Classified Cont.-

FOR SALE: TT/L-2 with built in scope (2 inch) incld., 7 x 19 inch rack mounted panel, excellent condition, 850-170 shifts, firm, $125.00. Kleinschmidt TT117 printer, $50.00, ST-6 (8 by W8FFC) printed circuit boards $12.00, Heath HW-12 (good working order) $75.00. Heath VFO HG-10-B (new) $45.00, Heath DX35 $20.00. Model 15 printer in excellent condition, $75.00. Model 14 typing reperf with ketboard $50.00. TeeDee $25.00. Instruction manuals included with all equipment listed above. W. L. Brown, W5NRD, 425 Magnolia St., Denton, TX. 76201 Phone (817) 382-0351.

SELL: MODEL 28 ASR NEW GEARSHIFT, $190.00. CV-116B converter A-1 condition with manual $30.00. CV-591A SSB converter $20.00. ST-6 kit, $75.00. Mac McCullough, WB5EUN, 3936 Love Lane, Dallas, TX. 75225. Phone (214)-691-3338.

FOR SALE: MITE TELEPRINTER, excellent condition; also, SJ-5 and K59QL Oscillator. Send stamped envelope for more information. Floyd Timmons, W0ERA, R#1, Box 156, Fredonia, Kansas, 66736.

28 ROTR, THREE-SPEED, auto ltrs feedout, w/cover, $125. 28RO, typing unit and base only, $100. R390A, very clean, $500. 3-speed mod kit for 28ASR dome reperf, $30. WA2HWJ, 205 Powell St., Central Islip, NY (516-582-9364).

****

Address Correction Requested

RTTY JOURNAL
P O Box 837
Royal Oak, Mich. 48068

FIRST CLASS MAIL

RTTY JOURNAL

July-August 1974

EXCLUSIVELY AMATEUR RADIO TELETYPE

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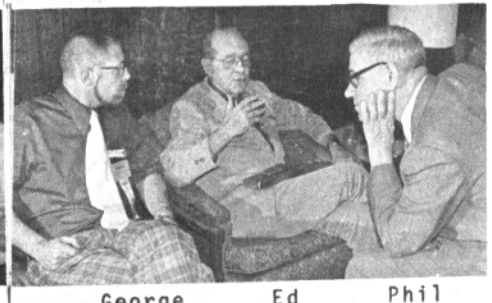


George W9KOI Ed W9WKC Phil W9HPG

DAYTON 1974- More Pix on page 7

CONTENTS-

SARTG DX CONTEST August-17-18

We have the great pleasure to invite you to join the 4th WW RTTY contest run by the Scandinavian Amateur Radio Teleprinter Group. Please note a few modifications from the past year: over a week-end, three operating periods have been established, each eight hours in length. There will be an eight hour off-period between each operating period. Somewhat reduced QSO-points and slight changes for the multipliers have also been established.

Rules

1. **Contest periods:** I: 0000-0800 GMT Saturday, August 17.
   II: 1600-2400 GMT Saturday, August 17.
   III: 0800-1600 GMT Sunday, August 18.
2. **Bands:** Use all bands 3, 5-28 MHZ. The same station may be worked once on each band for QSO and multiplier credits. Only 2-way RTTY QSO's will count.
3. **Classes:** A) Single operator, up to 100 W input.
   B) Single operator, over 100 W input.
   C) Multi operator, Single transmitter (any power).
   D) S W L ' S.
4. **Exchange:** RST and QSO number.
5. **Points:** QSO with own country, five (5) points. Other country in same continent, ten (10) points. Other continent, fifteen (15) points. In USA and Canada each call-district will be considered as a separate country.
6. **Multiplier:** Each country and each district in W/K and VE/VO. Use the DXCC and WAE Country lists.
7. **Scoring:** Sum of QSO-Points x sum of multipliers.
8. **S W L ' S:** Use the same rules for scoring, but based on stations and messages copied.
9. **Logs:** Mailing deadline is September 18th, 1974. The logs to contain: Band, Date/Time GMT, Call-signs, Exchanges sent and received, points and multipliers. Use a separate sheet for each band and enclose a summary sheet showing the scoring, classification, your call, name and address. Send the logs to: SARTG Contest Manager, OZ2CJ C. J. Jensen, Meisnersgade 5, Randers, Danmark.
10. **Awards:** To the top stations in each class, in each country, W/K and VE/VO call-district. In areas with sufficient participation also 2nd and 3rd place certificates, to stations showing a reasonable score.

*****

WSRY RTTY AWARD

Just to remind you about the WSRY RTTY award (Worked Scandinavian RTTY Awards). This is a nice diploma printed in 4 colours, awarded by the Scandinavian Amateur Radio Teleprinter Group, SARTG. All who have had 2-way RTTY contacts with the following Scandinavian stations after the SARTG start 1 May 1974 can apply for the WSRY.

No. of QSO's necessary for Scandinavians -- 25
No. of QSO's necessary for other Europeans-- 16
No. of QSO's necessary for non-Europeans- 8

All bands can be used. QSL's are not necessary. Send a list of the contacts made, with the date, time and band, together with 1oIRC's to:

SARTG Contest & Award Manager
C. J. Jensen OZ2CJ
Meisnersgade 5
8900 Randers Denmark

Following lands/prefix count for the WSRY:
LA/LG/LF/ - JW - JX - OH - OH0 - OJ0 - OX - OY - OZ - SJ/SK/SI/SM - TF.

***

Correction - Apology!

Somehow - and we have no idea why - the wrong name and address was given as the author of the article in the May-June issue on page 2 "Scooped Again by Hoff". The correct author was R.M. Stevenson, 16 Compass Ct. Huntington, N.Y. WB2CZL. The call at the end of the article was correct. Our apologies to both parties concerned.

Keyboard Art Contest

WE have advance word of a RTTY ART CONTEST in the planning stages by Don, WA6PIR. Full details will be published as soon as all details are worked out. With Don out of the contest everybody has a chance to be creative.

***

3 Band RTTY Transmitter-Receiver Xtal Controlled for $100.

TRUMAN BOERKOEL, K8JUG
2666 Edwin Drive
Xenia, OH. 45385

This is enough to raise some eyebrows, but let's be more specific. Would you believe excellent copy on 170 shift and stability so precise that unattended auto start is easily accomplished.

The above is how my article started when it was published in the RTTY Journal back in December 1967. A number of changes can now be added to this original article. W6FFC Irv Hoff's XT-4 crystal oscillator will be incorporated. And WOKXZ Jack Headley's article on the conversion from 15 to 20 meters will also be included.

The unit we are talking about is Heath Kits HW-16 Novice 3 band transceiver. The receiver contains an RF amplifier, hetrodyne mixer, crystal controlled hetrodyne oscillator, bandpass coupler, variable VFO, VFO mixer, crystal filter, if amplifier, product detector, crystal controlled BFO, and 2 audio amplifiers; sensitivity, less than 1 microvolt for 10 DB signal-pulse-noise to noise ratio; selectivity, 500 cycles at 6 DB down.

Sounds like a winner for 170 cycle shift, but there are some problems. First apparent thing is that the BFO crystal comes out on the wrong sideband and not in the center of the passband for 170 cycle shift. This must be changed.

Computations for determining crystal frequency for the receiver section, thanks to W8SDZ Keith Peterson.

Assuming that the half-lattice filter operates as they normally do, the center frequency will be half-way between two crystals, this is 3395.300 Kcs. When working with RTTY, it is easier if you convert everything to center frequencies. For instance the 3637.500 Kcs. channel is a center frequency of 3637.415 Kcs.

3637.500 Kcs. desired receiver frequency
- .085 (.085 Kcs is just half of 170 cycles)

3637.415 Kcs. desired receiver center frequency

Heath Kit transceiver

9045.000 high frequency oscillator
-3637.415 channel center frequency

5407.585 first IF frequency
-3395.300 second IF center frequency

2012.285 second hetrodyne osc. VFO

The desired audio center frequency is
2125
85

2210 cycles
Heath kit
3395.300 second IF center frequency
- 2.210 audio center frequency

3393.090 VFO crystal frequency

Using the center frequency approach is possible because you know that you have plus or minus 150 cycles bandwidth (at IF) on either side of it. It is therefore possible to state: For the Heath Kit HW-16 CW transceiver and the 80 meter auto start frequency, one would need a 2012.285 Kcs. crystal to replace the receiver VFO, and 3393.090 Kcs. crystal to replace the present receiver BFO crystal.

To crystal control the receiver, it is necessary to disconnect the variable receiver condenser at point "X" on the receiver printed circuit board (this eliminates L-7, C-55, C-54 and C-53 from the circuit). Using the vacated hole at point "X" on the P.C. board as one hole for mounting the crystal, drill another hole in the P.C. board so that the crystal can be mounted from point "X" to ground. Solder this crystal in the same manner used to mount the other crystals on the P.C. board. If you desire to use crystal controlled receive on 3675.500 Kcs., use a 2012.285 Kc crystal. If the frequency needs pulling one way or the other to zero a few cycles, you may adjust the frequency by varying the tuning of L-6 on the P.C. board.

The side tone that is built into the HW-16 must be disabled. Disconnect one end of the neon lamp associated with the side tone generator to accomplish this. By removing the side tone

*****

Following is a Crystal Chart of the more popular auto start net frequencies. HW-16 Receiver Crystal Frequencies

Note: it is necessary to modify the HW-16 from 15 to 20 meters for operation on that band. This will appear in a subsequent article.

	80 METERS		40 METERS		20 METERS	
Operating freq.	3637.500	3617.500	7137.500	7117.500	14,082.500	14,075.000
Receiver osc. xtal	2012.285	2032.285	2012.285	2032.285	2 067.285	2 074.285
HFO xtal	original	original	original	original	19,545.000	19,545.000
BFO xtal	3393.090	3393.090	3393.090	3393.090	3 393.090	3 393.090
XT-4 xtal	3637.415	3617.415	7137.415	7117.417	7 041.200	7037.000

*****

function, the receiver will be capable of monitoring the transmitted signal.

It may be necessary to install, on the back panel, a speaker matching transformer to match the input impedance of your particular terminal unit. Put a pad on the speaker, so the speaker may be run at normal room audio levels, yet supplying the terminal unit with adequate audio to fully saturate the limiters.

Transmitter modifications: So far this has been a "No Holes" modification. However, I strongly suggest that the Sylvanin grasshopper type power supply fuse be replaced with a conventional fuse. To do this, mount a fuse holder on the back apron of the HW-16. Remember, this fixed frequency net type operation is a 24 hour unattended business and if something goes wrong the grasshopper fuse will open, and when cooled down, reset, open again, etc. until it is discovered that something is wrong. This may be too late, as it happened to me after 6 1/2 years of continuous operation where darned near everything melted.

The XT-4, Irv Hoff's crystal oscillator, which has been reprinted here, may be built into a small Bud minibox with an octal plug mounted on one end of the box to match the octal accessory socket on the HW-16 in the following manner. Plus150 volts to pin 7, 6.3 VAC to pin 2, ground to pin 1, grid bias to pin 8, FSK voltage & RF output are connected to two phono jack connectors mounted on the other end of the Bud mini-box. RF output may be connected to the HW-16 VFO input jack with a short length of coax. FSK voltages may be taken from the FSK keyer in the terminal unit with a length of coax. Terminal units such as the TT/L types, ST-3, ST-4, ST-5, ST-6 are tailor made for the XT-4.

B plus of 310 volts is already connected to pin 4 of the HW-16 accessory socket. It will be necessary to connect a 10K ohm 2 watt voltage dropping resistor from pin 4 to pin 7 of the accessory socket to supply the needed plus 150 VDC to the XT-4.

WA8NGJ, Doug Williamson, has designed a printed circuit board for the XT-4. This will simplify the construction of the unit and has allowed us to reprint his layout here, showing both the foil side and parts placement. This will enable the builder to reproduce this board easily. The board may be mounted on the top side of the bud minibox, or be mounted on the inside of the HW-16, as will be shown in a 20 meter conversion article later.

Rapid switching may be accomplished at a remote location such as a switch on the keyboard of the printer. This switch would short the key jack located on the back apron of the HW-16. When closed, it will automatically actuate the transmitter and simultaneously mute the receiver by means of the automatic switching designed into the HW-16.

A note should be made about true transceiver type operation. Most transceivers use portions of the receiver and portions of the transmitter for dual function purposes, therefore it is impossible to tell exactly what your transmitted frequency is. The HW-16 is a completely separate receiver and transmitter. If you desire, you may leave the receiver connected to the input of the terminal unit and monitor your transmitted signal on the terminal unit scope.

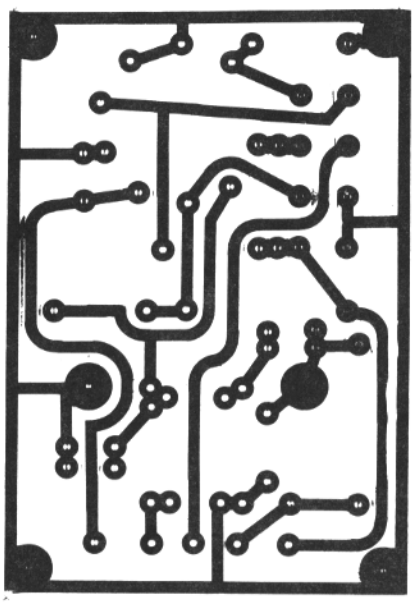
Those interested in the theory behind the XT-4 crystal oscillator are encouraged to read Irv Hoff's article published in the December 1967 RTTY Journal.

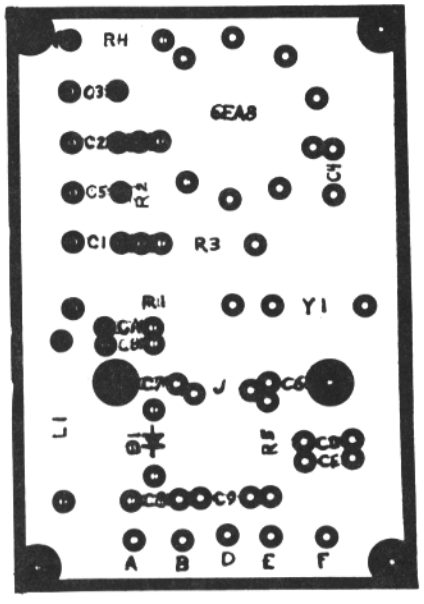
Bibliography

HW-16 Conversion
Boerkoel
RTTY Journal Dec. 1967

XT-4 Crystal oscillator
Hoff
RTTY Journal Dec. 1967

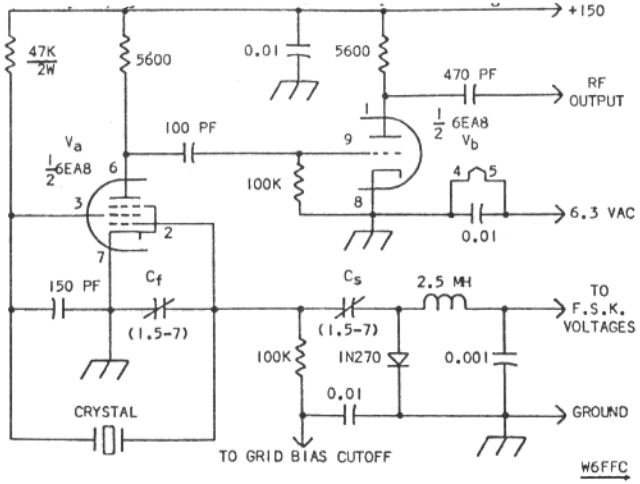
HW-16 20 meter conversion
Headley
RTTY Journal June 1968





Y1-XTAL
CA,CB,CD,CE-padders
D1-1N270
A-+150 VDC
B-FSK voltages
D-RF output
GROUND-Perhiperal foil
E-Grid bias cutoff
F-6.3 VAC
J-JUMPER
R1-47K 2 WT
R2,R3-5.6K
R4,R5-100K
C1,C4,C9-.01 uf
C2-470 pf
C3-100 pf
C5-150 pf
C6,C7- 1.5-7 pf piston
C8-.001 uf
L1-2.5 mh

Parts & Placement for the WA8NGJ board.



THE MAINLINE XT/4 CRYSTAL RTTY OSCILLATOR

HALS DKB 2010 Morse - RTTY Keyboard

ED F. TREGO, W9WKC
517 Market St.
HOOPESTON, IL. 60942

It is axiomatic that if we are going to improve something we have to have something in being on which to improve. In this case Hal's DKB-2010 Morse-RTTY or Dual Mode Keyboard has taken a long jump ahead of their original RKB-1 RTTY only keyboard.

Most manufacturers install improvements piece meal or just enough to keep the customer reasonably dissatisfied with what he has. But, Hal Communications jumped on the DKB-2010 with both feet and added about every feature one can dream up for a keyboard.

Even without additional operating features the "touch" of the DKB-2010 is very much lighter as the keys only have to be partially depressed to make contact. The RKB-1 always left me a little in doubt as to whether I had sent a signal or not. That problem was solved by leaving the monitor loudspeaker turned up to a point where I did not depress a key until I heard the signal from the last one. As a result, I don't believe I ever quite achieved the typing speed that I could on a Model 28 with its built-in limitation at 60 wpm.

This article describes the DKB-2010 more from the point of view of the RTTY operator which is my main experience with the keyboard. My excursions into the C.W. mode are relatively infrequent. However, I have had C.W. operators listen to the Morse transmission and all report perfect keying and easy copy.

There is a three-character buffer memory which stores the characters typed for transmission at a constant rate. Coupled with the n-key rollover capability, it helps smooth out variations in typing speed. A light comes on when the buffer is full. I have heard some criticism that a three character buffer is entirely inadequate; but if one considers its only purpose is to smooth out erratic typing, it fills the job admirably. I am such a typist and there are certain combinations of letters which I hit in more rapid succession than others. I find that the "buffer full" light rarely comes on. By making use of the buffer I find no problem in typing right up close to the 60 word speed which I could not do with the RKB-1 because of the occasional letter key depressed to be transmitted at all.

A "Here is" key is included as standard equipment and is programmed with your call at time of purchase such as "de W9WKC" preceded by a space. This key continuously repeats the call sign as long as it is depressed, both on RTTY and when in the Morse mode.

There are four RTTY operating speeds (60, 66, 75, and 100 wpm) switch selectable. The Morse speed is continuously variable from 8 to 60 wpm.

A light and tone burst signal warn the RTTY operator when the line length exceeds 64 characters. This leaves 8 characters in which to finish a word out to the standard 72 character teleprinter page line. I find this a very desirable feature not part of the old RKB-1. I would have to keep one eye on the TV screen to know when to give a carriage return and line feed.

One key labeled "QBF" is a built-in RTTY test generator and at one touch of the key transmits "The quick brown fox jumps over the lazy dog's back 0123456789."

The Morse Code weight can be set to any of four ratios by a panel switch. For my own taste the one marked "normal" seems just right.

The space bar functions in the Morse mode to simplify interword spacing, but of course no signal is transmitted.

There are two memory keys which can be pre-programmed to automatically transmit three letter combinations. One, marked "CQ" followed by a space, continually transmits "CQ" as long as the key is depressed. The other key marked "Aux" is programmed to send "DX" followed by a space. The owner has the option of having this key programmed in some other way at time of purchase.

The DKB-2010 provides the RTTY operator with the automatic transmission of the caseshift code for numbers and letters, as also did the RKB-1. The shift key is actually only needed for certain punctuation marks.

For Morse operation, a sidetone oscillator with adjustable pitch and volume, monitors the transmitted code. Five double character keys -- SK, AS, AR, KN, and BT, plus an error key -- provide special characters needed for Morse operation. A tune key overrides the keyboard output and keys the transmitter for adjustment.

64 and 128 character buffer memory storage will be available for the DKB-2010, but at this writing neither could be tried out so I only assume that these buffers would find their greatest use in Morse operation where transmitting speeds are lower than RTTY. Neither buffer is large enough to take the place of a keyboard perforator on an electronic basis. For RTTY use, about all I could expect from a 128 character storage would be to give you a headstart on your next transmission. 128 characters is short of a two line storage.

The appearance of the DKB-2010 is quite like the IBM Selectric (same type keys) and the feel is just about the same or maybe the 2010 is a shade lighter in touch. Since my station is now almost wholly electronic, I still retain a Western Union tape puncher and a model 14 TD just for sending test signals and calling "CQ". The tape gear can now go since I have the built in "CQ" and test signal capabilities in the DKB-2010 and of course the telegraph key is now superfluous. This is a saving of quite a few square feet in the shack which I can well use for other purposes.

There are two output connections for Morse Code keying: one for Cathode keying and one for grid-block keying. Neither of these situations satisfied my own problem of keying an Electrocom TK-100 tone keyer. The TK-100 requires both keying leads to be above ground and no voltage applied. Hal kindly solved the problem for me by installing a mercury relay to isolate the keyed stage completely from the DKB-2010. It also presented the problem of having the relay normally closed when used on RTTY.

My standard procedure for using the DKB-2010 is to leave the keyboard in the Morse mode when receiving and then when transmitting to switch the transmitter "ON" and depress the "Here is" key which sends my call in Morse, then switch the keyboard to RTTY and again depress the "Here is" key which then sends my call in RTTY.

I certainly hope the DKB-2010 finds considerable favor amongst the C.W. boys since this puts them a long way toward getting on RTTY. And, who knows, we might wind up with some new converts.

*****

Yep - We plain forgot to include June along with May on the mast head of last month's issue. It should have read May-June. In case we forget again this is the July-August issue.

Need UARTS?

Dusty,

As you no doubt know, the TI UART Chips are not to be had anywhere at the present time. I know that considerable interest has been stirred up in Irv's project and the fraternity will be looking for them.

About a month ago I picked up all of the 10 units which the local distributor had received as advanced samples and got them into the hands of the 3612.5 autostart boys here along the West Coast. The distributor tells me the allocations are tight but he has agreed to get me something like 20 of them on the first delivery which is now the end of May. I figured that in this way, at least some of the people could get the TI chip without having to go the GI ceramic route at $16.

I will accept prepaid orders on a first come, first served basis at $11.00 each postpaid by 1st class mail. Since I am retired and have the time, I figure I can do my part for ham RTTY in this fashion. You may include this info in the Journal if you wish. I will keep Irv advised of any developments via Herb, W6GQC who is on the autostart frequency here in San Diego.

73,
Peter Bertelli, W6KS
5262 Yost Place
San Diego, CA 92109

***

SOME OF THE GROUP AT RTTY FORUM SUNDAY

W8BBB K8JUC K4EYD

AFTER THE CROWD THINNED OUT
DAYTON-1974 PHOTOS by "Cap" W9QKE

RTTY theory & applications-

RON 'RG' GUENTZLER, W8BBB
Route 1 Box 30
ADA OHIO, 45810

RTTY for Beginners- Part 14

RTTY TUNING INDICATORS

There has been some call for a discussion of tuning indicators. The following is not meant to be exhaustive, but it will give some thoughts about ways to indicate the tuning status when receiving a RTTY signal.

There are at least three ways to indicate tuning of a receiver when trying to copy a RTTY signal: 1) A display on an oscilloscope of the demodulated signal versus time, 2) A cross as viewed on the face of a cathode ray tube, and 3) A zero indicating meter.

Before discussing how to connect a tuning indicator, a brief discussion of TUs is in order. The figure shows the "heart" of most audio-type TUs.

Basically, the operation is as follows. The tones coming from the receiver are run thru a limiter and amplifier. The audio output from the limiter/amplifier is coupled thru the two resistors, R, into two tuned circuits. The resistors are made fairly high in value to preserve the Q of the tuned circuits and to isolate them as much as possible. One of the tuned circuits is tuned to the Mark frequency and the other to the Space frequency.

Because the tuned circuits are parallel resonant, an audio voltage appears across only one tuned circuit at a time, and only when the frequency of the signal is at or near the resonant frequency of that tuned circuit. Thus, when a Mark tone is received an audio voltage will appear across the Mark tuned circuit and none (or very little) across the Space tuned circuit. When a Space tone is received, just the opposite will occur.

The voltage appearing across a tuned circuit is rectified using the same type voltage doubler commonly used in power supplies. The diodes connected to one tuned circuit are reversed from those on the other tuned circuit. In this example, a Mark tone results in a voltage across the upper tuned circuit and this voltage gives a positive dc voltage at point X. A Space tone results in an audio voltage across the Space tuned circuit and this results in a negative dc voltage at point X.

The voltage at point X will be a replica of the signal in the transmitting loop at the sending station and will be in polar form. The voltage at this point is used to key the output loop thru a dc amplifier ("keyer" tube or transistor) in a simple TU, or it can be processed thru various circuits such as a low pass filter, a level decision making stage, etc., before keying the output loop.

1) Perhaps the best tuning indicator from the standpoint of obtaining the maximum amount of information about the signal being received employs an oscilloscope arranged to give the demodulated signal as a function of time. For this you will need a dc coupled oscilloscope with a low sweep rate capability and a triggered sweep. The signal displayed will, ideally, be that pictured in a handbook showing a RTTY character. You can obtain such a display by connecting the scope input to point X in the figure. At this point, the signal has not been cleaned up by the circuits within the TU that prepare it for keying the output loop. Therefore, all noise and other forms of trouble making voltages will appear on the display. Perhaps the least desirable feature of this method of tuning is that it will provide a lot of information about the signal, and perhaps too much! One of the most interesting features is that it shows all the "crud" generated in the keyboard contacts of the transmitting station.

2) An oscilloscope can be connected to a TU in such a way that a "cross" pattern results when a RTTY signal is received. Adjust the scope for use with an external horizontal input. Connect the frame of the scope to the "ground" or common point on the TU, the vertical input to point "M" in the diagram, and the horizontal input to point "S".

Because the internal sweep is disabled, an ac voltage applied to the vertical input will give a vertical line; an ac voltage connected to the horizontal input will give a horizontal line. Ideally (for the purpose of scope display), the Q of the tuned circuits in the TU should be as high as possible. When a Mark signal is received, a vertical line will appear on the oscilloscope, because an ac voltage will appear across only the Mark tuned circuit. When a Space tone is received, a horizontal line will appear. If the oscilloscope is properly adjusted, the height of the Mark vertical line will equal the length of the Space horizontal line.

When a RTTY signal is received, the scope will show the horizontal and vertical lines alternately, and this will appear as a cross. Once the scope is adjusted to give a proper cross on a properly-tuned signal, you can then use the scope as an aid in tuning a signal.

Several things can cause the pattern on the scope to be other than ideal. The Q of the tuned circuits should be low enough to give proper operation of the TU. This will mean that even when a Space tone that is on frequency is being received, a small voltage will appear across the Mark tuned circuit. Consequently, the horizontal line will actually appear as an ellipse; ditto for a Mark (vertically-oriented ellipse).

When a signal is being tuned in, size, position, and shape of the ellipses will change. Once you are familiar with such a tuning indicator the pattern will tell you how well tuned the signal is as well as such things as the shift of the signal being received in relation to the shift to which your TU is adjusted, etc.

3) Because the signal at point "X" is a polar signal, a zero-center meter connected from point "X" to ground will read approximately zero when a RTTY signal is received and properly tuned. This is somewhat analogous to the zero-center tuning indicator used on some FM receivers. When a steady Mark or Space is being received, the meter will not read zero. Therefore, this type indicator is best for use when a steady, machine speed (tape) signal is being tuned in. A VTVM adjusted for center zero can be used very satisfactorily in this application.

tuning indicators can be found in the following references:

RTTY FROM A TO Z, Durward J. Rucker, W5VU, Cowan Publishing Co. (CQ), 1970. p. 180 (Fig. 14.10). pp. 194-198.

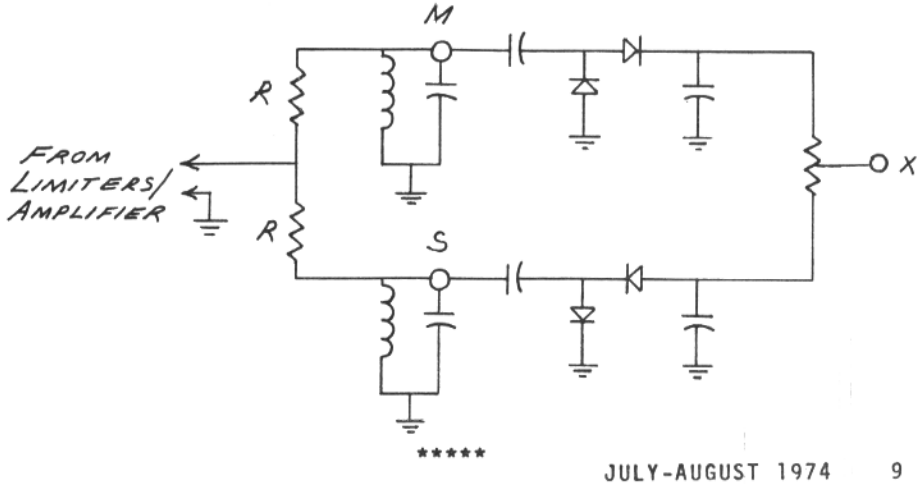
THE NEW RTTY HANDBOOK, Byron H. Kretzman, W2JTP, Cowan Publishing Co. (CQ), 1962. pp. 145-156.

HAM-RTTY, W2NSD/1 & W4RWM, 73 Inc., 1963. p. 60. pp. 76-77.

It should be noted that there are two types of "cross-indicators". One type is as described above. The other was omitted because it required some (although very little) additional circuitry. Some of the references cited show how to build a complete RTTY tuning indicator that is independent of the TU. If you do not own an oscilloscope, you can build a special oscilloscope just for RTTY tuning indication. Such a scope is included in some of the references cited.

Another somewhat curious note: The three largest, and best-known amateur handbooks were checked for tuning indicator circuits - there were none!

73 ES CUL, RG



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RTTY-DX

JOHN POSSEHL - W3KV
Box 73 Blue Bell, Pa., 19422

Hello there. . .

With these bimonthly issues we left you last in springtime and here we are in the midst of summer. Conditions have made their seasonal change also. It seems like there are longer periods of dull propergation with only short bursts of how it used to be "in the good old days". Many of you fellows have actually been traveling to distant lands to have "eyeball" QSO's to counter the unreliability of the HF bands. At least you are assured of a Readability Five - Signal Strength Nine report. The RTTY hospitality suite at Dayton was brightened considerably by the presence of KH6AG, XE1LL, and XE1WU. Noel, VK3NR was on the Continent and in England. Henry, CE3EX spent the month of May in the States where he met some of the West Coast gang and spent several hours at this QTH before leaving for Germany. Bill, KZ5BH was in the New York area for about two weeks and was able to have a chat with W2LFL and some of the boys up that way. Your scribe was in Bermuda and spent a perfectly delightful day with Ed, VP9GE. Ed took us by the hand to the "wireless office" where we were able to obtain a temporary license and operate RTTY as W3KV/VP9 for a few hours. Boy, what fun!

As you well know, attempting to collect all outstanding QSL cards can be a time consuming, expensive and frustrating experience. That avid DX'er to the South of us, W4YG, recently solved one problem in this area in a way that even Sherlock Holmes would be proud of. Gun, YN1CW, had been quite active for a short time but due to some problems with the mails only a very few were fortunate to get cards before the earthquake really upset things in Nicaragua. Nothing had been heard of Gun since then but Mac figured the name to be of Teutonic origin so he went through the DJ-DK-DL section of the Call Book looking for a call and QTH that matched the name. He found it: DJ3LQ in Augsburg. Mac made up a homemade QSL with all the QSO info leaving only a signature to be added and sent it off. In due time he received the signed card back from Gun who is now located in what must be the rarest of the rare locations, The Yemen Arab Republic, where he is 4W1CW but we hastely add that he is not on RTTY, yet. Gun lost all his YN cards in the quake so you might try doing as above to get a confirmation. Several have, including W3KV, and Gun sends all back signed and by registered mail. The QTH is as follows, but Gun says not to put any call signs on the envelope, please.

Guenter Zaenker
P. O. Box 500
Sanaa Yemen Arab Republic

Include IRC's tor return postage. Thanks Mac and good luck fellows.

More news from Bo, ex-YA1OS, and now SMØOS. He is now back in Sweden and all his gear has been returned in good condition. To those still missing cards he will be glad to QSL direct providing you include return postage. The present QTH is --

Bo Lindgren
Saterbaken 4
S-14200 Trangsund, Sweden

Through the efforts of the SARTG to promote RTTY among the Scandanavian countries the following stations are either QRV or will be in the near future. OX3MA, OX3JW, and OX3XX in Greenland and OY1M from the Faeroe Islands. We understand that the latter station is already active but it could possibly be on 80 meters as he has not been printed in this part of the world. Kristjan is still quite active from TF3IRA and his QSL has been promptly received by all that made contact.

Jeff, PZ1DJ, is now back in operation using a Model 15 and he has since assisted Two new stations to get on RTTY from there. W2LFL was the first QSO for Arnold, PZ1AP, and Bud has also printed PZ1BF. Arnold can be reached at --

A. J. Polsbroek
Anniestraat 26,
Paramaribo, Surinam

Just a bit further to the south FY7AO was quite active in late April and early May. His sending was 50 baud, inverted, with about a 450 hz shift but he seemed to have no trouble receiving the 170 hz that the boys were sending to him. His QTH is --

Pierre Perrouin,
P. O. Box 455, 97310 Kourou,
French Guiana

It was hoped that May would bring some activity from Marcus Island but at this writing still nothing heard. The planned DXpedition to Yap (KC6) by JH1ISF/JA1YCQ is still in the works for June but the stop at Nauru (C21) has been scratched due to visa difficulties.

Those much coveted QSL's from XV5AC have been finding their way to the lucky few that made contact but the initial shock upon opening the envelope was not meant for those with weak hearts. His manager endorsed them all for 2xCW!! However, we can say that the second requests were honored with 2x-RTTY in the Mode box. There is additional and more sustained activity planned from Saigon and licensing arrangements are presently under way. If successful it could very well be a two year operation with side trips to other countries in the immediate area. We hope to have additional details in the very near future.

Ed, CT1DV, was active again recently and as it was after the political coup took place apparently amateur activity has not been affected. Since the heavy SSTV involvement by Jo, CR6CA, Angola has been on the missing list for many months. Recent activity by Caria, CR6FY is welcomed particularly by newcomers that did not have this rare prefix in the log.

World Telecommunications Day on May 17th brought renewed RTTY activity by 4U1ITU for about a one week period. Operating was by Ed, one of the HB9 gang and QSL's can go via the bureau or to 4U1ITU, Geneva.

Mac, P29MC has been fairly active with his new call when the conditions are right. He mentioned that he now has his new QSL cards and you can get yours via --

Mac McCullock,
P. O. Box 512 Port Moresby, Papua.

Info supplied by Barney, ZL2ALW, indicates that there will soon be additional activity from New Hebrides by Ray Beely, YJ8RB. A printer is still needed and Barney would appreciate any leads to that end. Ray would be located on Esperito Santo, the northern part of the island group.

Rumored activity by 5U7AZ should happen at any moment. Perhaps if we print his QTH now he will, like magic, suddenly appear. It will be --

Alain Combelles,
P. O. Box 309,
Naimey, Niger Republic

In the meantime 5T5LO and occasionally CN8BO try to keep Africa on the active list.

From here beams pointed south will pick up copy from VP2MKH, YV5CMQ, DL2GG/YV5, HC1DL, HK3DJB, FM7WB, PY2BKJ, PY2CYK, OA4RL, and KZ-5USA.

The U.K. has burst forth with a surge of activity from G3YJQ, G3YDR, G3SYS, G3WOM, G4BFB, GI3SGR, GM3XWJ, all seem to be fairly recent arrivals on the scene.

On the Continent some new stations recently reported are YU2RWR, SV1EC, OK1KVK, HA5KFZ, HA5KBM, ISØEP, ISØXMA.

Latest addition to the WAC rolls are --

Nr. 224 Roger Cooke G3LDI
Nr. 225 Katsumi Goto JA2DHX

Welcome aboard men and congratulations on the fb accomplishment.

QSL's for the DXpedition to Grand Cayman, ZF1TV, have been sent out to all that applied. You may recall that the operation commenced a few days later than scheduled and the boys had some anxious moments. It seems that the boys and the equipment left New York on schedule but when they arrived at ZF1 the equipment was nowhere to be found. The air waves in that triangle ZF-W4-W2 were working overtime and the gear was fianlly located in Florida and quickly shipped in time to make it a successful operation. Dave and George in fact overstayed their visit in order to give as many as possible a contact. No hint yet as to their future plans but we understand it will be bigger and better when it does come off.

In the past two years or so there has been a tremendous upsurge in RTTY activity world wide as more machines have become available. This increase has been reflected, for the most part, in areas outside the USA if considered as a percentage of the total amateur population of a particular country. The various established RTTY Societies, i.e. CARTG, BARTG, SARTG, DARTG, AARTG, are being approached by their membership to come to an international understanding on speed. This thinking is leaning toward establishing a 50 baud standard. The USA has no formal RTTY

CONTINUED ON PAGE 13

It helps us, if renewing, to mention renewal - however - if the subscription has expired for over 3 months please state the last issue you received.

***

Please note the change in cost of Classified Ads and foreign air mail subscriptions. So far we have honored the old rates where received but in the future will have to return underpayments or shorten the subscription term to amount received.

***

PLEASE -- we can seldom answer questions about articles published. Usually the author will oblige but the least consideration to an author is to enclose a SASE. It also helps to ask specific questions and include all information.

***

John Isaacs, of Long Beach, CA. who for some time has been able to furnish Xeroxed copies of all back issues has been sick and until he has completely recovered is not offering this service.

***

We have received numerous suggestions on running a "Letters to the Editor" column but space limitations make this difficult. One idea we might try if sufficient volunteers come forth is a "Technical Answer Department" where anyone with problems might write. This would have to be limited to RTTY matters however. If you would like to be listed, let us know along with any special facet of **TTY** you might wish to undertake. If we get enough the list will be published every month.

***

We recently received a letter from the British RTTY Group, along with copies of letters from the German and Scandinavian RTTY groups regarding the standarization of speed for RTTY.

The consensus of these groups seems to be 50 baud. (That is the standard most European machines are originally set for). This is for use on both VHF and UHF bands. This is 67 wpm, faster speeds are not allowed at present in Europe. Since there is no national RTTY society in this country the Journal has been asked to request comments from operators in the United States and Canada or anyplace else where there is no national society to poll members. Please send any comments to Ted Double, G8CDW, 89 Linden Gardens, Enfield, Middlesex, England. EN1 4DX. .

Personally, although we have facilities for this speed, and many others including the Video Print-outs can work it if necessary, we have never seen any advantage. If we had to bet money we would give good odds that such a speed would never become general in this country. The 75-100 speeds were used for a while, more as a novelty than anything, but are seldom heard on the bands. Actually as we see it, it is easier for them to work 50 baud - so they favor it, it is easier for us to work 45.5 baud (60WPM) and I just can't see all our operators changing. This is just our own opinion and if you have ideas or comments send them to Ted at the address above - not to us. . .

***

With the risk of being repetitious we can only say that the Dayton Hamvention was bigger and better than ever. Extending the time to include Friday afternoon and evening and Sunday til 3PM allowed more (but not enough) time to see the largest hamvention in the world.

Statistically - over 8000 registered and a sell out crowd of 2000 attended the banquet to hear Senator Goldwater. There were 65 exhibitors - all busy as hell - and 700 tables in the acres of swap and shop with just about everything offered if anyone could make the rounds. We did see 2-28ASR machines which were sold before Sunday and in case anyone was looking for it - a parking meter.

Socially - RTTY Fans in abundance including Paco XE1WU and Art, XE1LL from Mexico, KH6AG from Hawaii, Don, WA6PIR, the picture man, Hank W6SKC from Dovetron and many others. Over 50 attended dinner Friday night - room for 24 but everybody got served somehow. Plenty of Kool Ade, although except for a welcome additional supply from HAL Devices we might have run short again. So many people in and out that when we got home everything was hazy as who we saw and what we said. John, W3KV and Ron, W8BBB, were also busy, John and Ron, who have been with the magazine loyally since we published it, and the writer always say we will talk things over in Dayton -- We know better now.

Next year -- we have the same room reserved, last week end in April, start your plans now and if possible stay all three days.

***

DX Cont.-

CONTINUED FROM PAGE 11

Society as such (although there are regional clubs) but to those active in the mode the gravitation has been toward the RTTY Journal in matters concerning RTTY particularly in International contacts. The subject is of course outside the scope of this column but we mention it so that those wishing to voice an opinion from the USA or those areas not represented by a formal Society may do so.

Thanks to the many for remembering to send in an update on their RTTY-DX country totals. We "forgot" to give you fair warning last issue so we will postpone publication until next issue. Please have your WKD/CFMD totals to me by at least 1 September to be listed.

Next issue we will publish rules for additional RTTY Journal MERIT AWARDS. They will be as follows: Five Band WAC-RTTY. Single Band WAC. WAS RTTY. All will be in the form of a certificate and no starting date required. We mention it now so that you can rummage around the coal bin looking for the pasteboards. We will leave WAZ-RTTY for future generations.

Thanks to-W2LFL, K3SWZ, WØCJZ, LU2ESB, ON4BX, OZ4FF, JA1ACB, DA-2WA.

DX-RTTY July/Aug. 1964

F9RY/FC QRV from Corsica. SVØWL QRV from Crete (W3CJK at home). OX3KW has Creed printer and may be on soon. Two UAØ stations have been calling RTTY stations on CW, apparently can copy but not FSK. BARTG up to about 170 members. ON4HW first licensed FSK station in Belgium. Ex-KZ5DS leaving for Taiwan and hopes to be QRV from BV1USC. VK4RQ back on the active list.

73 de John

FLASH ---from VK land we hear that VK9XW is now QRV on RTTY from Christmas Island. A very rare one on any mode.....

***

"Henry" CE3EX operating at W3KV

BACK ISSUES

New subscriptions and classified ads are cash in advance as we have no method for billing. New subscriptions will be started with the current issue and one back issue, if requested. Please do not ask us to start any further back than this. Back issues - if available - may be ordered at 30¢ each at time of subscription. The JOURNAL is mailed about the 20th of the month preceding the dated month. May and June are a combined issue and July-August is a combined issue.

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Editor & Publisher 'Dusty' Dunn, W8CQ

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Cash with copy, Deadline 1st of month.

MORE RTTY! ONLY HAM RADIO MAGAZINE consistently brings you more RTTY articles and better RTTY articles than any other general amateur magazine. You need RTTY Journal, but you need HAM RADIO also. $7.00 per year, $14.00 for 3 years. Ham Radio, Greenville, NH 03048.

FOR SALE OR ??; Model 15 with table. Also new typing unit (extra). W9MDG, 4975 N. Hopkins, Milwaukee, Wisc. 53209.

NEWS-NEWS-NEWS - Amateur Radio's Newspaper, "Worldradio", Trial subscription - Two issues for one dollar. "Worldradio". 2509-F Donner Way, Sacramento, Calif. 95818.

TELETYPE EQUIPMENT FOR SALE: Models 14, 15, 19, 28. TD's, Reperfs, KSR's, ASR's. Parts or complete machines. Write needs and send SASE for complete listing and prices. L. Pfleger, 10615 W. Ridge Rd., Apt. 54, Hales Corners, WI 53130.

M32RO, M33RO TELETYPES: Prices from $150 to $275 FOB. Also fast parts service on all 32/33 K1YCM Les Veenstra, ACTON TECHNICAL SERVICES, 919 Crystal Springs Ave., Pensacola, FL 32505. 904-434-1297

METRIC SYSTEM EXPLAINED, 500 Physical Measurements Converted. Booklet $2.00 H. Morgan, 883 Diana, Akron, Ohio 44307

CIRCUIT BOARD SET for "Low Cost Rtty Counter" Oct 73 Journal. Includes two counter modules, FET front end, 60 hz time base, and a bonus scaler board. Scaler will operate to at least 220 mhz. Boards are G-10 epoxy, plated, undrilled, with full size photos showing each assembly. Necessary info included. Set $10 postpaid in US., add $8 for Universal Frequency Standard Board. Bert Kelley, 2307 S. Clark Ave., Tampa, Florida 33609.

WANTED: TELETYPE MACHINES also parts and accessories for Models 28, 32, 33 & 35. Call or Write: A.D.M. Communications, 1265 Simpson Way, Escondido, Calif. 92025 (714) 747-0374

HAL COMMUNICATIONS CORP. can provide you with the proven video display system, the RVD-1002. When coupled with the RKB-1 keyboard, you will have the ultimate in noiseless, reliable reception and transmission of Baudot coded TTY. The RVD-1002 receives TTY pulses from the HAL ST-6 or any other demodulator, and generates a 1000 character display. Copies at all four standard speeds with selectable unshift on space. The RKB-1 features a high quality commercial keyboard, reliable solid state circuitry, and a rugged, attractive cabinet. BankAmericard and MasterCharge now accepted. HAL Communications Corp., Box 365RJ, Urbana, Ill. 61801. Phone 217-359-7373.

PHOTOSTAMPS OF YOUR STATION with gummed backs for your QSLS. Mini stamps $2.50 - 100 Midi stamps $2.00 50 Maxi stamps $2.00 Samples 25¢ Morgan 883 Diana Akron, Ohio 44307

HAL COMMUNICATIONS CORP.: HEADQUARTERS for MAINLINE Solid State RTTY Equipment. In demodulators, choose from the incomparable ST-6 or, for a low cost beginning in RTTY, the ST-5. Tailor either to your requirements by selecting the 425 Hz press discriminator, the AK-1 AFSK oscillator, and table or rack mount cabinets for the ST-6, or the AK-1 AFSK and the ST-5/AS autostart for the ST-5. Full details available in our current catalog. Charge your purchase to your BankAmericard or Master Charge account. HAL Communications Corp., Box 365RJ, Urbana, Illinois, 61801 Phone 217-359-7373.

WANTED - 33ASR, B. A. THUNMAN, W8ISG, 71 McCollum Street, Galesburg, Michigan 49053. Phone 616 665-7071 or 731-5164.

THE AD FOR GORDON WHITE in the April issue had the wrong Box number - Will any who wrote to Mr. White regarding the ad and whose letters were returned please try again. The correct address is PO Box 3067, Alexandria, VA. 22302.

CHICAGO AREA RTTY OPERATORS; Expert repair work performed at reasonable prices. Cleaning and lubrication; printers $10.00, keyboards $5.00, reperfs $7.00. Repair work $15.00 plus parts, any Teletype apparatus. Rebuilding by estimate. Phone 312-392-2358, ask for Neil.

FAX PAPER: For Desk-Fax, new (not surplus), precut (not rolls), $15 per thousand sheets, postpaid worldwide. Bill Johnston, 1808 Pomona Drive, Las Cruces, New Mexico 88001.

HAL COMMUNICATIONS CORP. announces the DKB-2010 Dual Mode Keyboard. Provides flawless transmission of RTTY and Morse Code with Standard 3 character buffer and optional 64 or 128 key buffer. Call letter identifier and "Quick Brown Fox" sequence standard. Write for detailed spec sheet. HAL Communications Corp., Box 365RJ, Urbana, Ill. 61801. Phone 217-359-7373.

TECH MANUALS - $6.50 EACH. TT63A/FGC, CV-591A/URR, TS-2/TG, CV-116, following manuals $8.50 Each. TT-47/48, R388/URR, FR114/U, USM-50, 51J4; Following $10.00 each - R390A/URR, SRR-11, 12, 13, USM-32, USM-24, URR-35C. Model 14 TD manuals $2.50 each. Thousands more in stock. Send 50¢ coin - for large list. W3IHD, 7218 Roanne Dr. Washington, DC. 20021.

OA-5 SOLID-STATE TERMINAL UNIT. See February "RTTY Journal". Drilled and plated boards, $15.00; parts kit with board, $100.00; complete unit ready for air, $210.00. All F.O.B. Alliance. Ken Simpson, WA8ETX, 3700 Mountview, Alliance, Ohio 44601

KLEINSCHMIDT TTY EQUIPMENT, Gears and parts available. TH-5 Converters @ 100 Cycle Shift $49.95, Converted to 170 Cycles Transmit & Receive $74.95. Model 14 Typing Reperfs, while they last $29.95. Andy Electronics, 6319 Long Dr., Houston, Texas 77017 (713) 641-0576.

11/16 PERF. TAPE, 3.00 BOX OF 10, 8.00 per case of 40 rolls. New nylon ribbons, black only, 6 for 3.50, 12 for 5.50. Model 14 R.O. typing reperfs 10.00 ea. Model 28 TD, 3 heads, 45.00 ea, Model 28 typing reperf heads 20.00 ea, Hallifcrafters SX-117 receiver $110.00, Hallicrafters HT-37 XMTR $110.00, P. Davis, 1830 Toepfer Rd., Akron, Ohio 44312

"RTTY SPEED CONVERTER" A drilled, fiberglass 4" x 6 1/2" printed circuit board now available for the WA6JYJ speed converter in the DEC 71 issue of HAM RADIO. $6.50 postpaid. Complete parts kit including PCB, $42.00, postpaid. Martex Corp., 519 South Austin, Seattle, WA 98108.

TRADE HAVE EXCELLENT HQ-110A Hammarlund receiver. Want BC-348 with dynamotor and original wiring. No alterations. John Riley, 914 N. Cordova, Burbank, Ca. 91505. tel. 845-3880.

WANTED: LTPE-1 Perforators; LRB-6 Underdome reperforators - must have 3-speed gear box. Also interested in Models 28, 32, 33, 35 & 37s. Will pay top price. Amber Industrial Corp., Phone 201/824-1244.

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U.S. GOVERNMENT SURPLUS Typewriters, Jeeps, Walkie Talkies, Rifles, Binoculars, Hand Guns, Boats. Official Guide tells you how and where to buy. $2.00 H. Morgan, 883 Diana, Akron, Ohio 44307.

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TELETYPE - KLEINSCHMIDT - MITE -; gears, parts, manuals, tape (11/16, 7/8), toroids, SASE for list. Typetronics, PO Box 8873, Ft. Lauderdale, FL. 33310. Wanted; Tubes 1Z2, 2BP1, Kleinschmidt TD, 60 speed gears, also Mite 75, and 74912 - trade 74913. W4NYF.

WANTED: MODEL 33 & 35 EQUIPMENT. Complete or partial units, any quantity. Will pay shipping. Terminal Systems, Inc., 11300 Hartland St., North Hollywood, CA 91605 (213) 769-6772.

SALE: MODEL 28 TYPING REPERF, type TT 315/UG code LPR-35, or TT 317/UG code LPR-37, tape data 11/16" wide, chadless or fully perforated; Good $25.00 each. Model 28 transmitter-distributor type TT 334/UG code LXB-9, Good $25.00. Tuning forks 96.19 VPS. or 120 VPS. Unused $2.00 each. Mite PD/82U 115 VAC, 60 Cy. Synchronous motor with connector Unused $18.00. Reader, High Speed Ferranti model 11 or 111 Good $15.00. TT Socket wrench 5/16" with 12" long handle Unused. 75¢ each. 60 WPM set of gears for Model 14 T.D. 1800 rpm Unused $4.75. Model 14, 15 and 19 Machines available as well as others and parts also. . .Send us a list of your needs. Atlantic Surplus Sales, 1902 Mermaid Ave. Brooklyn, N.Y. 11224.

WANTED; CV483/URA-17 group, will pay $200.00 cash. Also want RO Mod. 28 Mark 111 printer. Also need model 28 printing reperf, unit Only. George Tate, W4AIS, 300 Thornwood Dr. Taylors, S.C. 29687

TELETYPE RIBBONS, Black nylon, fresh stock - $3.95/DOZEN, 50¢ each, plus postage (2 pounds per dozen). CV-89 SCHEMATIC and 14 important pages copied from NAVSHIPS manual. $2.95 postpaid. 11/16" PERFORATOR TAPE, $2.95 for ten rolls, $8/case of 40 rolls plus shipping (49 pounds per case). JIM COOPER W2BVE, Communications Equipment, Supplies and Information, P. O. Box 73-T, Paramus, NJ 07652.

SPECIAL SALE-AUTOSTART until end of Sept. 1974, $15.00 ppd. PC boards $2.00 ea. and complete modules $15.00 ea. ppd. Great for Mars nets etc. Turns machine on after 2 seconds steady mark, 2125 tone. Send SASE for catalogue. P.C. Electronics, W60RG, 2522 S. Paxson Lane, Arcadia, CA. 91006.

FOR SALE OR TRADE: five (5) M32RO's. Make offer FOB Evansville. . .H. Galbraith W9RDJ, 1214 S. Alvord Blvd., Evansville, IN 47714.

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WANTED - Cover with base for Model 28 LPR reperf. John Vonderschmitt, R.R. #3, Box 35, Washington, Indiana 47501.

AUTOMATIC CR & LF MODIFICATION KIT Teletype Part 1-115751 $17.50, Page Printer Paper rewinder $12.50, Teletype Sync Motor $10.00, Clare Mercury wetted contact Polar Relay $7.50), Trepac Solid State Relay (adjustable) $9.00, Both direct plug-in to replace 215A-255A types, Page printer paper 12 rolls $8.00, Perforator tape 10 rolls $6.00; Prices F.O.B.; W3KA Ladd, 10406 Insley St., Silver Spring, Md. 20902 (301) 649-5580.

MODEL 28 LESU's: BELL TYPE, LESU-8. Complete wiring for 28KSR, contains loop supply, casting with 4 "horns", polar relay socket less relay, etc. $15.00 each plus shipping. L. Pfleger, 10615 W. Ridge Rd., Apt. 54, Hales Corners, WI 53130.

DIGITALLY CONTROLLED VFO SYNTHESIZER covers 5-6 MHz in steps of 100 Hertz and with accuracy and stability to one Hertz. Set your frequency with four thumbwheel switches (included in price) or "tune" it with automatic or programmable means. Spurious outputs down at least 60 dB. Direct outputs 50-60 MHz and 100-120 MHz also provided. All on one 4X6 circuit board for $245. Universal audio, AFSK, and VLF synthesizer covers 0 to 100 kHz in one Hertz steps: kit $135. Programmable RTTY stunt box answers with your message when someone calls your station: coming soon. Sase for information of these and other RTTY products. Petit Logic Systems, Box 51, Oak Harbor, Wa. 98277.

WANTED; COMPLETE COLLINS S LINE. Ken, WA5JJB, PO Box 355, Nederland, TX. 77627, Phone (713) 722-4196.

88 MILLIHENRY TOROIDS, clean, unpotted. Shipped postpaid in the US. Bakers dozen (13) for $5.00. T-C-V Co. Box 4117, Alexandria, VA. 22303.

HAL COMMUNICATIONS CORP. will display THE line of RTTY equipment at Rochester, Starved Rock, Pueblo, Atlanta, Akron and other major shows. Phone your orders for pickup at the show. HAL Communications Corp., Box 365RJ, Urbana, IL. 61801 Phone 217-359-7373.

WANTED, FOR NORTHERN RADIO Type 174 Model 3 solid state frequency shift diversity converter--need type SA-174203A-72, 170 shift discriminator module. Will buy or can trade SA-174203A-C58, 850 shift module. Also want SA-174203A switchable discriminator module. W6CRG 11007 Explorer Road, LaMesa, Calif. 92041.

"STELMA TDA-2 DISTORTION ANALYZER, needs work, $28. Rack mounted 48 VDC power supplies, 2 ea. model CA1502/2, $12 ea. Also M28 cabinets and bases, M15 parts and M14/M15 manuals. All items post paid. Info and prices on request. Bering Sea Communications, Box 32, Nome, Alaska 99762."

FOR SALE: TT/L 2, 19" RACK MOUNT, $95; Model 14 typing reperf $30; TT 230, 100 wpm Kleinschmidt typing reperf, $20; TT 63 regenerative repeater $25- I ship all UPS. HP 200 audio generator $20, must pick up. Frank Fallon WA2YVK 118-43, 228th Street, Cambria Heights, N.Y. 11411 (212)525-4493.

CRAMPED FOR ANTENNA SPACE? Slinky Dipole for 80/75, 40 & 20 meters operates efficiently at 24 feet long on 80 meters. Money-back guarantee. Complete kit $30.95 ppd., COD $1 extra. Teletron Corp., Box 84-T, Kings Park, N.Y. 11754.

FOR SALE: 28KSR $175 Blue/Gray crackle and 28RO $150 Gray enamel no dents. Both Table models, sprocket feed clean and well oiled. Will crate and ship, you pay. Write for details. M. Fisher W7NSU 1011 Hobson Street, Walla Walla, WA. 99362.

FOR SALE: MODEL 28 Mark 3 KSR, ASR/LXD, ASR/LCXD, receive only typing reperforator with gear shift and cover. P. Anderson, 2448 N. Wilson, Royal Oak, MI. 48073.

FOR SALE: MARK 111 28KSR table top, $225.00. Wanted 28KSR floor cabinet. Ed. Wagner, 1018 Birchhaven Cir., Monona, WI. 58716.

Additional Classified - Page 16