RTTY

NEWS OF AMATEUR RTTY

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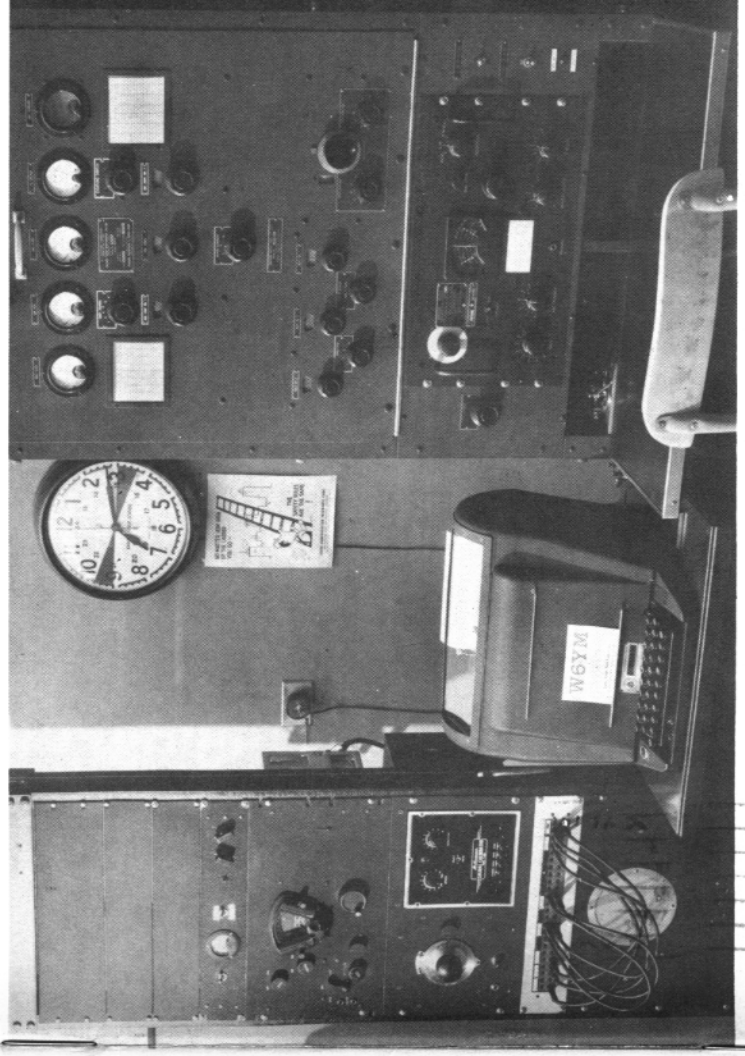
SPECIAL NCARTS ISSUE



W6YM,

HORSE TRADES

This page of the Bulletin is for use of amateurs who have RTTY EQUIPMENT FOR SALE OR TRADE and those looking for equipment to buy or trade. It is a free service and may be the means of getting someone on the air.

FOR SALE: Communications key tops for 12, 14, 15, 26 $4.00, tax and postage included W6EV

For Sale: Two Model TG-7Bs complete reasonable....W4UYU

Trade: Model 26 for 14 Perforator.....W4EHU

FOR SALE: RTTY Gear, misc. (Model 15 Bases $50) W2ZKV

WANTED: RTTY Equipment, Model 14 keyboards or receiving bases, tape containers and covers W2ZKV

For Sale or Swap: WU Distributor with AC Sync Motor WU 7B Transmitter with base, Receiving dist for 12, Model 21A printer.....K2OBJ

For Sale: Model FRF Converter (0-1000 cycles) Model FRC Converter (Dual Channel AFSK) Model FRA Converter Model FSD FSK Keyer with power supply WE 255A Polar Relays, Brand new. Model 12 Complete W2AKE

For Sale: Parts and repairs for RTTY gear.....W9GRW

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PASADENA CALIF.

Introduction of NCARTS and Activity in the Bay Area

BY ELLIOT S. BUCHANAN, W6VPC

For the privilege of preparing this issue of RTTY Magazine the Northern California Amateur Teletypewriter Society, NCARTS, extends the thanks to the members and staff of RTTY of Southern California from the members of this group.

Due to increased RTTY activity in this area we felt the need of an operating organization and through the tireless effort of W6AEE and various others in Southern California who kindly granted permission to use the By-Laws of RTTY we were finally organized and incorporated in August, 1956.

With an initiation fee of Four Dollars and One Dollar per year membership it was felt that a sufficient of money would be available to periodically put out a Bulletins of our activities and hold NCARTS meetings each two or three months as well as build up a sufficient amount in the treasury to handle the RTTY machines released in this area thus relieving RTTY of that much of the burden they have been carrying for so long a time.

We now have over 50 members including those in Canada, Okinawa, Hawaiian Islands and as far East as Illinois and Michigan.

There are several ARRL appointed OBS RTTY stations from our membership including VE7KX who has OBS on Tuesdays and Fridays at 8:15 p. m. on 3620 kc and 7143 kc. W6VPC each Wednesday 8:00 p. m. PST on 3620 kc. and 147.29 mc. and Fridays at 5:00 p. m. P. S. T. on 14330 kc. W6ASJ each Saturday and Sunday at 2:00 p. m. PST on 7140 kc. and 147.29 mc. and W6FZC each Saturday and Sunday on 14330 kc. and 147.29 mc.

K6GZ has weekly sked with WØBP on 20 meters on Thursday for clearing East Coast traffic which has been relayed from W1BDI. W6VPC fills in on Friday on this sked at 4:30 p. m. on 14330 kc. for any left over traffic. In addition K6GZ monitors 3620 kc. Monday thru Friday from 6:30 p. m. to 7:00 p. m. PST for any CW or RTTY traffic which is then put on the NTS.

W6FZC has a very active two meter MARS RTTY Net operating on 148.01 mc. from 7:30 p. m. to 9:00 p. m. each Tuesday with an average of 6 Checkins each drill period. W6MSG at Paso Robles is Net Control of another MARS RTTY Net operating at 9:00 p. m. PST on 3245 kc with W9GRW from Skokie checking in for inter Army traffic. Thru the splendid cooperation of Major Francis D. Ivey, Sixth Army MARS Director and who is also operating a Model 26 with his call K6OUR we have been able to get many Model 26's placed among MARS members.

With an active Board of Directors of NCARTS composed of W6FZC, President; W6EFT, Vice-President; W6VPC, Secretary-Treasurer and W6VVF, W6FDJ and W6NKP as Board Members we have secured much help in the ways of technical articles and assistance. Thru the kind graces and hard work of W6ASJ in taking his speed graphic around are we indebted to for the pictures of W6FZC, W6VPC and W6ASJ.

W6FDJ who is SCM for the East Bay Section and himself one of the pioneers of RTTY in this area has made several talks and given demonstrations at the various club meetings thus putting RTTY on the map in this vicinity.

Had it not been for the early pioneering of W6OWP, W6DOU, W6BNB, W6FDJ and W6MTJ and numerous others we would not be able to point with pride to more than 175 Model 26's that have been released in this area and placed in the Bay Area, Oregon and Washington.

To strive for rapid TTY Communication has been the objective of the Bay Area gang and along this line there are now fully equipped stations operating one or more printers, in connection with reperfs and tape distributor equipment as follows; W6CBF, W6FDJ, W6ASJ, W6FZC, W6MTJ, W6VVF, W6NKP, W6VPC, W6WOC, W6CQI and others who will be fully equipped as the tape and reperf equipment becomes available.

As all hams revere the memory of what Hiram Percy Maxim did for ham radio—we on the West Coast take our hats off to the tireless effort and expense that has been put forth by W6ZH, Herb Hoover, Jr., W6AEE, Merrill Swan, W6SCQ, Louie Rogerson, W6EV, Les Hammond and others for continually assisting the newcomer to RTTY.

Six Meter Activity in the S. F. Bay Area

BY ROBERT DOBBINS, K6KFF

Where is all this activity on 6 RTTY? There are about 10 contact hungry guys in the San Francisco Bay Area that are chompin' at the bit to chalk up a few States toward "WAS" on 6 RTTY. Isn't anybody going to give us a hand? Maybe if I tell you that there is a real good looking (X) YL in South San Francisco on RTTY, it might help. She is looking for some good RTTY DX so how about it?

Most of the gear on 6 consists of Model 26's with one or two Model 15's here or there. The converters are from one extreme to the other. Several of the boys are using the converter described in the April 1955 issue of "RTTY" and are having very good results. The other converters stem from complete home brew to the standard converters used by the two meter gang.

The Teletypers on 6 are getting quite CD minded, as the result there are several Model 26's that are, or are being rigged up so they can be operated portable on some hillside. This means that they can be easily transported around and that they are complete with their own TU. Everything is built right into the table so they just plug into the transmitter and receiver (or Gonset Communitcator) and they are ready for the worst. There has been only one occasion to use the gear on a portable basis and that was a demonstration at one of the local "6 meter picnics" held in the Oakland Hills. For this I combined forces with K6BAO as the gear had not been completed. Everything worked out very well though. There was much interest shown by "visitors" to our area.

The frequencies used here are 51.4 and sometimes 51.45. The following is a list of the stations on 6 RTTY: (And forgive me if I missed anyone).

K6IOG—Tom—Mountain View
K6PMK—Pat—Mountain View
(IOG's XYL)
K6BAO—John—Redwood City
K6QAX—Bill—San Mateo
W6OWQ—Bill—San Mateo
K6JHL—Harry—South San Francisco
K6QCL—Joyce—South San Francisco
(JHL's XYL)
K6GOW—Dan—San Francisco
K6KFF—Bob—Kensington
K6GDF—Bernie—Vallejo
K6KZV—Leroy—Sacramento
K6LNW—Don—Centerville

I believe there is another station getting on in Sacramento and also another (K6OCD) in Hayward, so lets have some activity on the good ole six meter band! We are looking for you so how about it?

W6VPC—BUCK BUCHANAN, OAKLAND

Left to right: Model 26, Model 14 TD, Perforator, Under Table Model 15 Perforator. Above 75A3 Receiver are AFSK, Converter and D. C. Power Supply. Above the Gonset, BC-221, AVR4 Receiver to monitor 80 Meters. Conelrad RC, Intercom.

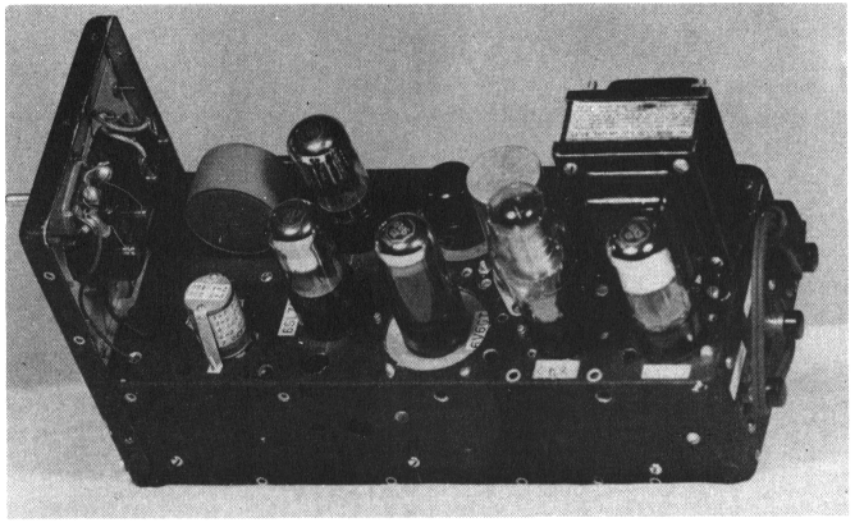
W6ASJ—CHARLES ELVIN, PIEDMONT

W6CBF—CLYDE SUNDERLAND, OAKLAND

Station consists of Model 15 and 26 Teleprinters, Model 14B Western Union Tape Distributor and Model 14 Perforator. Transmitter is a Collins 32V3 with Johnson Match Box and Receivers are a Collins 75A4 and Hallicrafters 28A with Pan Adapter, Frequency Measuring Equipment LM-14. FSK Unit is a conventional unit as seen on Speaker, Terminal Unit is modified Gates Circuit seen under the 26.

W6MTJ/W6LFF

W6GCS, Visalia, California



Photography being one of my hobbies thought I would send a couple of recent snaps.

Recently I built a Converter and since I always toil around to do it the hard way by miniaturizing the construction, I wound up by using an ART5 transmitter case stripped of all the components.

The circuit is the Bart, W6OWP which appeared in the March 1956 issue of RTTY, with certain modifications after some kindly advice from Bart.

Since the power supply is built in and the case is very small it certainly makes for convenience around an otherwise crowded shack.

For performance it justly lives up to my high expectations and with the miniature metering and the magic eye, makes for easy and consistent operation.

PS—The Command Transmitter case is 5 x 7 x 12 inches.

CLYDE LARY, W6GCS,
400 Sierra Drive, Visalia, Calif.

COVER PHOTO

W6YM, Laney Trade & Technical Institute

BY ROBERT SHRADER, W6BNB

The radioteletype and CW position of W6YM, in the Marine Radio Iaboratory of the Radio Communication Class at the Laney Trade-Technical Institute, part of the Oakland Junior College, Oakland, California. First time on the air with RTTY for W6YM was in November, 1954. Now in operation on 80, 40, 20 and 2 meter RTTY.

Reading from left to right, the top three blank panels normally house a 40 watt RTTY-CW portable transmitter used for demonstration purposes. Below this is the single-channel filter converter using 2975 cycles as the center frequency in order to copy 2-meter AFSK. Below is a stand-by receiver. Below this a secondary frequency standard. Below this a patch panel to allow easy interconnections between receivers and 2 meter station in adjoining room for 2 meter RTTY. On the bottom are speakers and another stand-by receiver (for short students.)

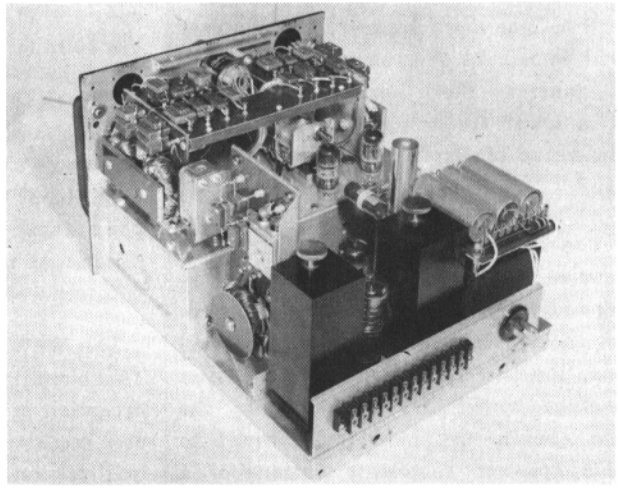
In the middle of the picture is a shipboard marked watch-standing clock set on GCT. Below this is the Model 26. Note the flat glass replacement of the curved eye-blinder supplied with the equipment. At the right, a Mackay marine short-wave transmitter with parallel 813's in final, using either crystal or VFO. Receiver is an RCH, 100 kc to 22 megacycles.

Note the cylindrical 850 cycle whistle hanging between the rack and the Model 26, used to determine the proper FSK frequency by zero beating the mark signal and tuning the FSK adjustment until the space signal produces the same tone as the whistle. While electronic means can be employed for FSK adjustment it is found that the whistle normally suffices.

Operators are either the instructor, W6BNB, or students studying a 2-year radio communication course to prepare for radiotelephone first or radiotelegraph second commercial licenses, or to work in allied electronics fields.

W6WIS

TEMINAL UNIT



A VARIABLE SHIFT TERMINAL UNIT

BY KEN MOORE, W6WIS

The ability to print any FSK from 150 to 850 cps is a must for the amateur who desires to take full advantage of sharp audio filters with minimum receiver band width. The TU in use at W6WIS was designed with these things in mind, and incorporates some features of interest to those contemplating construction of a TU, as well as features that may be adapted to many existing TU's.

If two tuned circuits are tuned to the same frequency and then coupled loosely a selectivity characteristic will result with a single peak at the reasonant frequency of the circuits involved. This is shown in Fig. 1 (a) where the coupling capacitor C is low in value. As the value of C is increased a point will be reached, known as the "critical coupling" point above which the output characteristic will start to develop a double peak, Fig. 1(b). As the coupling is increased beyond the critical coupling point by further increase of C, the two peaks will become more apparent and one peak will remain at the reasonant frequency, f0, whereas the other peak will move to a lower frequency, f1, depending on the value of C. This is shown in Fig. 1(c).

The described characteristic of over-coupled reasonant circuits may be conveniently taken advantage of in designing a simple variable filter that will pass the two audio tones required by a teletype converter. For example, the two circuits are individually tuned to 2975 cps and coupled by means of a variable or switchable capacitor. As the coupling capacitor is increased the two peaks of the filter can be positioned as desired, such as 2975/2805 pcs. for 170 cps shift, or on up to 2975/2125 cps. for the conventional 850 cps. shift.

A practical application of the variable filter is shown in Fig. 2. The W6WIS TU employs two seven position progressively shorting switch wafers, one of which switches in values of capacity centered at 200, 300, 400, 800 cps. The 1200 mmf variable (three 410 sections ganged) permits tuning each 100 cps. range with some overlap. The other wafer switches a fixed value of capacity across one of the discriminator circuits to center its frequency for each shift range. The discriminator circuit was found to be sufficiently broad to operate satisfactorily over each 100 cps. range as the input filter is tuned.

Characteristics of the variable filter of the W6WIS TU at 170, 340 and 850 cps. are shown in Fig. 3. The peaks are 40 to 50 cps. wide at the 6 db points.

The tuning of the variable shift TU is quite straight forward. The mark frequency is first tuned to the indicator, then the filter switch is turned to the point that provides space signal indication. At this point the variable tuning is introduced to "peak" the space signal.

The W6WIS TU is pictured in Fig. 4 The circuitry is conventional with the exception of the filters. The discriminator rectifier was taken from a BC-733D localizer receiver and is coupled to the

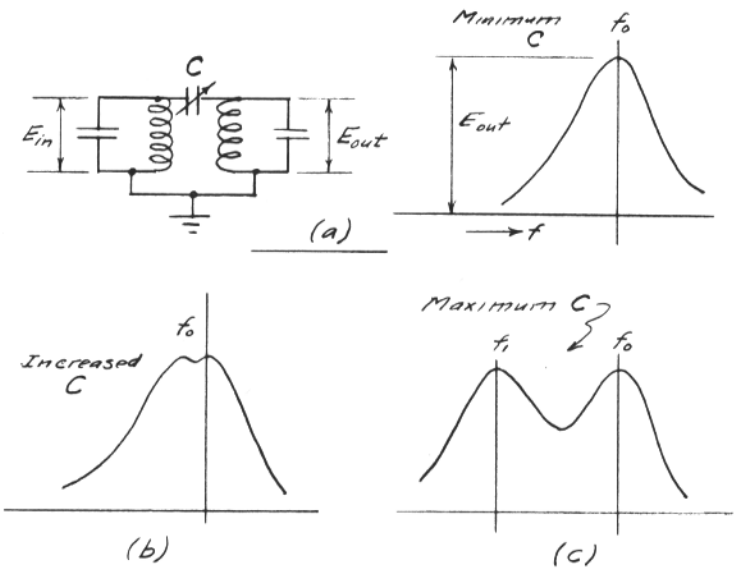


Fig. 1

tuned circuits by means of the original BC-733D transformers. This rectifier has prover to be quite stable. An AFSK oscillator is included in the TU as well as two polar relays in the keying loop. One of the relays operates the external FSK, whereas the other keys the AF osciHator of the TU. The TU has performed well at W6WIS and the filters are sharp enough to set the FSK quite accurately as well as to give the other station a reading on his shift frequency.

Acknowledgement is made to Wayne Downie, W6IHL, who conceived the idea of adapting the over-coupled tuned circuit phenomenon to a two frequency teletype filter.

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W6AEE—Merrill Swan
W6SCQ—Lewis Rogerson

For Traffic Net Information:
W6FLW W6IZJ

For "RTTY" Information:
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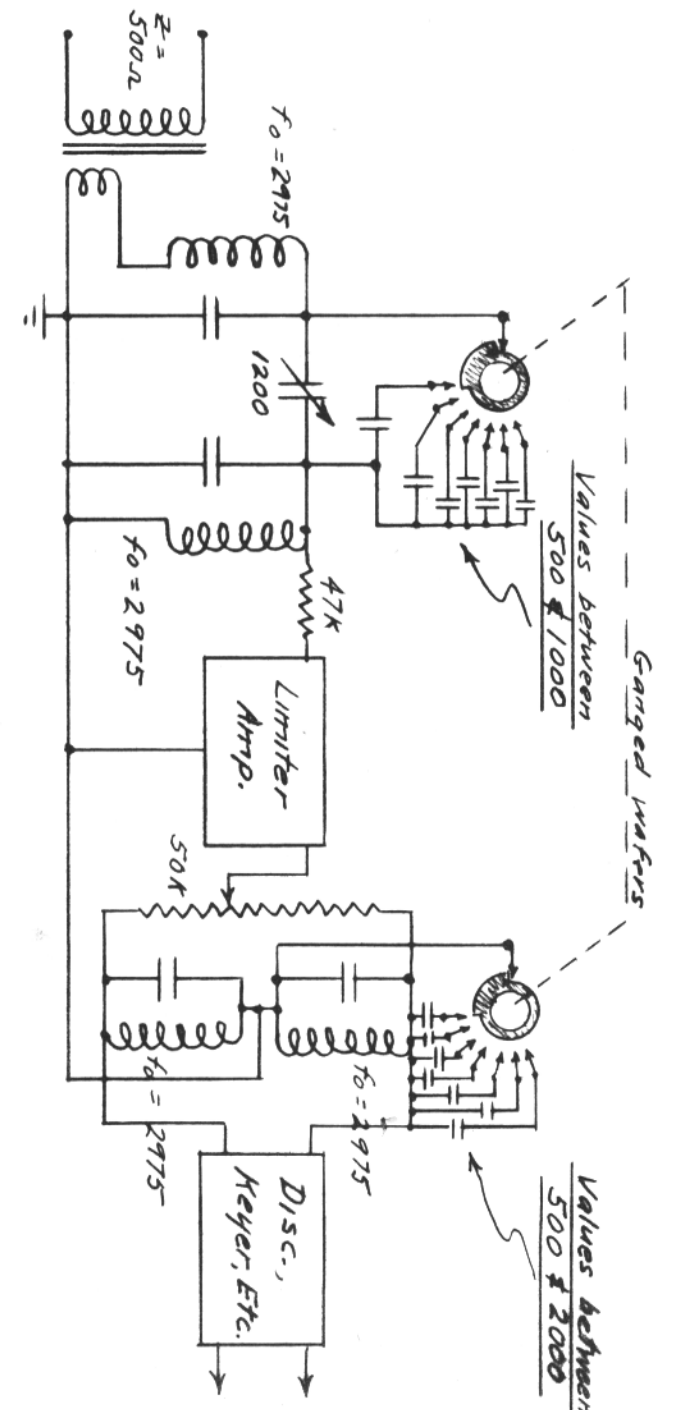
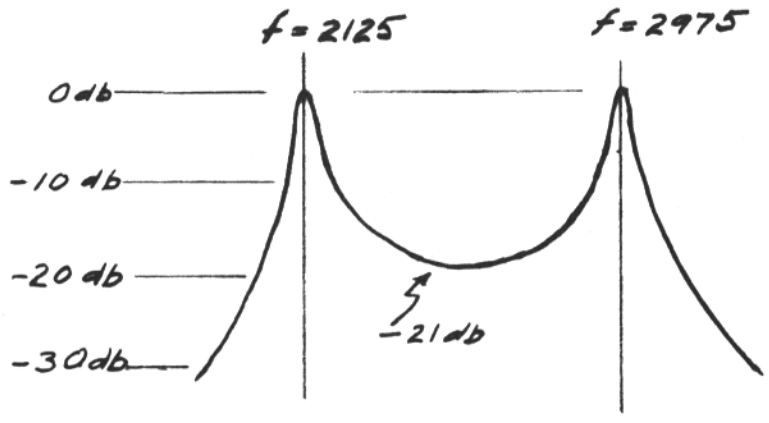


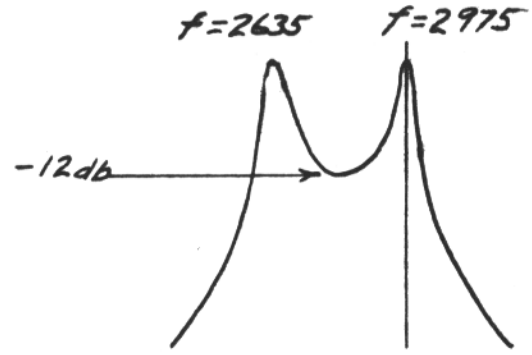
All inductances are 0.25h TELCO toroids.

Four circuits tuned to 2975 prior to adding external switching.

Fig. 2



(a) Filters set for 850 cps



(b) Filters set for 340 cps

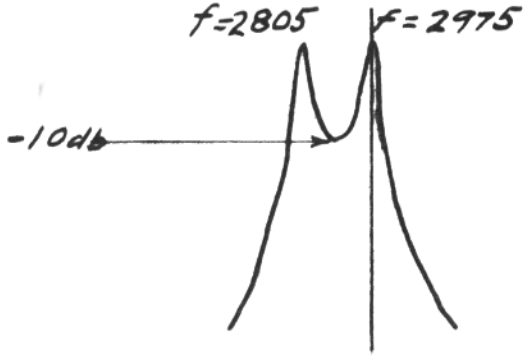
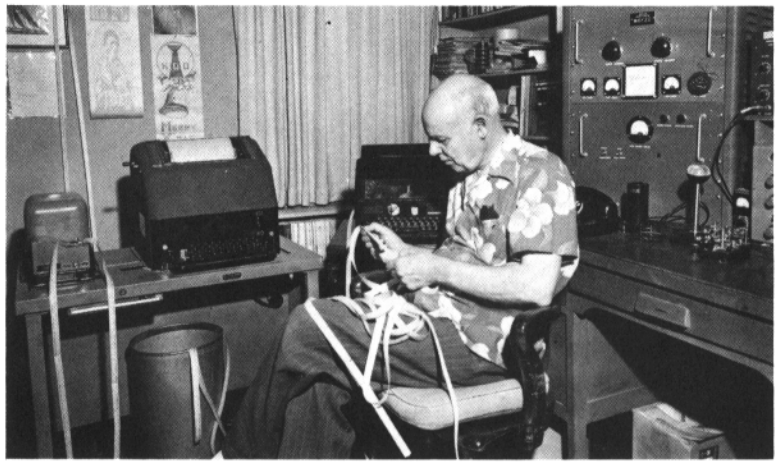


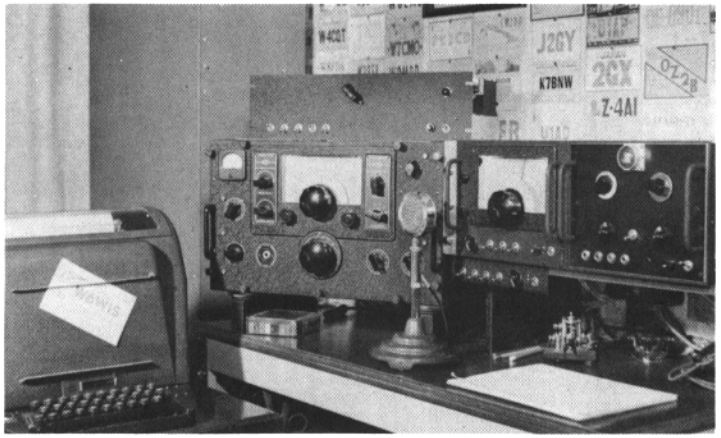
Fig. 3

(c) Filters set for 170 cps



W6FZC

Shown in the photo is a Model 14 Tape Distributor, a Model 15 Printer and a Model 14 Typing Reperforator. The Converters in use is a home built version of the Gates circuit with a two stage limiter ahead of the regular Gates circuit. Also a Navy FRC-1 Converter which was designed for three receiver input circuits which could be patched into a Diversity Converter. When this Converter is in use it is used as a single channel job. All equipment which can be used for RTTY is fed into a Jack Panel for easy patching of various receiver outputs to Converters, Frequency Shifters, etc. Two receivers are in use, a HRO-7 and a Hallicrafters SX-96. The equipment i sin use on all bands from two meters through eighty meters. A Collins 32V2 has been converted for use in Frequency Shift Keying.



W6WIS

Lineup is Model 26, National RAO-7 Receiver, VFO/Speech Amplifier and the TU. The 98A Wilcox VHF Cabinet is the big box showing in the background. Also the Crystal Controlled Converters for two and the fifteen meter band shows on top of the receiver. Old Betsy couldn't be shown in the picture but she runs about 350 watts right along on FSK.

For FSK – A New Frequency Shifting Device

BY DICK SEGERSTROM, W6CQI, A6CQI, SONORA, CALIF.

The method described herein allows a new order of stability, using remote shift control, with the VFO in the Collins 32V or other transmitters. At first glance it may seem very much like existing methods (1) but should not be confused with them.

The controlling element is a true voltage sensitive variable capacitor (2), and therefore lends itself to a myriad of uses including remote tuning systems, automatic frequency control, AFSK, etc. (3). The voltage sensitive capacitor is not, as it appears in Fig. 2, a common germanium diode such as the 1N34 point contact type. It is a germanium JUNCTION diode, such as CBS type 1N497 through 1N502, and others. A germanium junction transistor can be substituted, as in the case at hand, connecting only half of it as a diode. (Either base-collector or base-emitter).

A junction diode is biased in the reverse or non-conducting direction for minimum capacity (10 mmf. or less) and as the applied voltage is reduced the capacity will increase to about 200 mmf. in a non-linear fashion. The reverse voltage, applied for small capacitance, is limited to a value less than that which results in reverse voltage avalanche breakdown. Current drawn by the diode in the reverse direction will be in the order of tens of microamperes, short of the breakdown point, at which it rises rapidly. This reverse current is also a function of temperature, but if the applied voltage is constant there seems to be no capacitance variation with temperature change.

The 70E8A VFO used in this work was first tried in the circuit shown in Fig. 1. The "mark" frequency note was clean even to ten meters, but the "space" frequency note showed signs of hum on forty and was intolerably bad on ten. A 6AL5 diode was abandoned in favor of the point contact diodes shown, but filament hum was not the cause.

A look at the curve for the diodes in Fig. 1, gives a clue to the reason for the failure of this circuit. The slope of of the curve is such, (640 cycles/volt), that a small voltage change, (from power supply ripple or equipment ground currents), results in a large frequency change (FM hum). This slope could be improved by reducing the size of the coupling capacitor, but then shifting the oscillator a full 850 cps on 80 meters would be impossible. The measured frequency change was 10 cycles per millivolt in the "space" condition, with 850 cycles shift, on ten meters.

The junction diode shifter in Fig. 2 exhibits obviously desirable characteristics, particularly in the region of small amounts of shift—i. e. when multiplying to ten meters. In this region the shift is not very voltage sensitive and the oscillator "space" note is very clean. Using the circuit shown, the improvement was 14X on 10 meters, 12X on 20 meters, 7X on 40 meters and 4X on 80 meters.

The current through the VR tube

(Fig. 3), should be a reasonable value so the voltage regulation to the diode is the best possible. The power supply should be well filtered. The iron core choke (CH) with its damping resistor, and the .1 mf capacitor across the diode line (feed-through) are important items because they shape the waveform to the shifter. A good DC coupled oscilloscope will aid in selecting these values for an individual installation and allow final adjustment. No overshoot in the square wave fed the junction diode should be allowed, for the sake of others on adjacent frequencies. The tap switch with associated variable resistors allows changing bands rapidly with the correct shift instantly available—but remember, this holds true only at predetermined spots.

R. F. should not be allowed to enter the diode circuitry. Careful shielding and the other normal precautions common to this condition should suffice.

The output of the keyer can be fed (as shown) through a coupling capacitor to a one stage inverter amplifier and then to a Gates or other type terminal unit as a monitor during transmission. The input to the TU keyer stages is switched during transmission.

It should be noted that the junction diode units can be connected in parallel if the maximum capacity is in-sufficient with a single unit.

1 Modification of Heathkit DX-100 for FSK, Merrill Swan, W6AEE, RTTY, August 1955, P. 10 and numerous others.

2 A Variable Capacitance Diode, etc., Giacoletteo & O'Connell, RCA Review, March 1956 P. 68.

3 The Useful Diode Modulator, Robert Weitbrecht, W6NRM/W9TCJ, CQ, April 1952, P. 18.

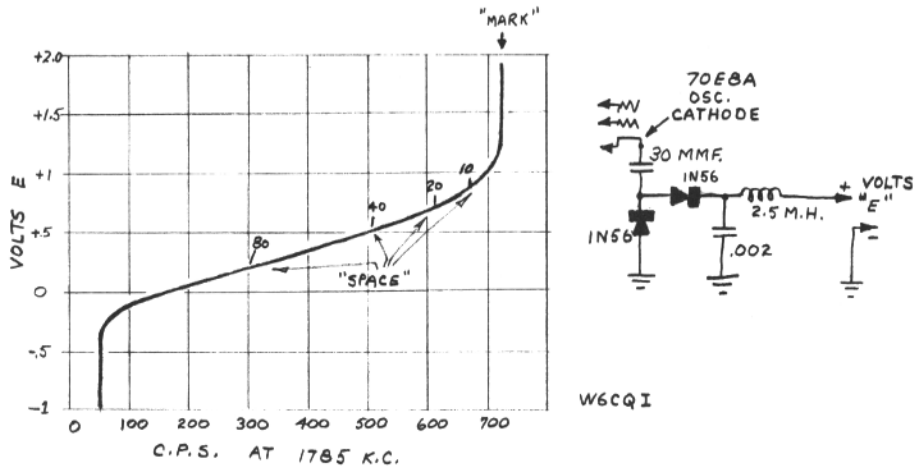


Fig. 1

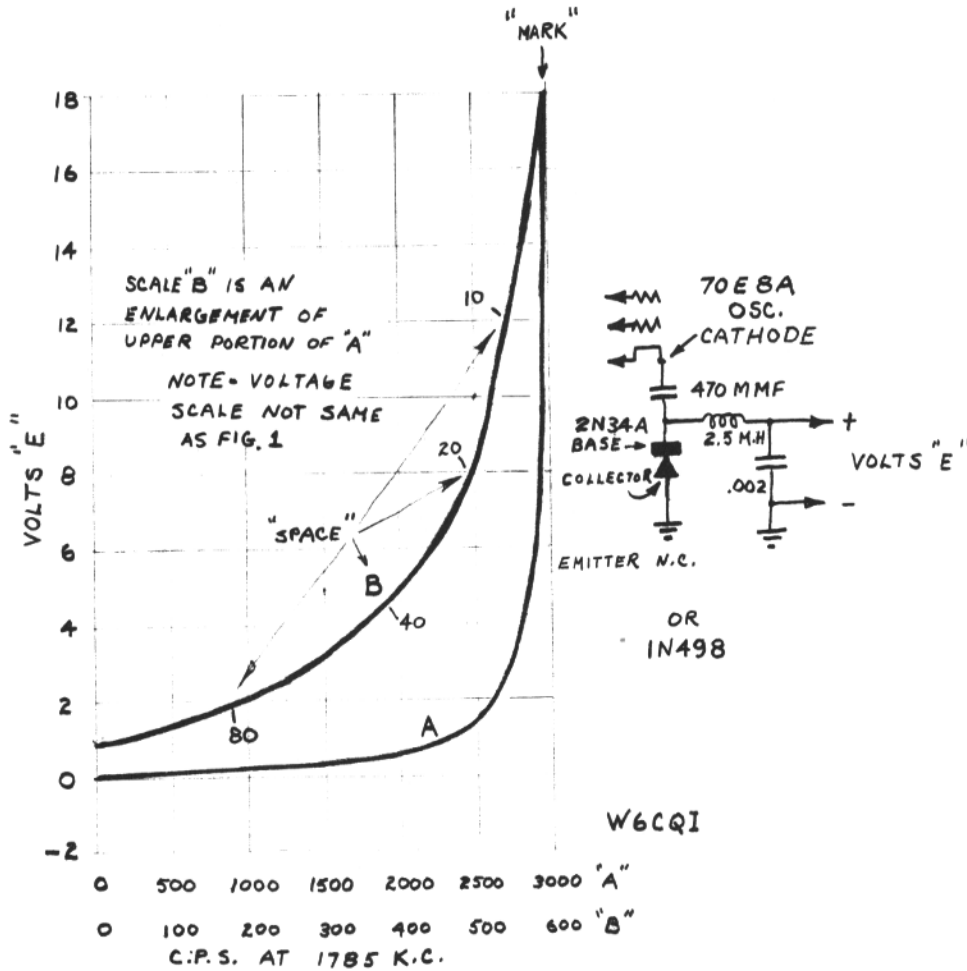


FIG. 2

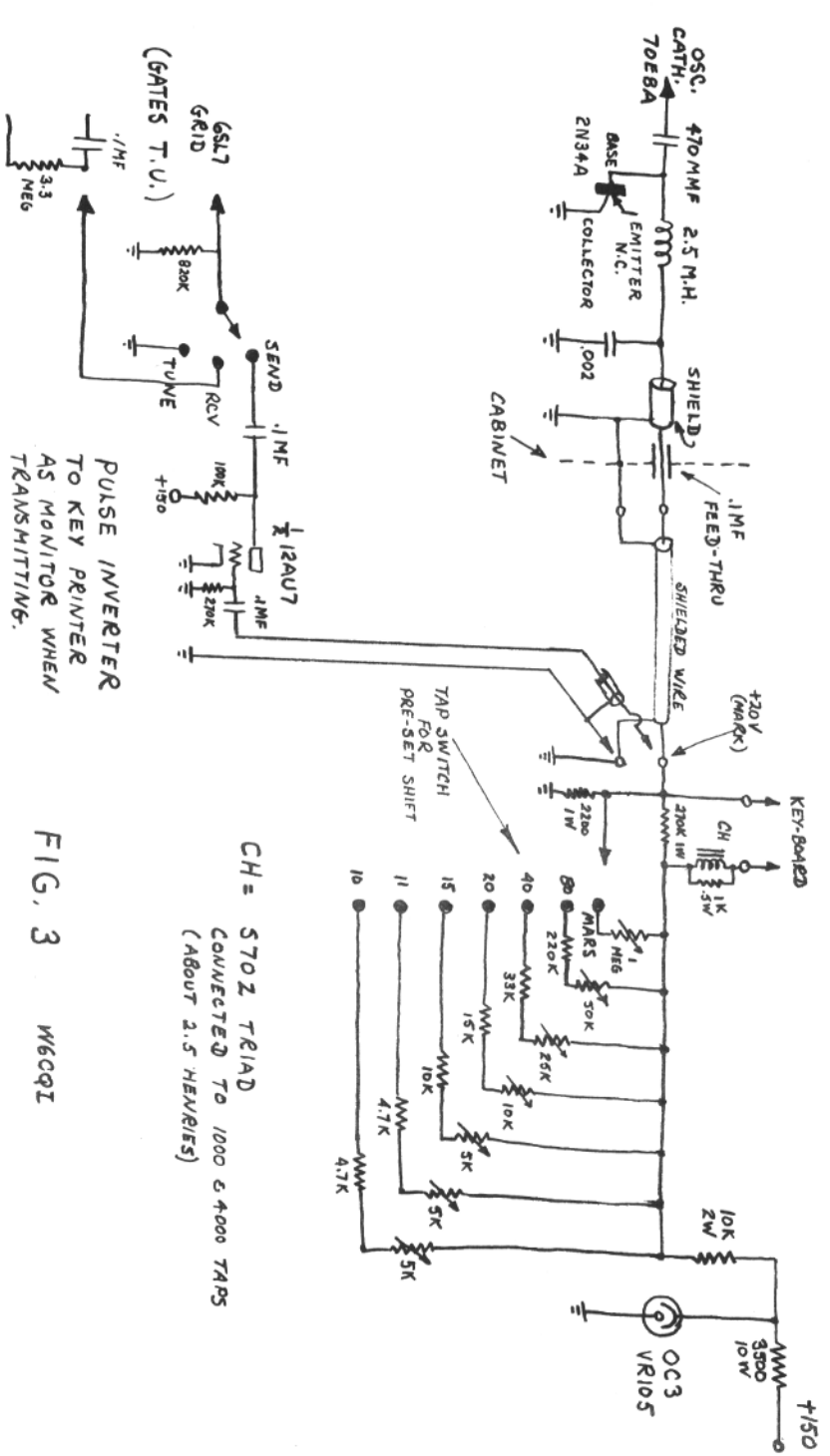


FIG. 3 W6CQZ

Modification of ARC-5 FOR FSK

BY FRED HEWARD, K6EER, AA6EER, SAN MATEO, CALIF.

For those of you who are interested in arranging your RTTY equipment so as not to disrupt existing setups the ARC5 transmitter can be made to serve very well as a stable VFO for frequency shift. Power requirements are not too great and if one of the regular racks is used a unit can be made up for the coverage of each band desired. Frequency shift will vary for various frequencies and it will help to ensure FCC compliance if a lock is provided for the dial indicator on the shift control. The plate on the upper top front corner of the panel serves very well for logging the frequency, coupling (drive) and dial figure at which point 850 cps is obtained. Minor frequency excursions may of course be made but shift should be checked for anything over a few kcs. The wiring diagrams show a before and after picture. The unit herein described is in use at this station and is coax fed to a Viking II in the same manner as the usual VFO.

The drive control on the transmitter should be set to the approximate position usually used for the band in use and the "Ant Coupling" advanced to give sufficient grid drive. There will of course be many individual arrangements but these should include a switching arrangement so that both mark and space signals can be used for shift setting. These are best incorporated in the terminal unit or converter.

A relay was incorporated in the negative B plus lead which works along with the antenna relay. A pushbutton switch was used on the rack base (Test Key) to short across the power relay for so that a signal can be obtained for "zeroing in."

To get started: Remove the top cover section and bottom chassis plate—clean up and remove the tubes. It's also a good idea to turn the frequency control till variable condensers are meshed, for obvious reasons. The crystal is removed and the socket used for tie points when wiring. The following components are also removed from the chassis:

1. Antenna post assembly and grounding post.

2. Relay on front panel—(clip leads at coils).

3. Roller coil assembly complete (clip the wire lead near the coil as this coil terminal will be connected to the Coax socket after it is installed in place of the antenna post.

4. Antenna inductance lock knob (install plug in hole).

5. Front plate which incorporates the window and scale. Do Not Remove "Ant Coupling" knob or lock.

Facing transmitter from the front, clip off plate lead (at the coil) going to the 1625 on the right hand side. This tube will not be used.

Facing the open part of the bottom side of the chassis with the front side away from you, remove the relay on the left hand side, clipping the wires at the coil. Other parts not included in the modification circuit will be removed also. Grind off the rivets holding the bracket and resistor on the rear chassis wall as these holes are used to mount the RF choke and a tie point strip. Note the wiring and change the yellow wire on the left hand 1625 socket from where it now is to the lug next, in line anticlockwise. Now dress the yellow that went to the relay (chassis wall) and solder to the socket terminal that was just "vacated."

Mount a small two connection terminal strip on the rear part of the mica condenser (#4190)—left side of chassis.

Coil connections are found in two semi circular slots at one end of the variable condenser. Place the chassis with the

bottom side up—the front end to your left and proceed as follows:

1. Unsolder or clip the connection to #8 at the terminal and remove the other connections to the 1625 socket farthest away from you. Run the remaining socket lead to the front connector of the tie strip mounted on condenser #4190.

2. Number 7 terminal is blank.

3. Remove the black wire on #6 completely.

4. #5 is left as is.

5. Remove black wire from #4 and three section condenser mounted on rear wall of chassis.

There are two red wires which were connected to the relay—clip off the one going to the left hand tube socket at rear and the other 3 inches from where it runs to the power socket—center on the rear chassis wall; remove remainder.

Turning now to the top section—file out the tang in the hole left from the antenna post so that a coax socket may be mounted. It is possible to mount this at an angle and so use one hole already in place. One other hole for the socket fastening is all that is necessary.

Fashion a plate to cover the "window and scale" space after removing the plastic. This can be made from a salvage piece having a wrinkle finish as can also an inside patch to cover the hole left to the right. Mount the shift control potentiometer in the center of this assembly and be sure to arrange for a dial lock on this control. A dial and lock from an odd BC610 tuning unit will serve very well.

There will be a yellow and black wire coming through an opening in the chassis that were connected to the antenna relay. Connect the black one to the center terminal of the shift control—the yellow to the terminal farthest to the left from the rear view and ground the remaining terminal.

Next—turn the chassis over and follow the yellow wire just hooked up to where it joins one of the 1625 socket lugs. Disconnect at this point, leaving the other yellow wire in place and add an extension to the loose yellow wire so that you can follow along the side corner of the chassis around to pin #3 on the power socket. The black wire is removed from #3 pin of the "crystal" socket and left available for later connection to the resistor going to pin #5 of the 12H6.

Reference to the wiring diagram should take care of the remaining wiring. The 12H6 is installed in place of the "eye" tube and a 12A6 in puace of the original 1626.

Dial calibration may be brought to accuracy by adjustment through the top of the case (small latched opening) after assembly is completed.

The final screen and oscillator B plus may be tied together externally and supplied with 105 to 150 volts DC Regulated. It is possible that a small amount of drift may be encountered when using the 150 volts but dropping to 105 regulated will eliminate this factor. 12 volts AC is used for the filaments and the power relay in the power supply was a 110v ac in parallel with the antenna relay.

Two units—one for 7-9.1 and one for 3-4 mc are in use at this station and have proven most satisfactory. Drive is more than adequate and it is noted that the "Ant Coupling" does not have to be turned past "2" to give adequate drive.

We would like to thank Bart (W6-OWP) for his invaluable assistance in getting these units on the air and for his suggestions on calibration. An audio oscillator is of course a big help in checking shift but with care you can use your receiver and calibrate the BFO control from a commercial station—in which case it would be wise to check against several. It is suggested that proper shielding of all wiring be done to avoid the possibility of RF getting into the keying leads, etc.