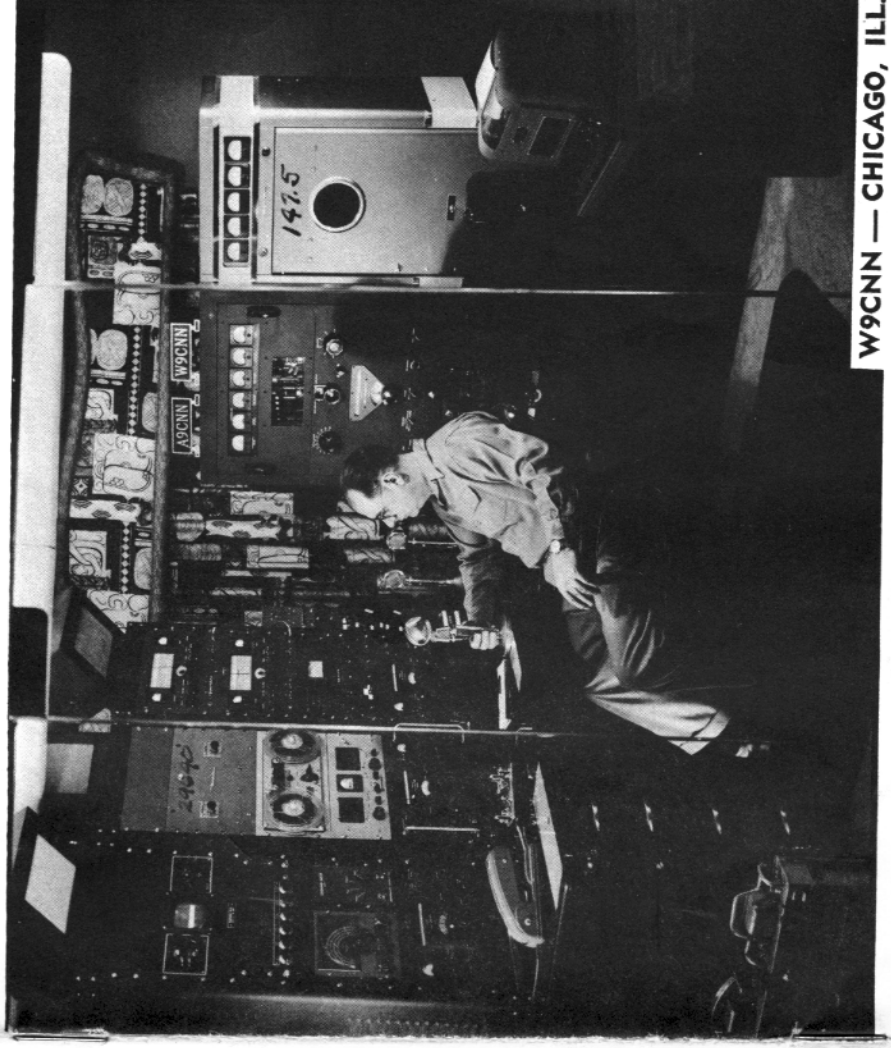
RTTY

NEWS OF AMATEUR RTTY

JULY 1954 — 25 Cents — Vol. 2, No. 7



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 SALES—Model 12 complete with power supply and filters, A-1 operating ,special price to KL7's KL7CK

WANTED—TAPE GEAR W4TJU

FOR SALE—Model 26 with table, gooc condition W4JGD

FOR SALE or Trade—Terminal Unit my design, W6-AEE Filters, good operating condition W6ZBV

WANTED—Model 14 Cover Only W9TCJ

FOR SALE—Model 12 less cover and keyboard W6ZNU

FOR SALE—Model 15 with 1-OE-1, rectifier. Is complete, less cover, and has been recently overhauled and all checks made. Will consider trade for rcvr. W9HNT

FOR SALE or Trade—1 rec. brush type distributor, 2 12 Printers with mount base for both, 1 & 2 tape heads. Auto stop relays with mtg bases. 2 wheatstone polar relays. 1 cover for printer and a couple of 117 volt rectifiers. Will trade for two meter equipment. ..... Jack Gallup, 1715 N. Orchard, Chi., Ill.

FOR SALE—Model 12 printer unit, perfectly reconditioned, cover for above. Receiving distributor for Model 12, AC Sync Motor, W.U. 2-B Keyboard perforator. 2 DC motors for 12 printer, DC motor driven rec. distributor., W. U. Model WU-10A re-perf with table and Sync Motor W2AKE

WANTED—Base, cover, keyboard for Model 15 ..... W9HJV

RTTY SOCIETY OF SOUTHERN CALIFORNIA
3769 East Green Street
Pasadena 10, Calif.
Return Postage Guaranteed

Station of the Month Department

W4TJU - DOUG. WELLS

GAINESVILLE, FLORIDA

The rig is an 813, 225 watts with 811 modulators fone and the VFO is right behind me in the picture. The receiver is a surplus Super Pro (and a good one) and the chassis on the upper deck by the scope is the RTTY TU. I use the scope for tuning in the conventional way and also on the upper right hand corner of the chassis you can see a 6AL7GT staring at you which also makes a good tuning indicator (and which I will describe in my article. The 304TH is a paper weight. The 26 of course is at the lower left with some hot copy on it!

That's about the set up here. Oh yes —that's me staring out at you. The XYL clicked the shutter and the print is by me. I am a darkroom fanatic also.

Modification on the Viking VFO for FSK

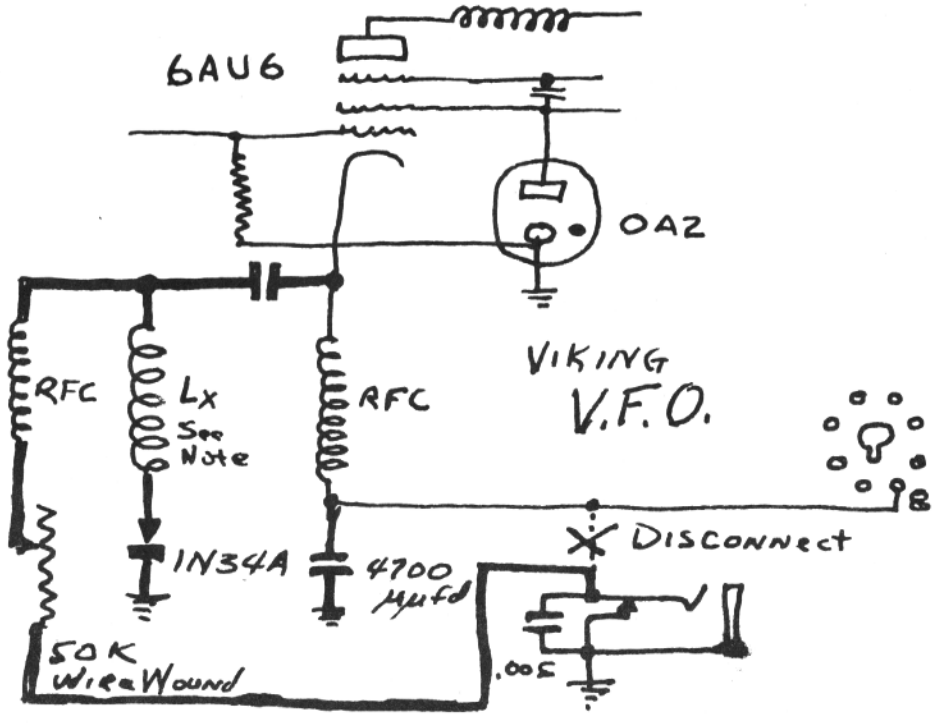
By ED CLAMMER, W2BDI, Merchantville, New Jersey

The circuit below shows the necessary modifications to provide for Frequency Shift Keying. All of the wiring changes are shown in heavy lines.

First, the original connections to the key jack were removed and a 4700 mmfd. capacitor was connected from the lower end of the RF choke to ground. A lead was run from this connection to the RF choke to number eight pin of PL-51 to allow keying from the Viking Transmitter. Next a 50K ohm wire wound resistor was mounted between the lower controls on the front panel. This control sets the amount of shift, and is connected in series with an RF choke to a 1,000 mmfd. silver mica coupling capacitor which in turn connects to the cathode of the 6AU6 oscillator tube. L is a 30 mh coil, which in my case is the antenna coil from a BC746 surplus set. However any similar coil such as a TV slug tuned coil which can be adjusted thru the necessary 30mh range will be satisfactory.

I use the VFO set for the eighty meter band on both 80 and 40. Two settings of the 50K potentiometer provide the proper shift on either band. This system does not require a polar relay, however it is better to use one though.

I have used this modification since June of 1953 and have worked quite a number of stations, including some of the west coast stations.



Definitions Recommended by C.C.I.T.

The following information was submitted by Mr. John Brown of the Shell Oil in Maracaibo, Venezuela. Many of the articles in the past has been some what confused in regards to the term "Baud." The "Baud" is the unit of telegraph speed and can not, therefore, be used interchangeably with "Significant element" or "Unit Interval."—Ed.

1.—Telegraph Modulation and Telegraph Restitution.

Telegraph modulation is the series of discrete conditions assumed successively by the appropriate moving part of a telegraph instrument (or by an electrical device performing a similar function) having a significance according to the code used, with the object of effecting on the appropriate receiving device a series of changes of condition permitting the reconstitution, according to the same code, of the message transmitted. This series of changes of condition is called a restitution of the telegraph modulation.

2. Significant Conditions (of a modulation or of a restitution).

Discrete conditions assumed by the appropriate moving part of a telegraph instrument (or by an electrical device performing a similar function) used to define the modulation(or the restitution).

3. Characteristic or Significant Instants (of a modulation or of a restitution).

Instants at which the appropriate moving part of a telegraph instrument (or an electrical device performing a similar function) reaches its significant condition.

4. Significant Interval (of a modulation or of a restitution)

The time which elapses between two successive characteristics (or significant) instants.

5. Significant Element (of a modulation or of a restitution).

That part of a modulation (or of a restitution) occurring between two successive characteristics (or significant) instants.

6. Unit Interval.

The modulations of the standardized telegraph systems are composed of significant elements having a duration equal to or a multiple of the duration of the shortest element.

The theoretical duration of this shortest element is called the unit interval. An exception to this rule occurs with the start-stop systems for which the stop element may have a duration greater than the unit interval and not necessarily equal to a multiple of it.

7. Unit Element.

Significant element having the duration of a unit interval.

8. Modulation Rate (or telegraph speed).

Reciprocal of the duration of the unit interval, measured in seconds. The modulation rate (or telegraph speed) is measured in Bauds. Example: If the unit interval is 20 milliseconds, the modulation rate is 50 Bauds.

9. Restitution Delay.

The delay between a characteristic or significant instant of modulation and the corresponding characteristic instant of restitution.

10. Isochronous Modulation.

Modulation appropriate to a standardized system in which the significant intervals are equal to the unit interval or to a multiple of it.

11. Stop-Start (or arythmic modulation).

Modulation appropriate to a standardized system consisting of isochronous modulations having a duration limited to a certain number of unit intervals, separated by intervals of any duration equal to, or greater than, the unit interval.

12. Perfect Modulation or Restitution.

Modulation or restitution conforming accurately to the code adopted (as regards both the significant conditions and the characteristic instants).

13. Distorted Modulation or Restitution (or modulation or restitution affected by distortion).

Modulation (or restitution) not having all the characteristics of a perfect modulation (or restitution). For standardized modulations and their restitution, the series of conditions must be in accordance with the code, without omission or addition; this being understood, the distortion concerns only the characteristic instants.

14. Degree of Individual Distortion of a Particular Characteristic Instant(of modulation or of restitution).

Ratio to the unit interval of the displacement, expressed algebraically (i. e. early or late), of this characteristic instant from a specified instant. It is necessary to state in each particular case the basis on which this specified instant is determined.

15. The Degree of Distortion of an Isochronous modulation (or restitution).

Ratio to the unit interval of the maximum difference, irrespective of sign, between the actual and theoretical intervals separating any two characteristic instants of modulation (or restitution), these instants being not necessarily consecutive.

16. Degree of Distortion of a Start-Stop (or arythmic) modulation (or restitution)

Ratio to the unit interval of the maximum difference irrespective of sign, between the actual and theoretic intervals separating any characteristic instant of modulation (or of restitution) from the commencement of the start element immediately preceding it.

(a) Degree of gross start-stop (or arythmic) distortion).

Degree of distortion determined when the unit interval and the theoretical intervals assumed are those appropriate to the standardized modulation rate.

(b) Degree of synchronous start-stop (or arythmic) distortion.

Degree of distortion determined when the unit interval and the theoretical intervals assumed are those appropriate to the actual mean modulation rate of the signals under consideration.

17. Degree of Service Distortion (of a circuit, including apparatus).

Degree of distortion of the restitution measured during an unspecified period of time when the telegraph apparatus is in service. The result of this measurement may be completed by an indication of the probability of exceeding this degree of distortion.

18. Degree of Standardized Test Distortion (of a telegraph channel).

Degree of distortion of the restitution measured during a specified period of time when the modulation is perfect and corresponds to a specific test.

19. Analysis of Types of Distortion.

It is useful, for certain applications, to distinguish:

(a) Bias Distortion.

Distortion suffered by a modulation (or a restitution) of which the characteristic

instants corresponding to a particular change of condition are systematically advanced or retarded.

(b) Inherent Distortion.

Distortion suffered by a restitution when the modulation is perfect and when the receiving device is ideally perfect.

(c) Characteristic Distortion.

Distortion suffered by a restitution when the modulation is perfect, with the normal receiving device in correct adjustment and in the absence of disturbances of any kind.

(d) Fortuitous Distortion.

Distortion resulting from disturbances affecting the circuit including apparatus.

(NOTE: Definitions 10 and 15 do not apply to Teletypes).

RTTY SUBSCRIPTION RATE
$2.50 Per Year

RTTY is the Official Publication of the

RTTY Society of Southern California

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

Permission to copy is granted provided credit is given.

For Information regarding the Society contact the following:
W6CLW—Ed Simmons
W6AEE—Merrill Swan
W6SCQ—Lewis Rogerson

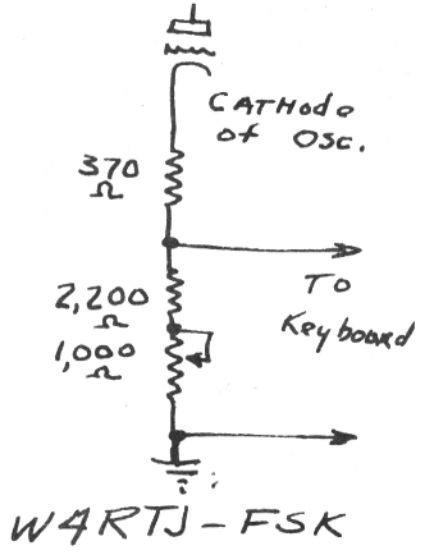
For Traffic Net Information:
W6FLW W6IZJ

For "RTTY" Information:
W6CL W6CLW
W6DEO W6AEE

Simplified Freqnency Shift Keying

I ran into trouble in attempting to use the Diode Modulator Circuits described in CQ and RTTY with the Meisner Signal Shifter. With the frequency changing condenser attached to the cathode of the oscillator insufficient shift is obtained and with injection into the grid Hum Modulation occured. Jack Seitner suggested putting a suitable resistance across the keyboard contacts and the keying plug into the oscillator keying jack of the Signal Shifter. It works. The values used here are, fixed 2200 and 1000 ohm pot in series.

—"Doc" Lipscomb, W4RTJ



COMING!!!

2nd ANNUAL SWEEPSTAKES
OCTOBER 30 - 31

Details to be announced SOON!

7.5 Unit Vs. 7.43 Unit

BY ROBERT WEITBRECHT, W9TCJ
Williams Bay, Wisconsin

Referring to the Electronic Tape Distributor of which I sent you a paper recently[1], I think I should expand a little on why I chose 7.5 Units rather than 7.43, the latter being the standard teleprinter dimension. I did that to keep the distributor as simple as possible. Introduction of the .43 Unit instead of the .5 Unit would have required additional circuits, such as a one-shot multivibrator to delinate the odd-valued "Stop" interval. With all the added circuitry complications, not to mention an added timing adjustment. After all, the difference between 7.43 and 7.5 Units is only one percent. In all my experience with the two models of Electronic Distributors I have built thus far (the 8 unit and the 7.5 unit) I have never run into a situation due to the 8 or 7.5 Unit I used. All printers synchronize readily to the Distributor's signal after several several character trials upon starting up. In case the signal is being transmitted when one's printer is turned on.

So—the 7.5 Unit Distributor actually has a generating speed of 365 OPM, instead of 368. All in all the 3 OPM difference is very insignificant and one obtains the precision and convenience of Electronic Scaning. Of course the distributor driving oscillator could be adjusted to a very slightly higher frequency so as to obtain the 368 OPM, if desired. If this is done, it results in a very slight shortening (overall) of the 22MS Bauds. The net effect would be one percent for the whole of the teleprinter signal (one cycle). This won't hurt printers at all, as they all have a range of something like ten percent tolerance. That is a large in comparison with the one percent difference between 368 and 365. Considering all the above factors, the Distributor is on 365 OPM basis and as it reproduces the teleprinter signal correctly and without error in timing.

[1] Jan. '54, RTTY

Five Unit Visible Code

The following information was sent in by RTTY's good friend, Doc., while at first it may not seem of much use, but after a second glance it has a good use. To identify "slips" or tapes, used in the lead end of the tape for future reference. All of our readers have seen the bank check cancelations which employ punched holes. Here is a simple version which can be used quite easily.

LETTERS

A—V-S-V
B—LTRS-Y-R
C—C-Z-Z
D—LTRS-Z-C
E—LTRS-Y-Z
F—LTRS-S-E
G—C-Z-B
H—LTRS-SPACE-LTRS
I—LTRS
J—N-T-K
K—LTRS-R-Z
L—LTRS-T-T
M—V-A-N-A-V
N—LTRS-A-N-LTRS
O—C-Z-C
P—LTRS-S-U
Q—C-B-V-T
R—LTRS-S-FIG
S—L-Y-D
T—E-LTRS-E
U—K-T-K
V—U-T-U
W—K-O-I-O-K
X—Z-C-Z
Y—A-M-A
Z—B-Y-W

FIGURES

1—LTRS
2—B-Y-L
3—Z-Y-R
4—U-SPACE-V
5—W-Y-D
6—C-Y-N
7—Z-S-A
8—R-Y-R
9—L-Y-C
0—C-Z-C

"I am enclosing several leaflets describing European equipment which you may find interesting. The recently introduced Model 54 is developed from the well-known Model 7 and incorporates all the improvements made to the latter during the last few years as well as several new features. I will be pleased to let you have further information on Creed teleprinters if you want it."

—John Brown, Cia Shell de Venezuela

RYRYRYRYRY

"Things hot and slow here. No leg yet so am out of circulation. Had a nice letter and card from W2PAU re harmonic has from keying FSK. Think there is two approaches, one is reduction of bandwidth, key from 100/200 CPS instead of 2125/2975 he tells me the Navy is doing it now. Says it sounds uike a noisy carrier till you pull out and use filters, then it is as clear as mud. The other way is up my sleeve until I can do some preliminary work on it."

—Doane c/o St. Joseph Co. Infirmary
South Bend, Indiana

"Fellows, drop Doane a line. Ed."

RYRYRYRYRY

"To be honest with you there isnt room for very many more on 7140 at once now as nearly all my contacts are spoiled by QRM from too many RTTY hi, so am thinging of going on 20, until get high power going, am rebuilding shack with acoustic tile, floor tile, etc and new desk and then will get the KW back on the air, and hope to knock a hole in the wall then, hi."

—Don Newman, W7CO

"I got my 26 and it seems to be in good condition, as I had it hooked up and printing an hour after getting it home. At present I am working a six day shift out here at the Station (Press Wireless), but manage to get on the air from time to time and do a little RTTYing, Hi."

—Rich, W6RZL

RYRYRYRYRY

"Thanks a million for the Manual on the 21-A printer. It clears up a lot of questions I had on the operating of the printer." —73, Walter, WØUJC

RYRYRYRYRY

"I am banging this out on my printer so your RTTY eyeballs will be able to read it. Since writing you for information on RTTY equipment. I contacted your old friend Tom Banks and he was good enough to loan me all his copies of 'RTTY.' Now I have so much dope on on terminal units that I don't know which one to try to build." —Doc, W5QZT

RYRYRYRYRY

"For your information my present interest in teletype operation is confined to reception of weather broadcasts from CAA stations at New Orleans and Miami. The weather is a combined hobby with ham radio and I use the information to make up a weather map and do a little amateur forecasting."

—73, Mac, W3OB

"Anyone interested in this phase of RTTY operations, drop Mac a note. Ed."

"I have recently come into possession of a model 26 teletype machine and since I know from nothing about the requirements for getting on with RTTY, I am seeking information. Is it possible to make the oscillator of a BC459 stable enough for FSK? What is the gang on 80 and 40 using for receiving converters? Where and how can I obtain the construction dopeon them?"

—Hratzell Boren, W9FVI

RYRYRYRYRY

"We have been slowed down considerable by the summer noise, which is fierce down here on 80. Of course the boys in the Eastern Seaboard are still on 80 and we hear their signals trickling faintly through sometimes, but not well enough for a QSO. Also, of course the conditions are worse in the summer, and a combination of that with the noise level is just too much for the ole RTTY. 40 meter operation is not so hot for us since you guys out there are on pretty late, our time. And also there is much QRM."

—Doug, W4TJU

RYRYRYRYRY

"Congratulations to Merrill Swan for his excellent monitoring of the 7140 kc RTTY frequency. When I landed at the Mare Island Naval Shipyard I borrowed a local ham station and got on the frequency. I called him three times and signed and there he was. I was in contact with the old home town faster than I could have been by placing a long distance telephone call. (Look who is saying such things! I will probably be fired from Ma Bell in the morning for that one, hi) Merrill has also been sending 'RTTY' to me in the Philippines. Not only have I been enjoying it to the utmost myself but I have been passing it around to my gang. They are all hams and are getting very interested. I wonder what the shipping charges on twenty-six machines to the Philippines would amount to?"

—de W6CMQ

"Thought I would drop you a line or two as to whats going on—the National Geographic Society eclipse expedition is now set up near here on a farm 4 miles north. Right on the middle of the path of totality. There are three of us manning an assortment of cameras, wide angle and color; and photo electric gear. The latter is my responsibility and we are trying to get the intensity profile of the zoduacal light in order to test a theory that the zodiacal light is an extention of the outer corna o fthe Sun."

"This is why W9TCJ has not been on the air—Ed."

RYRYRYRYRY

"I was informed a few days ago that I was to receive a teleprinter probably by next Saturday, in view of this I should like to have the available back issues of RTTY Bulletin. —W6NPB

"There are still a few of the back issues available. Ed."

RYRYRYRYRY

"I enjoyed reading the RTTYs and am now building a W6UPY converter. Hope to be copying RTTY in the not too distant future. I have no rig built up now, however I do have a complete 15 printer, so all the rest is just a case of getting the time and money to get a rig on and a converter."

—Bill, W9ABC

RYRYRYRYRY

"Sure enjoyed my visit with you, W6ZBV, W6IZJ, etc. Mani thanks and hope to see you all and have more time next time. Sure sorry that conditions nd on 7 mc., sure wanted to talk to Frank, W3PYW from your place."

—Bob, W9TCJ

RYRYRYRYRY

. . . . W1FGL de W3PYW RTNET Control. GE Al. You are QSA 4 to 5 here.

Z Signals Used by Commercials for RTTY Operations

The following list of Z Signals was sent in by W6VYI in response to a request for information as to what was used instead of Q Signals.

ZAL—Altar your wave length.
ZAN—We can receive absolutely nothing.
ZAP—Acknowledge please.
ZAR—Revert to automatic relay.
ZBN—Break and go ahead with new slv—Back normal.
ZBR—Break circuit returning.
ZBY—Break, go back a yard.
ZCC—Collate code.
ZCD—Your collation is different.
ZCF—Check your center frequency please.
ZCK—Check keying.
ZCL—Transmit call letters intelligibly.
ZCP—Local receiving conditions poor, please increase to maximum power.
ZCR—Now using concentrator, please make warning signal.
ZCS—Cease sending.
ZCT—Send code twice.
ZCW—Are you in direct communication with....?
ZDF/1-5—Your frequency is drifting to degree indicated.
ZDH—Your dots are too heavy (long) adjust lighter.
ZHL—Your dots are too light (short) adjust heavier.
ZDM—Your dots are missing.
ZDT—Following transmitters running dual.
ZDV—Your dots varying length, please remedy.
ZED/1-5—We are experiencing drop outs to degree indicated.
ZEF/1-5—We are experiencing fillins to degree indicated.
ZEG/1-5—We are experiencing garbles to degree indicated.
ZFA—Failing Auto.
ZFB—Signals are fading badly.
ZFC—Check your FSK shift please.
ZFD/1-5—Depth of fading of your signal is as indicated.
ZEF—Please observe and furnish frome code reports on (call letters and frequency).
ZFK—Revert to FSK.
ZFO—Signals faded out.
ZFQ—Frequency shift your signals to....cycles.
ZFR/1-5—Rapidity of fading your signal as indicated.
ZFS—Signals are fading slightly.
ZGF—Getting fair signal, good for.....w.p.m.
ZGP—Please give priority.
ZGS—Your signals getting stronger.
ZGW—Your signals getting weaker.
ZHC—How are your receiving conditions?
ZHS—Send high speed auto....w.p.m.
ZHY—We are holding your.....
ZHA—How are your conditions for auto reception?
ZIP—Increase power.
ZIR—Your signal has strong idle radiation.
ZJF/1-5—Your frequency is jumping to degree indicated.
ZKO—Revert on on-off keying.
ZKQ—Say when ready to resume.
ZKW—The keying weight of your signal is .
ZLB—Goive long breaks please.
ZLD—We are getting long dash from you (long mark signal).
ZLL—Distorted landline control sigs apparently caused by control wire pickup.
ZLP—Low (minimum) power.
ZLS—We are suffering from a lightning storm.
ZMG—Magnetic activity.
ZMO—Stand by moment.
ZMP—Mispunch or perforator failures.
ZMQ—Stand by for.....
ZNB—We do not get your breaks, we sent twice
ZNC—No communications with.....
ZNG—Receiving condx no good for code, or just no good.
ZNN—All clear of traffic—nothing now.
ZNO—Not on the air.
ZNR—Not received.
ZNS—Here new slip.
ZOH—What traffic have you on hand.
ZOK—We are receiving OK.
ZOL—OK on line.
ZOR—Transmit only reversals.
ZPA—Printer line advance not received.
ZPC—Printer carriage return not received.
ZPA—Punch everything.
ZPF—Printer motor fast.
ZPO—Send plain once.
ZPP—Punch plain only.
ZPR—Rerun slip at present running.
ZPT—Sent plain twice.
ZRA—Reversed automatic tape.
ZRC—Can you receive code.
ZRK—Reversed keying.
ZRN—Rough note.
ZRR—Run Reversals.
ZRY—Run test slip please, send RY please.
ZSF—Send faster.
ZSH—Static heavy here.
ZSO—Transmit slip once.
ZSS—Send slower.
ZTA—Transmit by auto.
ZTH—Transmit by hand.
ZVB—Varying bias.
ZVF—Signals varying in frequency.
ZVP—Send V please.
ZWC—Wipers or clicks here.

Traffic Net News

By EMILE DUVAL, W6FLW

The RTTY Society of Southern California Net operates every Tuesday evening at 8:00 p. m. on 147.85 mc.

ACTIVITY FOR THE MONTH of JUNE

June 1—W6SCQ NC—21 Checkins

W6CAP	W6IZJ
W6CKS	W6JAU
W6DNJ	W6NAT
W6EV	W6NWM
W6FLW	W6RCM
W6FXF	W6SCQ
W6IAL	W6SCK
W6ICS	W6WYH
W6IIV	W6ZBV
W6ILW	W6BPZ
W6AEE (Excused)	

June 8—W6BWQ, N. C.—13 Checkins

W6AEE	W6NWM
W6CAP	W6RCM
W6CKS	W6SCK
W6FLW	W6UPY
W6ICS	W6SCQ
W6IZJ	W6ZBV
W6JAU	W6BWQ

June 15—W6ZBV, N. C.—20 Checkins

W6AEE	W6NAT
W6BWQ	W6MQP
W6CKS	W6NWM
W6DNJ	W6SCK
W6EV	W6SCQ
W6FXF	W6WYH
W6IAL	W6EGZ
W6IIV	W6QYY
W6IZJ	W6ZGC
W6JAU	W6ZBV

June 22—W6IZJ, N. C.—19 Checkins

W6AEE	W6JAU
W6BWQ	W6MQP
W6CAP	W6NAT
W6CLW	W6NWM
W6DNJ	W6RCM
W6EGZ	W6SCK
W6EV	W6SCQ
W6IAL	W6WYH
W6IIV	W6ZBV
W6IZJ	

June 29—W6FLW, N. C.—21 Checkins

W6AEE	W6IAL
W6CAP	W6IIV
W6CG	W6IZJ
W6CKS	W6MQP
W6CLW	W6NAT
W6CYR	W6NWM
W6DNJ	W6PNW
W6EGZ	W6RCM
W6EV	W6SCQ
W6FLW	W6ZBV

W6BNB (San Leandro thru W6CLW)

East Coast Traffic Net

The East Coast RTNET meets regularly on Wednesdays at 8:00 p. m. on 3620 kcs. At present approximately twelve to fifteen have been checking in and taking part in the handling of traffic.

The Mid Western RTNET also meets on Wednesday at 7:00 p. m. on 3630 kcs. from information received by RTTY. 10 to 15 stations have reported in during the last few weeks.

Florida RTTY Stations

W4DFU is the club station of the Gator Amateur Radio Club at the University of Florida. Only available occasionally for RTTY at present but will be more in use later.

W4EHU and W4TJU copied the Armed Forces Day transmission on May 15. Don got perfect copy from NDF and Doug copied from A4USA with only 2 mistakes. Signals were pretty good in spite of local thunderstorms.

W4FPC in St. Petersburg is very much interested in RTTY and was shopping around for a machine when an Elmac caught his eye. So W4FPC won't be on RTTY for a while yet.

W4GZV in Palatka is shopping for a machine now, is all fired up to get on.

W4EHU and W4TJU are checking into the East Coast RTNET but the summer QRN and general conditions are about to get the best of all. Can't print W3PYW a lot of the time and Frank's signal is usually best of all in Florida.