

RTTY ATTENDS ARRL PACIFIC DIVISION CONVENTION

FRESNO, CALIFORNIA, 21 MAY, 1955

The convention committee again this year invited RTTY to take part in the convention program. W6AEE took his RTTY equipment which consisted of a Model 19 printer, a Model 14 typing re-perforator, a 14 transmitter distributor, a SX-96 receiver, and a Heath Kit DX-100 transmitter. The antennas used were 2 vertical half waves, 1 for 40 meters and 1 for 80 meters.

The formal portion of the meeting started at 1:10 p.m. with introductions of these RTTY interested persons present. Among those at the meeting were the following;

W6AEE	W6KHW
W6AFA	KN6KLH
W6BRY	W6KMT
W6BTH	W6LIH
W6CBF	W6MSG
K6DDT	W6MTJ
W6DVL	W6OPL
W6FDJ	W6QIE
W6HOR	W6QZQ
W6JNY	W6ZNU
W6JPS	W6ZSS

W9GRW from Skokie, Illinois, and 2 SWL's.

A general discussion of over all RTTY matter, followed by a brief talk on the National RTTY meeting in New York. Also a short discussion of the request for narrower frequency shift allocations, which was brought up at the New York meeting.

The Robert Dollar Company furnished a commercial AFSK/FSK converter (TU) for inspection and a proto-type AFSK keyer which is to be offered for sale shortly. Circuit manuals were on hand to show types of circuits being used. Roger Bruce, W6EFT of the Robert Dollar Company arranged the equipment loan to RTTY for this meeting. Our thanks to them.

After the technical portion of the meeting was over, several of the amateurs present operated the equipment. A few contacts were made. RTTY wishes to thank the Fresno Radio Amateur Club for making this meeting possible.

ON THE COVER

MACE WARNER
WØJRQ

2848 SOUTH HARRISON
Denver, Colorado

Model 26 Printer

Collins 32-V-2 Transmitter

National NC-183 Receiver

Gates Terminal Unit

FRESNO, ARRL CONVENTION



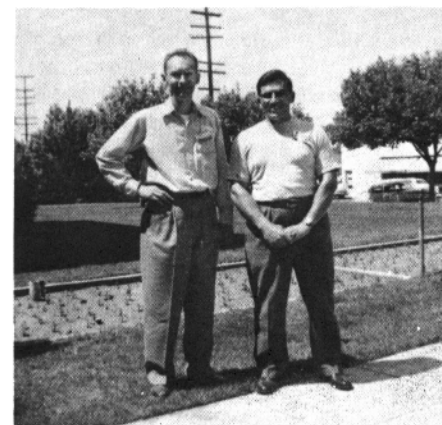
RTTY SETUP



XYL's W6MTJ, W6AEE



RTTY BREAKFAST



W6MTJ, W6ZNU

W6ZNU's Photos

MEASURING AUDIO FREQUENCIES WITH AN LM OR BC-221

By J. P. ISAACS, W6PZV

Here is a way to measure those elusive audio frequencies with an accuracy of better than one cycle. With a very simple addition to your existing equipment and an LM or BC-221 frequency meter (borrow one if you have to) and you're in business. The frequency meter is accurate to .01 percent or better so a simple matter of arithmetic will show that this means an error of .3 cycles when measuring 2975. If this doesn't satisfy Net Control there is no hope for him.

One easy way to do all of this is to use a synchronized saw tooth oscillator which is driven at 2125 or 2975. The drawing shows a circuit using a 2D21 as the oscillator. An 885 will probably work just as well. The circuit values are not critical. With the values shown the oscillator locks in very readily on either frequency when the 25000 ohm pot is adjusted properly. The output of the saw tooth oscillator is rich in harmonics and this is fed to the frequency meter. The meter is adjusted for operation at 125 kc and all of the measurements will be done between there and 130 kc. The harmonics which we are looking for are:

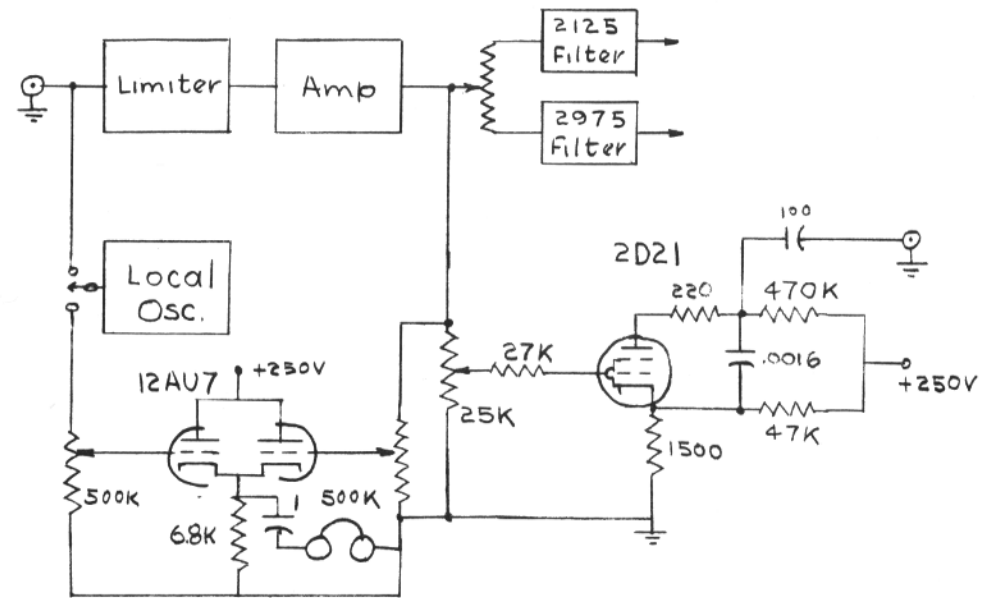
2125	60	127,500 cycles
2125	61	129,625 cycles
2975	43	127,925 cycles
2975	44	130,900 cycles

When listening to the frequency meter you will hear a lot of spurious chirps and beats but with a little concentration the correct ones will be easy to distinguish as they are the strongest. Also as you tune through the zero beat you will note that in the case of the correct harmonics the beat note changes much less per dial division than it does with the other or incorrect harmonics.

If you know that your oscillator is within 10 or 15 cycles it is a simple matter to set the frequency meter at 127,500 and zero in and then check at 129,625 to be sure. If the oscillator is off more than that, you have a little more work to do. This consists of measuring two successive harmonics which, for example, may turn out to be 129,600 and 131,760. (The frequency meter can be read to about 10 cycles) This shows that the oscillator is on about 2160 cycles and so you lower the frequency and try again until you can read it direct. Note that this latter method of making a rough frequency check is only accurate to about 13 cycles and is not good enough for making the final check.

An interpolation chart is shown which is an aid in reading the frequency meter when making the rough checks. Once you have your oscillator right on the nose on both frequencies you are ready to check somebody else's off the air. This is done by comparing your oscillator with a received signal using the additional 12AU7 as shown. If the guy is off you can have him move until he is zero beat with you.

One word of caution, it is a good idea to use the rough check method to find out where you are before you go and make any adjustments. You can really get fouled up if you are not careful.



	4.2	4.1	4.0	3.9	3.8	3.7
1	.42	.41	.40	.39	.38	.37
2	.84	.82	.80	.78	.76	.74
3	1.26	1.23	1.20	1.17	1.14	1.11
4	1.68	1.64	1.60	1.56	1.52	1.48
5	2.10	2.05	2.00	1.95	1.90	1.85
6	2.42	2.46	2.40	2.34	2.28	2.22
7	2.94	2.87	2.80	2.73	2.67	2.60
8	3.36	3.28	3.20	3.12	3.04	2.96
9	3.78	3.69	3.60	3.51	3.42	3.33
10	4.2	4.10	4.00	3.9	3.80	3.70

W6PZV

NEWS FROM SPOKANE, WASH.

By GEORGE B. SCHEE, W7ULL

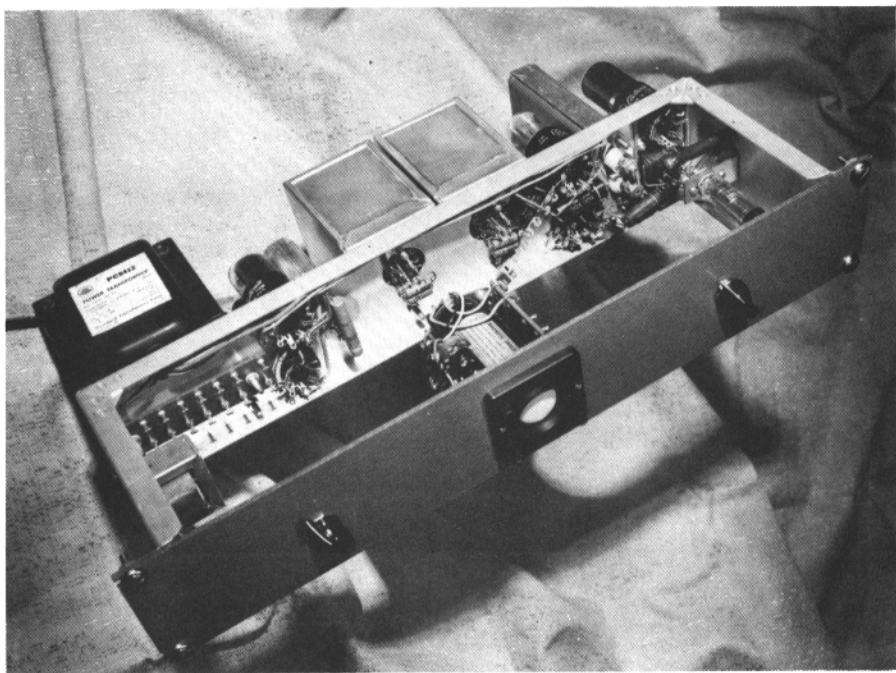
I thought that you might be interested in what the Spokane gang is doing with R T T Y at this time. So here is the straight dope. . . . The following have Model 26 machines: W7OHF, W7PVF, W7HCJ, W7NXN, W7PCV, and W7ULL. W7QCI has a machine and I believe it is a Model 15.

The following use the RTTY converter that appeared in January, 1953 QST; W7NXN, W7HCJ, and W7PCV. W7OHI

and W7QCI use a converter designed and built by W7PVF. W7OHI uses W7HCJ's converter, and W7ULL uses the Gates converter.

The two stations transmitting are W7PVF and W7ULL. W7PVF shifts an ART-13 and has worked several W6's while W7ULL shifts an Heathkit AT-1 and has worked W7PVF and KL7CK on forty meters. Interest is picking up here.

73's—George



W7ULL's GATES TERMINAL UNIT

AFC CONTROL FOR RTTY

By J. W. McKINLEY, KL7CK, JUNEAU, ALASKA

The problem of drifting ECOs HFO's, and BFOs in RTTY reception with the receiver of questionable stability and average ECOs can be licked with the use of the AFC adapter to be described.

Basic function of AFC is a circuit across the BFO tank connection in such a manner that it will shift the BFO frequency to maintain the 2125 cycle tone within close enough tolerance to enable the printer to make solid copy. An audio triode with input signal level is coupled to a 6H6 discriminator which drives a reactance modulator. The reactance modulator is coupled to a BFO at your particular receivers IF.

The unit is built on a Bud AC 402 chassis with ample room. Miniature tubes may be used with the exception of the 6AG7 which must not be substituted without dire consequences as the operation of a reactance modulator tube is mostly dependent on the transconductance of the tube. The audio input triode is conventional and merely isolates this adapter from whatever circuit the audio control voltage is taken from. The tuned filters consist of two tuned circuits, one about 100 cycles above 2125 and the other about 100 cycles below 2125. The larger spread between the two the greater will be the swing of the beat note before correction and also the receiver or signal can drift further before losing control so a happy medium is chosen at 100 cycles each way.

The filter network in the output of the tuned filters is for delay so the AFC does not work too rapidly and it will hold during the spacing interval when no 2125 signal is present. The 6AG6 components the only critical ones as the audio input, the discriminator and the BFO are standard practice items.

Range of control of the reactance tube is primarily a function of the transconductance of the tube in the case of the 6AG7 it is very high order of 11,000. An ordinary pentode either RF or audio just will not work so don't substitute. The next value or R compared to the capacity of C determined the available frequency swing. The Q of the BFO could of course have a definite relation to the swing and is suggested a coil be used that has capacity across in the order of 200 mmfd as a slug tuned coil with a bare minimum of capacity will be slightly erratic in operation and the swing will not be uniform above and below 2125 cycles.

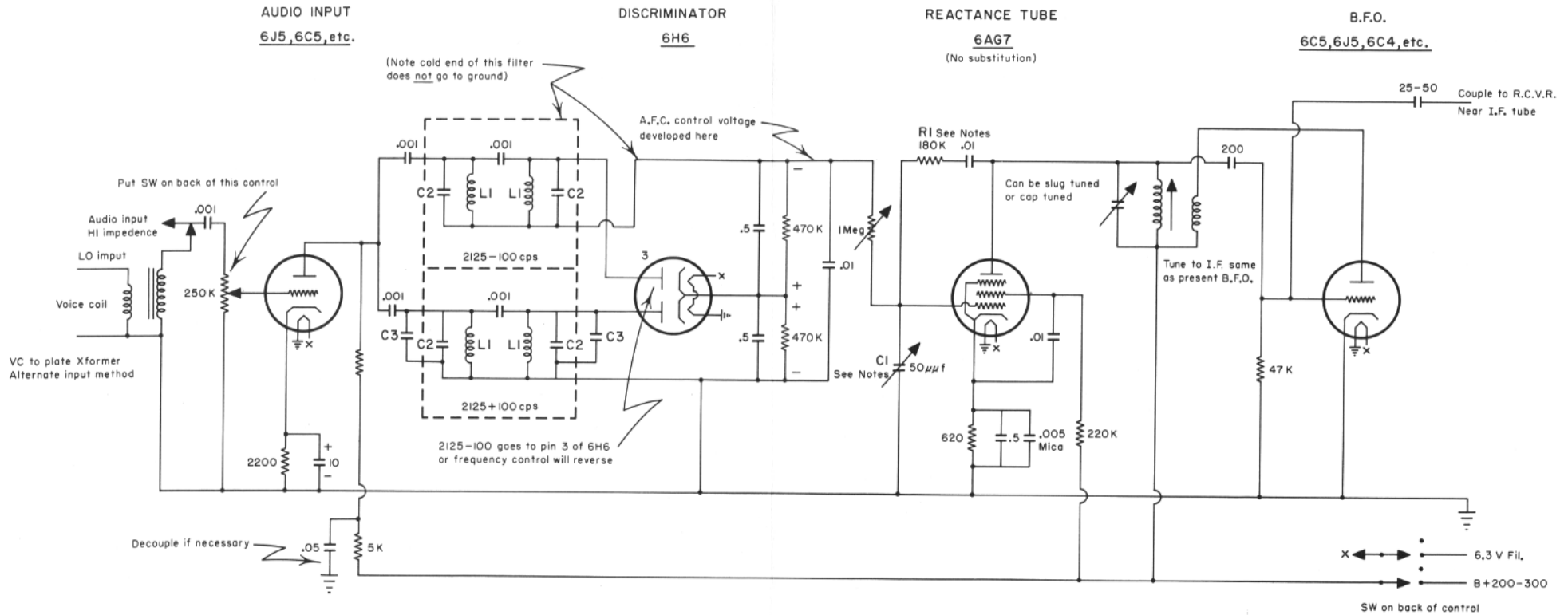
The AFC circuit departs from the usual reactance modulator by being isolated from the control circuit voltage by a 1 meg. resistor as the usual AFC circuit deals with higher frequencies, or as a modulator deals with audio input instead of a DC control voltage.

Coupling to the receiver is a matter of hang'in the output lead near an IF tube or near enough for good BFO operation. Voltages are not critical and the small amount of current required can usually be taken from the receiver or tuning unit.

As a discriminator usually is in the average tuning unit for RTTY and the receiver has a BFO and audio amplifier. It could be done with just the reactance tube alone by taking control voltage from the RTTY tuning unit and the reactance tube hooked across the BFO in the receiver, if you are inclined to tear into things you can save some building by following the above suggestion.

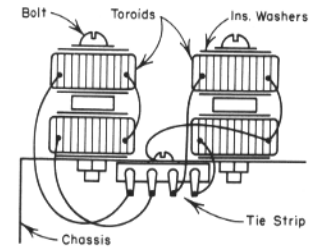
In operation as a signal is tuned in and gets close to the 2125, 2975 tones the

(Continued on Page 15)
Diagram on Pages 8 and 9



- L1 - Toroid from Tel. load pot
- C2 - .05
- C3 - .02

NOTES: B.F.O. coil has B+ on both windings so use caution with trimmer or pads.
 Tuned filters can be most any fair filter either from surplus filters, 50L6 Xformers, etc.
 Making R1 smaller in relation to C1 extends the range of the A.F.C. control in turn allowing the tone to vary more before correction so the components given are a good compromise.



Proposed FCC Rules and Regulation Changes Effecting FSK Shifts

The April issue of RTTY reported the First Annual National RTTY Meeting, held in New York City on March 21. Discussions of terminal units (reported in the April issue) lead to further discussions of the possibility of having the FCC Rules and Regulations amended to permit the use of a 170 cycle shift as well as the present 850 cycle shift. From technical considerations it appeared logical to use 170 cycles shift as a second "Amateur Standard". Several of the group reported laboratory tests of lesser shifts than 850 cycles even as low as 20 cycles, with good results.

At this point it might be well to list the expected advantages of using less shift than 850 cycles, say a shift of about 170 cycles.

1. 170 cycles shift is about optimum for single channel 65 word per minute RTTY operation. It will still permit good reproduction of the 22 cps. square wave teletype signal.
2. Selective fading on RTTY circuits is much less of a problem with 170 cycles shift than with 850 cycles shift. For amateur applications the use of space diversity reception is impractical.
3. The reduction in shift will facilitate the use of crystal controlled FSK transmitters (how many of us have "given up" trying to shift a crystal 850 cycles at 80 meters without tearing the transmitter oscillator apart?)
4. The use of less shift permits employed techniques of advantage to RTTY

itself. These include the use of narrow band receivers with IF filters (mechanical filters and otherwise) ahead of the usual audio selection spectrum.

5. Better economy in use of the frequency spectrum. Less shift than 850 cycles permits more RTTY signals and more CW signals to operate in the same amount of frequency spectrum.

The question then arose: "How might the proposal be made to the FCC by the RTTY gang itself? - - by ARRL? Of course it would be best for ARRL to make the proposal, but how long would this take?" Perhaps a mail poll of the ARRL Directors (by ARRL Hdqs) could be in the offing? A few key men volunteered to undertake finding out if the ARRL would get behind the proposal, to amend the FCC Rules and Regulations governing amateur operations to permit the use of less shift than 850 cps.

Inquiries to ARRL Directors disclosed that the ARRL Board meeting was soon in the offing (May 13th and 14th) and that if a proposal could be worked out in time for consideration by the ARRL Board - - that would be the best move. Several Directors were contacted. Each offered his help. One, Gilbert Crossley (Atlantic Division Director) also offered to discuss the proposal in the League planning Committee, which also meets a few days prior to the Board meeting, to insure that the ARRL Headquarters Technical Staff was on the Board.

An inspection of the minutes of the meeting will show that Director Cooke

(Hudson Division) made a motion to amend the FCC Rules and Regulations to permit the use of less shift than 850 cycles for FSK applications.

In view of the fact that the ARRL Board had not been given an opportunity to consider our proposal, BEFORE the Board meeting, it was the studied opinion of Director Crossley that any possible objection to our proposal could be sidestepped by having the Board take affirmative action on our proposal, yet take an action that would permit the Headquarters Staff of ARRL to review the matter with the FCC and assure that the proposal was (in general) acceptable to the organization.

It is always wise, where changes in Federal Rules and Regulations are involved, to discuss with the agency responsible that no inadvertent or inappropriate moves are included in your suggestion.

Accordingly, Director Crossley moved that the original motion be amended to permit the Gen. Manager (Mr. Budlong) of the ARRL to discuss the proposal with the FCC for action. Mr. Budlong has contacted the FCC, he has determined that the proposal is in order, and is now being written up for submission to the FCC. Once the proposal is forwarded to the FCC, the FCC will review it, and then publish it in the Federal Register (the official organ of Government - - - under the Administrative Procedures Act) for comment by all interested parties. Sufficient time will be allowed to permit both QST and CQ to publish the proposal so that all amateurs will have knowledge of the proposal and have time to offer comment. After the time for comment elapses, the FCC will take the action it believes appropriate.

If things go as we expect, by early fall we should have the FCC approval to use any shift we want, from 900 cycles on down.

It is important, at this time, in view of the foregoing, that amateurs interested in RTTY, make a determination of what shifts they expect to employ. It was the consensus of the group that met at New York City that 170 cycles would be an appropriate shift to experiment with if less shift than 850 cycles were to be used in the immediate future. We recommend, therefore, that if any amateur plans to develop new terminal equipment and wishes to make provision for possible new amateur standards, he include provision for the use of BOTH an 850 cycles shift and a 170 cycles shift.

Of course a few stations will want to experiment with shifts that have no "standard" significance at all. The proposed change to the FCC Rules and Regulations will permit this type of experimentation. All a RTTY enthusiast would have to do is make arrangements with another station to conduct experiments, and "have at it" - - - as soon as the FCC amends its rules.

At such time as the FCC published a proposed amendment to its Rules and Regulations, you will want to be prepared to comment (favorably) on this proposal. We will advise you when such action is appropriated.

Summary

The discussions and actions that lead to the ARRL Board taking favorable action on an RTTY proposal are outlined. A summary of the present situation is presented, together with a prediction of what can be expected to occur.

NEW EQUIPMENT

By TED SWIFT, W6CMQ

A most unusual electronic device has been developed in this laboratory which is particularly adapted to use in amateur radioteletype stations. Actually, the device is a by-product resulting from the development of a paper rewind machine arranged to rewind the paper expelled from a number fifteen teleprinter during the course of QSO.

The paper rewind machine consists of a reel mounted behind the machine in line with the used paper eject chute. This reel is mounted on a shaft in a suitable bracket arranged for wall mounting. The shaft extends through the bearings and carries a spool on which a cord is wound. The cord from the spool is carried over a pulley mounted on the ceiling and down to a weight. Gravity acting on the weight causes the paper reel to turn and wind the used paper as it is expelled by the teleprinter. An arrangement is provided to rewind the cord to the weight on the spool before the weight has reached the floor.

Experience with the rewind device indicated that the longer winded the QSO, the more string was unreel from the spool and the further the weight traveled toward the floor. It was immediately apparent that the cord could be attached to a pointer and scale by wrapping the cord to the weight around an auxiliary shaft on which pointer was

mounted. The scale could be calibrated in QSO units. QSO units are defined in the operating section of a leading amateur handbook: The operating frequency in megacycles multiplied by the date of the month and divided by the hour of the night. In day-time QSO's, the term hour-of-the-night is replaced by the reciprocal of the time of day.

An experimental model of the QSO meter was constructed and has been in operation at this station for some time. Experience with the device indicated that an error was introduced which was a function of the diameter of the rolled paper on the take-up spool. As the diameter of paper on the rewind spool increased, the length of cord unwound by the gravity motor decreased per QSO unit. Measurements were taken over an extended period and this data fed to a univac computer. A special slide rule, divided in accordance with the computer-developed curve, has been made and this machine. It is now not only possible, but practical to measure all QSO's with a high degree of accuracy. The resulting information indicates immediately the degree of satisfaction obtained from each and every QSO without distracting the attention of the operator from the pretty calendar on the wall.

Patents on the QSO machine are of course pending.



"I just got married (Jan. 8) so have been spending most of my time getting the house organized and looking for furniture. Will have more time for RTTY in another week or so.

—Jay McClasky, Jr., W9--

RYRYRYRYRY

"I just had a very nice RTTY three-way with W3KYR and W2PBG. I always print Bob pretty well. This was the initial contact with Fred. But the signals were nice and strong, and very little QRM, so I printed them both almost land line."

—73, Ken, W1RBF

RYRYRYRYRY

"Still don't have the revised Gates circuit. Have been working it over for more gain and an extra tuned stage to follow limiting. So far the results look worth while. More later.

—73 Phil, W2JAV

RYRYRYRYRY

"I don't know how long it will be before I will be able to work any of the West Coast gang since the transmitter is not in the best of conditions now and needs to be changed for CW and FSK work. But when it gets going it should put a signal out there if you can re-

member W9ECA's signal from a couple of years back. Same transmitter since he is the OM here. Sincerely"

—Robert Hajek, W9QBH

RYRYRYRYRY

"One deal that we tried that perhaps you would like to pass along in RTTY is that I set up the tape recorder and recorded my own signal and then played it back. It gave me an idea how the other fellow was receiving me. Was quite surprised that you fellows copied me at all as I couldn't copy my own signals, hi. Made some changes and was able to find the correct combination to make copy. Found that it worked very well."

—73, Reg., W6JUE

RYRYRYRYRY

"Also please let me know what other information is available as this Teletype is new to me. Just got a model 26 last week and want to use it with Collins 32-V-1 and 75-A-2 and don't know where to start. Bought a homemade converter with it per Jan. '53 QST I believe, but want to make up a Gates circuit with scope. Tnx for any info.

—73, Jack, W6UMZ

RYRYRYRYRY

"Had a little visit from Mac, W5ESV, of Tulsa. Worked Ted, W7HJC, Seattle while he was here just to show him that a pile of junk like this could get out.

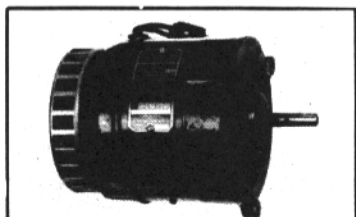
—73, Hugh, W5EBFX

"This may sound like a commercial plug, but I got a pair of those Mark and Space filters from Bill Gates, just before I left Rockford. Couldn't leave them on my desk and just walk out. Though I had worked all night clearing up so I could get away, I took the filters, drove most all day and then stayed up 'till after midnight running check curves on them at my Minneapolis Lab. They are very flat for a hundred cycles each side of the M & S frequencies, and then at the 2550 cross-over point they are down about 30 DB. Sure worth the 20 bucks he asks for a pair. Don't Know where I could buy six toroids and condensers for that."

—73 Beep, WØBP-W9BP

(Beep, Bill is not a commercial concern at all. This is his hobby. He is Engineer with KHJ-TV in Hollywood. Ed.)

RYRYRYRYRY



SYNCHRONOUS MOTOR

Made for Teletype Corp. Model S9014 DU, 115 VAC 60 cycle single phase. Centrifugal switch repulsion start - synchronous run type. Speed 1800 RPM 1.6A. Rated for continuous duty, 40° temp. rise. End mounting, sleeve bearings, with external cooling fan. Shaft 5/16 dia. x 1 1/2" L. Has an easily removed special gear on end of shaft. O/A size: 4 1/2 dia. x 5 1/2" L. Pulled from equipment, but guaranteed in perfect working order. Shpg. Wt. 18 lbs. Cat. No. TM 4074. **\$19.95**

As above, but NEW. Cat. No. TM 4385. **\$27.50**

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W9GRW reports the following stations active in the Chicago area on 2 meters:

- | | |
|--------------|--------------|
| W9BGC—Joe | W9LLX—Harry |
| W9DRW—Dick | W9NRC—Vern |
| W9JFO—George | W9QBH—Bob |
| W9GRW—Ray | W9QM—Len |
| W9JBH—Harry | W9SPT—George |
| W9JBT—Bob | W9THE—Chuck |
| W9KLB—Al | |

Congratulations gang—Ed.

RYRYRYRYRY

"Who is the Amateur Radio Teletype Society and what is their address? I have the interest. All I need is some teletype equipment and help."

—William Kriz, W8TCT

(A R T S QTH is Andy Stavros, W2AKE Secty, 116-32, 132nd Street South Ozone Park 20, N. Y.)

AFC CONTROL

(Continued from Page 7)

signal will burble and gurgle as the AFC is trying to gain control. As the signal is tuned in properly you will note that tuning the receiver up or down quite a ways will not change the tones and then as it loses control the note will jump up or down several hundred cycles.

From a cold start my HQ 120 will now print 36 lines of RYRYRY test, THE QUICK BROWN FOX, etc., before losing control and after being reset is good for all evening.

With good sharp filters such as those shown in my article in RTTY made from toroids. The QRM problem is licked as far as present problems. A new CW signal on 2125 will just help it stay tuned altho it messes up the print. A bad QRM slightly off 2125 will make it chase back and forth and gives things a T6 note, but it hangs on just the same. With another RTTY signal close it will go crazy just like the printer does without it, but that's the time to break into the QSO and "join'em don't QRM'em".

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 MAY, 1955

May 31—W6RCM, N. C.—24 Checkins

- | | |
|-------|-------|
| W6AFX | W6KMT |
| W6BWQ | W6LDG |
| W6CAP | W6NAT |
| W6CG | W6NWM |
| W6CK | W6OZO |
| W6CKS | W6QZR |
| W6CMQ | W6RCM |
| W6EGZ | W6RL |
| W6EV | W6SCK |
| W6FLW | W6SCQ |
| W6FNW | W6ZBV |
| W6IZJ | W6HQR |

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.

Arrangements have been made between W3PYW and W9TCJ to take care of any traffic originating in either RTNET with destination in the other RTNET. In half an hour after start of RTNET work, contact will be made between W3PYW and W9TCJ in respect to traffic on hand and then will relay on any traffic afterwards into their respective RTNETS.

May 3—K6BTK, N. C.—25 Checkins

- | | |
|-------|-------|
| W6AFX | W6JAU |
| K6BTK | W6JFZ |
| K6BXX | W6JJP |
| W6BWQ | W6LGO |
| W6CAP | W6NWM |
| W6CKS | W6NV |
| W6CMQ | W6RCM |
| W6CND | W6SCK |
| W6EGZ | W6SCQ |
| W6EV | W6TZA |
| W6FLW | W6VAD |
| W6IAL | W6ZBV |
| W6IZJ | |

May 10—W6SCQ, N. C.—33 Checkins

- | | |
|-------|---------|
| W6AEE | W6IZJ |
| K6AFX | W6JAU |
| K6BTK | W6JFZ |
| W6BWQ | W6KMT |
| K6BXX | W6NAT |
| W6CG | W6NWM |
| W6CKS | W6NV |
| W6TRX | W6HQR |
| W6CMQ | W6RCM |
| W6CND | W6RL |
| W6CZ | W6SCK |
| W6DNJ | W6SCQ |
| W6EGZ | W6TZA |
| W6EV | W6VAD |
| W6FLW | W6ZBV |
| W6FNW | W6GRW/6 |
| W6IAL | |

May 17—W6ZBV, N. C.—27 Checkins

- | | |
|-------|-----------------|
| W6AEE | W6IZJ |
| W6AFX | W6JAU |
| W6BWQ | W6KMT |
| K6BXX | W6NCP |
| W6CAP | W6NWM |
| W6CG | W6OZO |
| W6CKS | W6RCM |
| W6CMQ | W6SCK |
| W6EGZ | W6SCQ |
| W6EV | W6VAD |
| W6FLW | W6TZA |
| W6FNW | W6ZBV |
| W6HQR | K6BPI San Diego |
| W6IAL | |

May 24—W6AFX, N. C.—22 Checkins

- | | |
|-------|-------|
| W6AEE | W6IZJ |
| W6AFX | W6JAU |
| K6BTK | W6KMT |
| W6BWQ | W6LGO |
| K6BXX | W6NUY |
| W6CAP | W6NWM |
| W6CG | W6RCM |
| W6EGZ | W6SCQ |
| W6EV | W6TZA |
| W6FLW | W6WYH |
| W6FNW | W6ZBV |

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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 W6DEO W6AEE