W7CO was out somewhere in the Aleutian chain during the SS. He said he might get on CW and give you a call but not sure about that as he expected to be very busy there. Gang here active on two for the most part but as time goes on I think there may be a few more get up or should I say "down" on forty, etc.

W7CBE Easty

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Here is the log for the best RTTY SS yet. It's good to see that interest in the contest and RTTY in general continues to grow. I was glad to hear that P.T. & T. is releasing some 15 printers. If machines continue to be available it could well be that some large scale traffic nets could be set up.—73.

Bert, K4RRG

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I had more fun than in a conventional DX contest of which I have been entering for the past 25 annual contests.

I could have contacted many of the east coast gang on 80 but didn't get up there until past daybreak on the East and succeeded in only working BEEPWOBP and

heard Frank, W3PYW but not strong enough to print.

I hope to improve my equipment. Auto-start converter was put together one week before contest, toroidals two days before, and automatic carriage return and feedback (homemade) just the day before (after staying up till 3:00 a.m.) but they sure made things easy. So you can see that everything was lashed together at the last minute.—73

K. Nose, KH6IJ

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Have a transistor TU working fb on 800 and 1000 cps shift. Uses three transistors 50 milliwatt types, and keys a printer to full range 90 points! Using only 35 volts for power supply. Certainly feel pleased and proud of it. . . Have not put it in final form but so far it looks most excellent. It's destined for phone patching RTTY, but looks very useable for use on air—RTTY (short shift). And am figuring on new filters for the same TU for broad M and S responses with 850 cycle shift. Man, the transistors are here to stay and we gotta use 'em! I will send you a circuit soon as I can . . . want to have some suggestions and criticisms on the particular circuit as I have it worked out—it's been bench tested and so far as I can see I have tried to keep within transistor ratings, and apparently I have done so.—W6NRM.

I am enclosing you the form of SS contests. This is not very good. Better luck next time. I was assembling wiring W2PAT converter and two polar relays yesterday morning and part in afternoon. Anyway I had some fun. Am going to try out the KY-58/GRT now. The box of it looked monster, when it was delivered to Hills Elec. Bros. in Sacto. I brought it in my car to Chico in order it would save me the cost on the freight. I am azevedoich!! Hi hi . . . I was going to have 05/FR, but George said that he regretted that last one was sold before he got my letter. He suggested me about KY-58/GRT and decided to buy it.—73

W6ZNU, Frank

DX Notes: Eric VK3KF is bemoaning the poor conditions during the RTTY Sweepstakes . . . Bruce ZL1WB has a big list of stations he printed "Down Under" . . . It was the first RTTY SS for Nosey KH6IJ, a relatively newcomer to RTTY, and he made our "Rota Magna" citation first try . . . Cas KR6AK from Asia in the contest worked 14 stations in 9 sections for a score of 252, which is better than many stateside lads did . . . A VK9 in New Guinea is very interested in getting on RTTY . . . Bud, W6KUY/MM is near the southern end of Formosa, although he was with Cas during the contest. The roaming /MM boys miss out on many then to Cubic City PI and Hong Kong, we learn from Cas . . . Curt W2ZXM/MM is in the Pacific headed for Calif. . . that's the DX roundup . . . Jim VE7KK on October 19th did a guest editorial for the awards . . . Bob W6DTN is in Manila, net during his visit to WOBP and it is being echoed in other parts of the world. He sure twisted the lions' tail for RTTY in Great Britain! His suggestion that you talk up RTTY operation to the "G" boys by other modes and mail is still a good one and enough clamoring will jar something loose over there. It looks like VE7KX is top man in the RTTY SS for the third time, establishing new highs of 50 sections worked and a score of nearly ten thousand! Wotta gent!!

Random chats: During the net last week Byron W2JTP, RTTY editor of "CQ," walked into the WOBP shack. He said a few words from the 15 at the copilot chair to the net, then took off before we could put him to work like we did to ZL1WB and VE7KX. Some hasty QSO's via the twisted pair landline mustered out eight of the local "Rats" members for a dinner meeting with Byron at the Elk's Club in Minneapolis on Monday evening. When Cas KR6AK didn't work WOBP for ten days he mailed a neat "get well" card! Beep has it hung on the 15 meter transmitter which was awfully sick that Sunday . . . When we casually mentioned a few months ago that the Collins 75A-4 was being discontinued this fall due to manufacturing costs, there were some scoffers who couldn't understand how any \$800 receiver could be made at a loss! While that is not the whole story, WOC-XX (occasionally on RTTY) told the stockholders last week there would be no dividends because of a net operating loss of

\$256,749. Everyone looks for improvement and the previous fiscal year the profit was \$2,192,946 . . . Narrow shift is being used more now due to crowded band conditions and selective fading. Several of us printed Cas KR6AK solidly Friday night. . . . We chatted via the W6MTJ rig with Bill Gates, famous for his excellently designed RTTY filters he makes as a hobby, and Bob says we made progress at talking Bill into bringing out another economical pair for narrow shift . . . Some of the Twin City boys talk about getting together to manufacture some RTTY gear needed. Who has some ideas? Beep suggests the name "Snilloc," which is a famous name name backwards . . . QST QST QST DE WOBP WOBP WOBP WOBP 7140/21-090 KCS . . .

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W6AEE, Merle

Merrill L. Swan, 372 Warren Way, Arcadia, Calif. Born in Coffeyville, Kansas, July 24, 1906. XYL, Margaret, daughters, Betty and Barbara. 5 grandchildren.

Calls, XZS (before, license) 5-AEE, 5-ADE, 5BFU, W5AEE, W6GGM, W6AEE, W10XGW. Graduated Oklahoma City University, UCLA Biv Adm. , ESMWT program, also was instructor at CIT and PCC.

Member of ARRL, IRE, SEG, AMA, NCARTS, SCRTS, CEMA. Hobbies: photography, music and amateur radio.

Occupation: manager quality control department, Cannon Electric Co. Published RTTY Magazine since 1953, also RTTY Call Book 1956-1958. President SCRTS (RTTY, Inc.) trustee K6EAE Canhams Club at Cannon Electric. Holds California teachers creds. Commercial 2nd April 17, 1924, and commercial fone first, and commercial telegraph second ever since. First issued 5AEE Sept. 23, 1920. Built two broadcast stations in 1925-1926, both still on the air.

(Ed. note:) Merle's love and devotion to RTTY has been like a guiding light to the rest of us when we know of the countless hours he has spent in helping the newcomer to RTTY get started and the many miles he has driven to deliver a Model 26 with no profit to him. We all know how Merle and Margaret have given many hours of their time in getting out the RTTY Magazine, many times digging down to use their own money to make up a deficit. The many hundreds of

us in the Midwest and West Coast are indebted to Merrill and the group down South for their tireless effort in distributing the Model 15 and 26's so generously released to the hams by PT&T.)

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WOGK ES WAOJS ES WOITX DE WOYKZ Wichita, Kansas

Good grief! What a gang. Good evening to everyone. Es arghhh! Keep the world safe for Charlie Brown. Hi there Ralph. What is the good word if any? Say—what has happened to the "Big Beeper" lately. I guess he is too busy to come down off of the big DX to talk to the common slob's anymore.

Oh boy—yes indeed—heads shrunk all over the TV screen. Am now modifying my KWS-1 power supply so that I can give myself some "do-it-yourself" shock treatments. Actually I have a small dachshund who needs them quite badly, and expect to experiment on him. Actually he has already had one series of shock treatments and has another series coming. You see, he is a rather "short grass" dog and is not built for doing the things that dogs normally do when they go outside in the high winter snow. So whenever I send him outside into the snow to do those certain things he gets his shock treatments!

(Sent in by W9LKK)

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Just a card to congratulate you from the Staff of Florida Skip on your 70th issue of RTTY. Truly a great job!

Please pass along out Margaret, Weibrecht, Fletch and the others our congratulations also!

We hope you are receiving Florida Skip in good shape. Feel free to use anything from "Behind The Green Keys" by Don Wiggins, W4EHU. Don is doing a swell job here in Florida to build up RTTY both on the air and thru his column to SKIP. Best of luck to you and your Staff

73—Andy, W41YT

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W6NRM/6, stopped by today and we had a very enjoyable four and a half foot QSO and I came out of it with something I feel is of interest to every Ham operating RTTY.

Bob Mead, K6GZ has developed a method of FSK-CW keying which puts the carrier on the air at any time a key is

pressed, this being accomplished by no more than a micro-switch arranged to put the carrier on the air with each rotation of the cam or for a period of 163 milliseconds, thereby causing a carrier-off period of at least 10 milliseconds, more if you are not typing at the rate of 60 wmp. A break-in station, therefore, has the opportunity of breaking the transmitting station. There are some receiving problems to over-come; the T.U. must have "mark-hold" so it will not run wild during the off carrier period. You should have muting action on the receiver such as that on the Collins 75 series, a T-R switch is desirable as used by most SSB stations. With those minor problems taken care of, it looks like RTTY can now enjoy break-in such as are used in many CW and most SSB stations.

W6VPC

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Enjoy RTTY, best of all radio publications. Just finished November issue. The story of RTTY is excellent, please keep up the good work. I think that RTTY has done more for TTY than any other group.

73—Jim, K6IZY.

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From Harold, W6NKP.

W6KUY (Bud) aboard the Pacific transport was off the coast of Japan November 24, and expecting to leave Yokohama November 26. Due to arrive San Francisco about Dec. 11, or 12. Look for him on RTTY on 21090 or 29005.

Anyone interested in securing a complete set of used bauds in excellent condition, contact W6VVF. These were acquired thru a most fortuitous serendipity.

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W7BEG W7BEG W7BEG W7BEG
Medford Oregon CQ CQ CQ CQ
W7BEG W7BEG DE W9 DPY W9DPY
W7BEG DE W9DPY AR KKK

W9DPY DE W8BEG at Medford Oregon and good evening to you. Here is Chuck and you have a very fine signal and so far copy seems to be good. So how do you do on this signal W9DPY DE W7BEG at Medford Oregon K K K K

W7BEG DE W9DPY Lombard, Illinois Roger and fine on all of that UR 599 599 here in Lombard Illinois. Name is Dave. Dave and very glad to work you

- 0 -

here on the high end of 20 20. Power is 750 750 to a 3. EL Wide spaced beam headed toward Los Angeles. It is bolted and can't be turned without climbing the tower. Again sure glad to work you here.

W7BEG DE W9DPY AR KKK

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W8TLW gave him my number three. But he was unable to get a single word to print, and he never did give me a number so when Beep came back on the frequency I folded up for the night.

Last year I helped Beeps two close competitors W2RUI and W2TKO. By some quirk of fate I refrained from doing that this year and helped only Beep (Rui never came back Hi) I think I was only Minnesota contact for Beep.

Appreciate all you are doing for RTTY. Am enclosing subscription to RTTY Magazine. Last issue I have is August 1957 1957. Please send any available issues from past year as part of subscription. I have purchased the last two RTTY Call Books but am not in it Hi. Will buy the next one if I am listed Hi Hi.

Still using the Model 26 and the W2-PAT converter. Mostly AFSK on two. . . Philip, WOJHS

You will notice by the enclosed log that W4ZC/K2 OBJ finally got in one of these RTTY contests! Only reason that happened was that Dave Walker of this city K2 1AZ/ W1 DHJ came home from OCS and wanted to attempt bettering the record he and his friends made from U of NH (W1 ASZ) last year.

— K2OBS

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RTTY MARK-SPACE-GRAM

Featuring Excerpts from N.C.A.R.T.S.

Bulletins — Equipment Exchange

November 1, 1958

No. 2

(Congrats—RTTY)

- 0 -

By the way, we missed having a good one hr today. Was talking to DL4WX on SSB yesterday on ten and he was just about in tears. He was all set to get GG in the contest and then his rectifier for his DC motor went up in smoke and no replacement parts. It was a bum break.

W6CG DE W7LPM

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FIRST TRANSCON TT QSOS REALIZED! QST, March, 1949

As we go to press, confirmation has been received of successful amateur two-way teletype communication and message exchange between W1AW and W6PSW, Bakersfield, Calif. The stations effected partial contact on January 30th, repeated more successfully on the 31st, and on February 1st rag-chewed and exchanged congratulatory-message traffic solidly. Earlier, on January 23rd, William T. Knott, W2QGH, Larchmont, N. Y., had been able to make rough copy of W6PSW's test transmissions. Stations participating in this notable work used 11 meters and the a.f.s.k. teletype system described by John E. Williams, W2BFD, in October, 1948. *QST*. Left: Tom McMullen, W1QVF, who operated W1AW TT installation during transcon; right: Johnny Agaloff, W6PSW, scans 'print' from W1AW.

