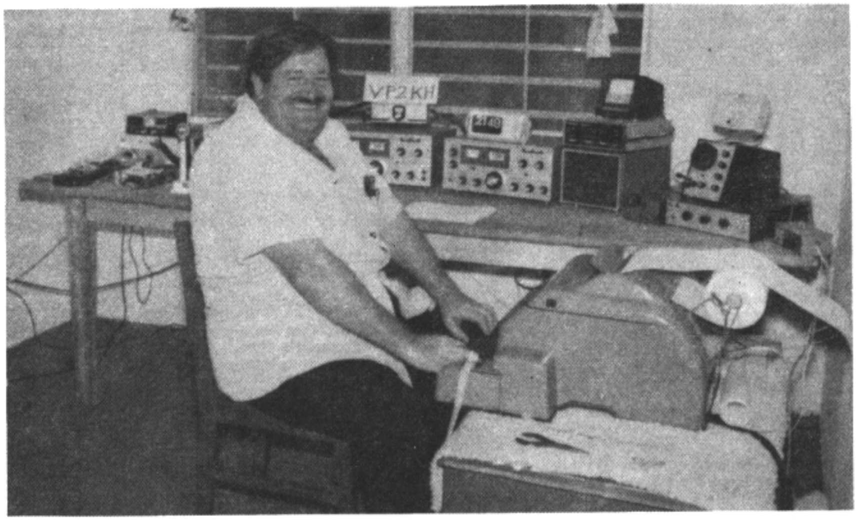

Just about everyone working the lower bands has worked "SID" VP2KH. Since he is the only RTTY call to operate from St. Kitts Island he has been a new country for everyone. On December 4 Sid operated a RTTY station on Monseratt, VP2MKH for another new one for many. Sid had to leave early but expects to be back soon.

*****

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1974

FIRST CLASS MAIL

January, 1974

RTTY JOURNAL

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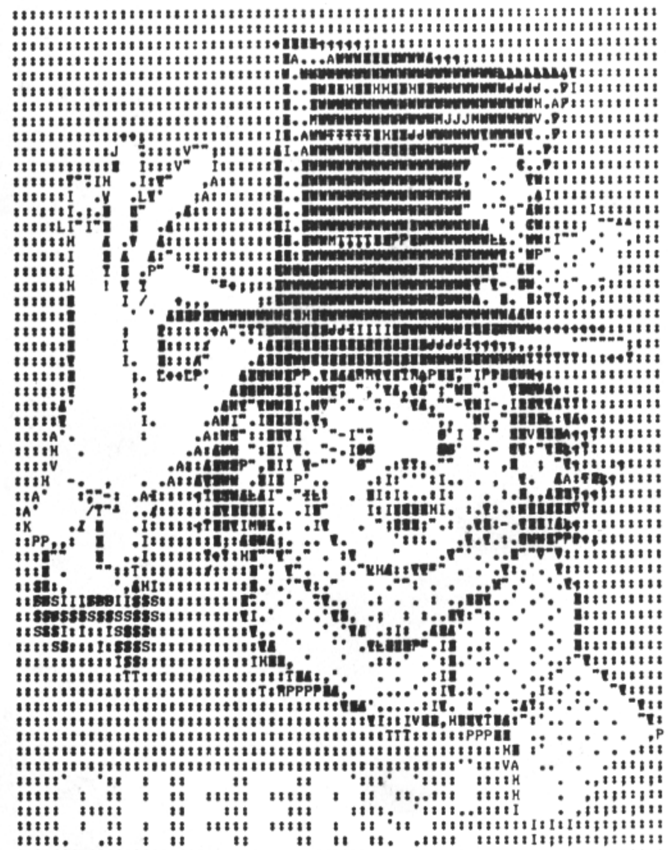


FROM DON, WA6PIR AND HIS XYL MAXINE, ENCINO, CALIFORNIA

CONTENTS-

A TTL R-Y Generator-

Maj,WERNER FEHLAUER,KL7HKB
392-H Kenai Ave.
APO. Seattle, WA. 98749

A recent article* described a simple, low cost R-Y generator for teletype testing utilizing RTL integrated circuits. This design uses TTL circuits, and further describes an approach that can be easily modified for CW and WRU purposes. The complete cost, including power supply, cabinet and hardware is less than ten dollars.

The circuit operates as follows: First, a 74122 retriggerable monostable multivibrator (with clear) is made to produce pulses at 22 ms intervals (60 wpm) by an external RC/diode network connected between pins 11 and 13.

The output pulses are fed to the second IC, a 7493 4-bit binary counter. This counter provides a binary coded sequence from 1 to 16, which is connected to the appropriate inputs of the third IC, a 74150 data selector/multiplexer. This IC is essentially a single-pole, 16 position switch with the position selected at any moment being determined by the binary coded number presented to it by the 4-bit counter. By allowing the multivibrator and counter to run freely, all 16 inputs of the data selector IC are scanned sequentially. By connecting logic "ones" and "zeroes" on appropriate input pins, and observing the output, we find that we have an 8-unit code for the letters R & Y (or any other two-character sequence desired).

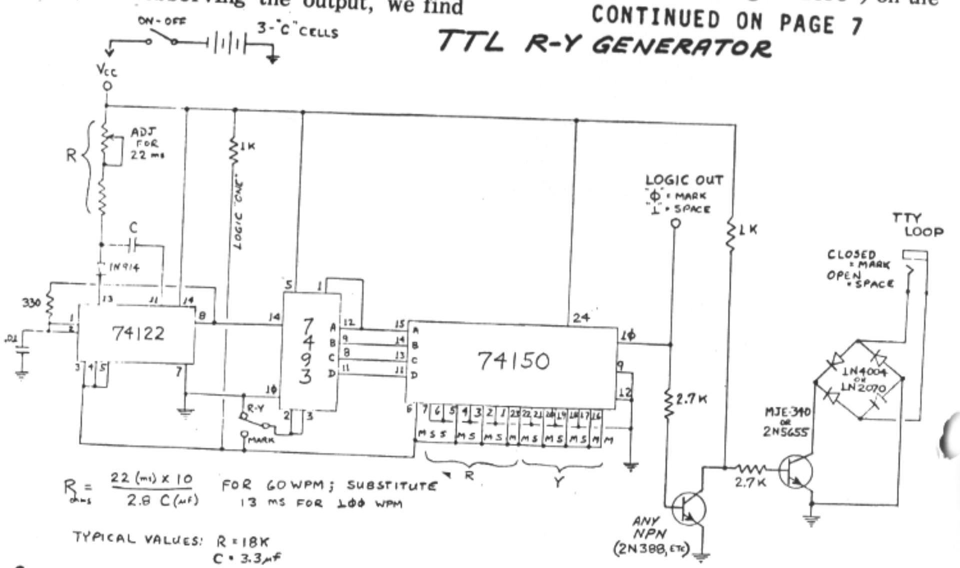
As long as a ground is applied to pins 2 and 3 of the 7493 IC, a continuous stream of R-Y's will be generated (all with zero bias). Raising these pins 2 and 3 to logic "one" inhibits the counter, and effectively puts the unit in "mark hold".

The output from the 74150 IC directly produces an inverted TTL logic level R-Y signal. By also connecting this line to a simple switching transistor, a sixty milliampere loop can be easily keyed. The keying transistor must be adequate for the voltages encountered. The diode bridge allows connection into a loop of any polarity.

Note that data input zero is shown as a mark, as is data input fifteen. These two inputs provide the stop pulse for the second character (Y). This configuration is used so that when the counter is stopped the output is tied to a mark rather than to a space, as would be the case if the first data input corresponded to the start pulse of the first character (R). Thus, any different character coding should be done at inputs two thru six (character 1), and ten thru fourteen (character 2). Coding is determined by placing a high (logic "one") on the data input terminal when a mark output is desired, and a low (logic "zero") on the

CONTINUED ON PAGE 7

TTL R-Y GENERATOR



RTTY DEMODULATOR WITH GOOD DYNAMIC RANGE.

Part 2-

JIM ABSHIER, W8QOP
1750 South Hill Rd.
MILFORD, MICHIGAN, 48042

The output of the low-pass filter is the teletype keying waveform and appears at C in Figure 4. This signal is applied directly to the slicer (A3) and also through the ATC switch to two peak detectors (A1 and A2). When the ATC switch is off, the inputs to the peak detectors are zero and the ATC circuitry is inactive. When the ATC switch is on, amplifier A1 and its associated circuitry detect negative peaks of the input waveform, and A2 and its associated circuitry detect positive peaks of the input waveform. When the input waveform is negative and decreasing, diode D1 conducts and amplifier A1 acts as a unity gain inverter. Capacitor C1 is charged through resistor R1, and since the time constant R1, C1 is small, the voltage across C1 is nearly equal to the negative of the input voltage. Since the input was assumed to be negative, the voltage across C1 is positive. When the input waveform stops decreasing and starts increasing, the positive charge on C1 lingers and D1 becomes back biased. When D1 is back biased, the time constant for the decay of voltage on C1 is much larger than the charging time constant and is primarily determined by C1 and the parallel combination of R2, R3, and R4. The net result of this action is that the voltage across C1 tends to be a positive voltage nearly equal in magnitude to the negative peak voltage of the input waveform. In a similar manner, amplifier A2 and its associated circuitry tend to develop a negative voltage across C2 which is nearly equal in magnitude to the positive peak of the input waveform. These peak voltages across C1 and C2 are summed with the input keying waveform at the summing junction, the peak voltages are scaled by 1/2 with respect to the input waveform implementing the relationship given above (in the system description) for the ATC strategy.

The slicer (A3) is essentially a hard limiter which produces an out of +10 to +13 volts when the sum of all its inputs are negative, and produces an output of about -.7 volts when the sum of its inputs are positive. In addition to inputs from the ATC circuitry, an offset balance voltage and a squelch voltage are summed at the input of the slicer. The offset balance compensates for accumulated dc offsets in the system and is adjusted so that symmetric slicer switching is obtained for the smallest practical keying waveform (about 50 mv pp). When the squelch is on, a sufficiently large negative voltage appears at H (Figure 4) to hold the slicer output positive regardless of the signals appearing at other inputs.

The slicer output is applied to the print magnet drive transistor MJE-340. The print magnet loop power supply and inductive spike suppression circuitry are external to the demodulator.

Figure 5 shows the metering and squelch circuitry used in the demodulator. The metering circuitry allows monitoring the combined mark-plus-space signal level, the average value of the keying waveform and the ATC threshold voltage. With the meter switch in the signal level position, the meter reads from zero to 100 ua. In the keying signal and ATC positions, an offset current of 50 ua is applied so that the meter indicates 50 ua when the input is zero. A position of the meter switch is provided for adjusting this offset. The ATC threshold is obtained from the peak detectors at F and G of Figure 4. The keying signal is obtained from the low-pass filter at I of Figure 3. Signal level is developed by summing detector outputs D and E of Figure 3. This is done in amplifier A2 of Figure 5 which also performs low-pass filtering. The signal level voltage is applied to the squelch circuit of A3 in addition to the meter switch. The squelch circuit consisting of A3 and its associated circuitry is essentially a schmitt trigger. When the signal level is above some threshold determined by the squelch level pot., the output of A3 is plus 12 v. When the signal level drops below the threshold, the output of A3 is -12 v. If the squelch switch is ON, this negative voltage is applied to the slicer and causes a steady mark condition regardless of other inputs to the slicer. For clean switching of the squelch circuit, an adjustable amount of hysteresis is provided.

Construction

Although it is not primary intent of this article to present details of the demodulator construction, a few details are discussed below for those who may want to build the demodulator. The demodulator is housed in a BUD TILT-A-VIEW Cabinet, No. TV-2155. Circuitry is contained on six pluggable circuit cards as indicated by Figures 2 through 5. Controls, switches and the meter are mounted on the front panel, and jacks for input and outputs are mounted on the rear panel.

Two low voltage dc power supplies are required for the demodulator. Voltages of plus 12 volts to plus 15 volts have been used successfully, so the selection of power supply voltages is not critical. The supplies should be regulated because the supply voltages are used for certain balance and offset adjustments. Current drain for either supply is less than 50 ma. The supplies used in the demodulator were based on Motorola MFC-4060A voltage regulator integrated circuits. A diagram of these supplies is not included because when connected together as a dual voltage supply, they were rather temperamental and special precautions had to be taken to prevent one of the supplies from latching up when primary power was applied. A suitable power supply which could be used for the demodulator is the one for the ST-6 demodulator described in the September 1970 issue of RTTY Journal. The ST-6 article also gives a cricuit for a printer magnet loop supply which can be used with the experimental demodulator.

A few words about operational amplifiers used in the demodulator are perhaps in order. It was found that fully compensated 709 amplifiers were rather sluggish in applications such as the limiter, the precision rectifiers and the peak detectors. In these applications, therefore, the compensation was reduced. Since this adjustment of compensation is not available with 741 amplifiers, substitution of 741 amplifiers for 709 amplifiers in these applications is not recommended.

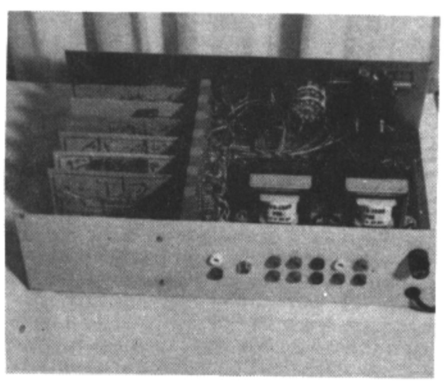
Performance

The demodulator has been in use for over a year, and although extensive quantitative data on performance has not been collected yet, some observations of performance have been made. For signals which are well above the noise level, the demodulator performs equally well in both linear and limited modes. When the signals are fading in and out of the SNR improvement threshold, the linear mode appears to be slightly better than limited mode. The demodulator also seems to recover from static bursts faster in the linear mode. For signals above the improvement threshold, a definite improvement in SNR can be observed when the limiter is switched in. Since most of the signals considered acceptable for a QSO are above the improvement threshold most of the time, the demodulator has been operated mainly in the limited mode.

When copying selectively fading signals in the linear mode, the ATC circuit improves demodulator performance rather dramatically. This circuit is usually left on even when the demodulator is operated in the limited mode because selective fading can occasionally cause the loss of either the mark or space when it fades below the SNR improvement threshold. When the fading is rather rapid, it is generally better to operate with ATC off because it cannot follow rapidly fading signals very well.

The squelch feature is usually only used with linear mode. In limited mode, the output of limiter is constant regardless of whether its input is signal or noise. This tends to reduce the difference in monitored signal level between the conditions of signal - plus - noise when the transmitting station is on and pure noise when the transmitting station goes off the air. Under such conditions it is difficult to find a suitable setting for the squelch level. In linear mode, however, the squelch works well.

It was originally intended that quantitative data would be gathered on the effects of various features of the demodulator under various conditions. Some attempts have been made to do this using signals recorded from the receiver and played back to the demodulator for various modes of demodulator operation. The main problem with using "live" signals has been that so many things can vary that it is difficult to isolate the effects of such phenomena as fading, static bursts, and QRM without rather meticulous scrutiny of the conditions under which each error or group of errors is committed.



REAR VIEW OF DEMODULATOR

***

AFSK-73 Audio Frequency Shift Keyer.--

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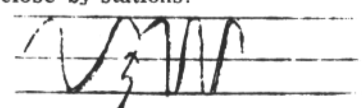
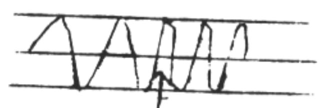
Ontario Science Center
770 Don Mills Rd.
Don Mills, Ontario, Canada

Courtesy C.A.R.T.G. RTTY NEWS

The desirability for the abscence of phase discontinueties in the output signal of an AFSK generator has been mentioned recently in Ham Magazines. These phase discontinueties appear at that point in time when the generator is switched from one frequency to the other. e.g. from mark to space, and the switch-over occurs anywhere along the sine wave except at the zero voltage cross over point. Phase disruptions in the audio sine wave cause fast amplitude changes and present themselves as clicks which, like CW clicks, can be heard on either side of the RTTY signal. Needless to say that these clicks can cause interference to close-by stations.



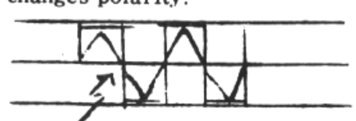
Phase disruption



No Phase disruption

How it Works:

U1 and U2 constitute the audio oscillator. The output of U2 is a square wave which is fed (via R4) to the input of U1 which operates as an active filter whose frequency is determined by the values of C1, C2 and the R1 and R2 combination. The output of the active filter U1 capacitively coupled to the input of U2. The loop is closed oscillation occurs. The sine wave output is available at pin 6 of U1. This sine wave crosses the zero voltage point precisely at the same time when the square wave at Pin 7 of U2 goes through its transition. e.g. changes polarity.



Zero Cross over

This square wave transition can therefore be utilized to command the switch-over from one audio tone to the other to occur only, and only at the zero voltage cross-over point of the sine wave. This has been accomplished in the following way:

The square wave from U2 is fed to Q2 which works as a voltage level changer. (The output swing of U2 is about plus/-10 volts while the maximum input requirements for U3 is from zero to 5 volts.) The square wave signal appears again at the collector of Q2 and is fed from there to the toggle input of U3 which is a J K flip-flop. When the keyboard contacts at the input of the gate arrangement U4 are opened the polarity at pin 6 and 8 of U4 will invert and the Q output of U3 will change its state only then when it is toggled by the negative transition of the square wave signal from Q2 which occurs at the zero voltage cross-over of the sine wave. At that instant the Q output at pin 8 of U3 goes to low and brings Q1 into conduction.

Q1 works as a switch effectively parallel-ing the network R1 and R6 with another resistor and thereby increases the output frequency of the generator. When the keyboard contacts are closed again the same sequence occurs in reverse, switching back to the lower frequency again precisely at the zero voltage cross-over point of the sine wave. In this way phase discontinueties are avoided.

ALIGNMENT.

The best way to adjust the frequency and amplitude equalization is by means of an electronic counter and an oscilloscope. These instruments are now owned by many fellow hams who presumably don't mind to lend a hand as those adjustments once performed should hold true for a long time.

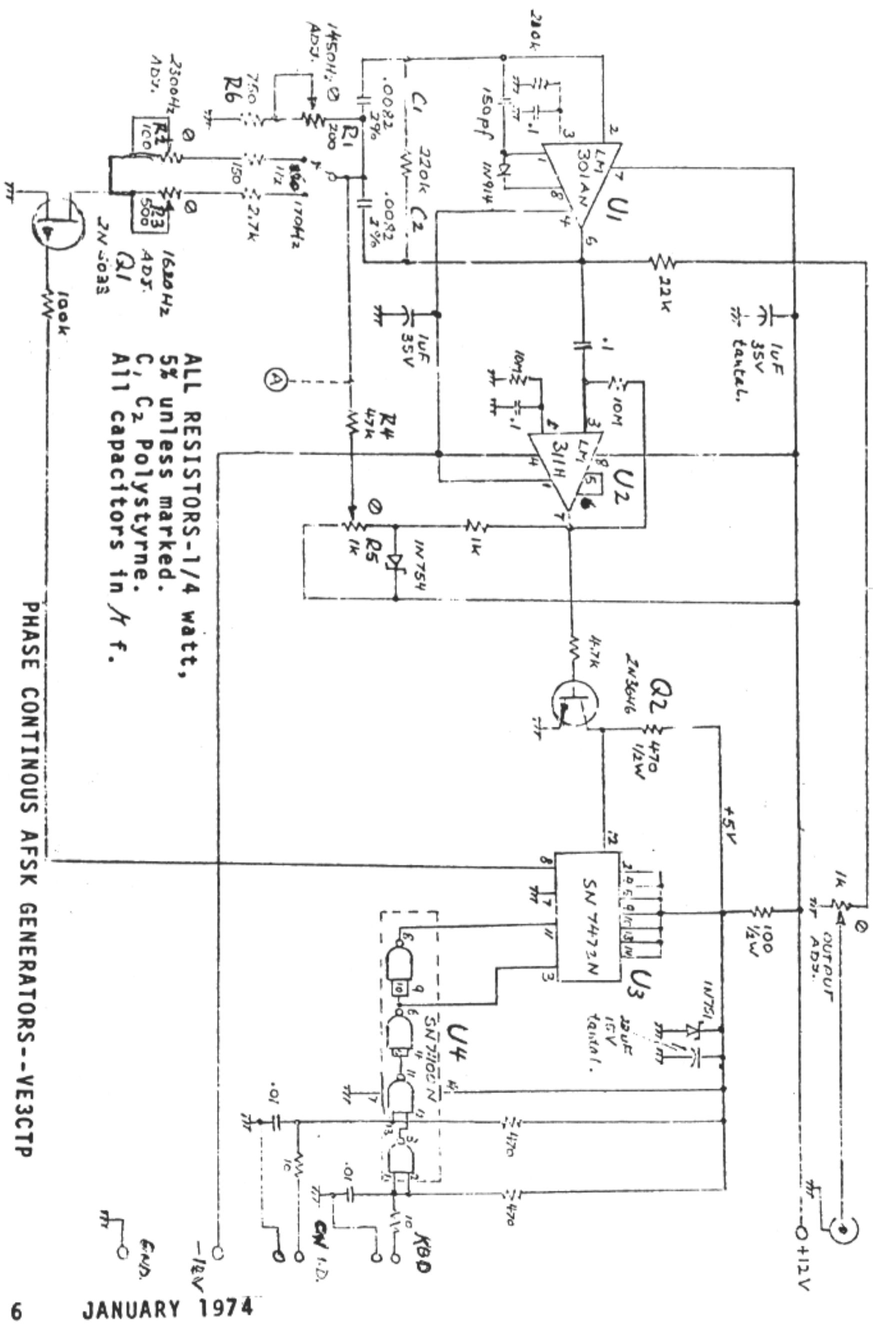
(1). Connect the scope and the counter to the output jack of the unit.

(2). Short the keyboard input terminals A and B and adjust R1 for 1450 Hz on the counter.

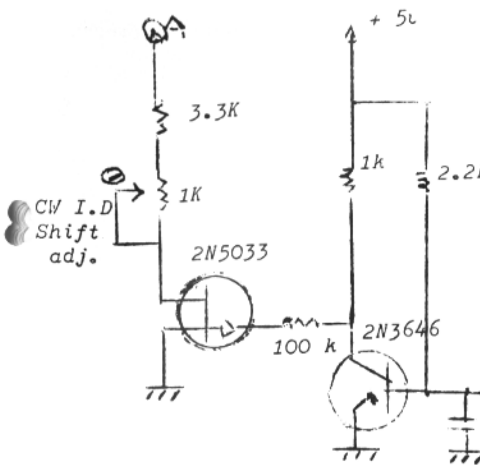
(3). Set the switch to 850 shift and adjust R2 for 2300 Hz.

(4). Set the switch to 170 shift and adjust R3 for 1520 Hz.

(5). Disconnect the scope and the counter from the output terminal, and connect the scope probe to pin 6 of U1. Set the switch to 170 shift and adjust R5, while simultaneously opening and closing of the keyboard input terminals A and B, so that there is no difference in amplitude. There may be a slight difference in amplitude when switching to the 850 shift but this should be in the order of 2 per-



PHASE CONTINOUS AFSK GENERATORS--VE3CTP



OPTIONAL CW I.D. KEYER

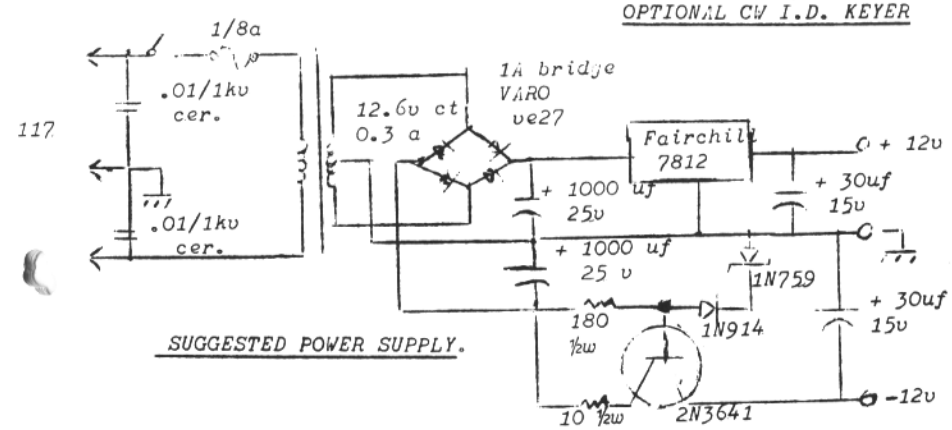
cent which is not objectionable.

ADDITIONAL NOTES:

The CW indent as shown gives a CW shift of the same width as the selected RTTY shift, in other words 850 or 170 Hz. For those who want to employ a different CW ident shift an optional circuit can be added. Simply connect point A of the option to point A in the main circuit.

For easier adjustment R1, R2 and R3 should be multi-turn trimpots (if you can afford them).

The circuit has been built twice here and worked well. It is currently in operation at my RTTY set-up.



SUGGESTED POWER SUPPLY.

*****

TTL R-Y GENERATOR-cont.-

CONTINUED FROM PAGE 2

data input terminal when a space output is desired.

The author laid the entire circuit out on a small piece of punched board using "Circuit Stik" material*, and enclosed the entire unit in a small minibox that included three "C" cells, for complete portability. As running current drain at 4.5 volts was 65 mills, many lines of R-Ys can be generated on one set of batteries. The circuit was tested at voltages below 4 volts, and the only noticeable effect was an increase in the speed of the multi-vibrator, but the change was still within the capability of a properly adjusted machine to print R-Y. Ease of use of this generator assumes that the operator has a machine with Auto CR-LF, as otherwise one line of characters is all he will get without manual intervention.

The author wishes to acknowledge the work of Fred, WAIDLZ, who designed the basic circuit and supplied the necessary encouragement for this project to be completed.

***Ham Radio**, March 1971, pg 23, RTTY Signal Generator, W7ZTC.

*A beginner's kit is available from several sources that includes sufficient pre-punched board and materials to do this project.

*****

RTTY theory & applications.

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

RTTY for Beginners- Part 9

DESIRABLE COMPLEXITIES

Last month we described the Twin City TU because its basic principles of operation are similar to those of more complex units; i.e., the Twin City TU contains the fundamental or "absolutely" necessary circuits found in any TU. It is a unit that can be used with FSK or AFSK. It is a relatively simple unit that will give excellent performance on reasonably-good signals, but is not the best performer when the going gets rough (QRM, QRN, QSB).

We are not going to describe specific circuit modifications that can be made to the Twin City TU, but, instead, we are going to point out some of the reasons why a basic unit such as this may not perform well under poor conditions. The possible solutions to be described have been incorporated into many other units.

THE LIMITER

We discussed the limiter and indicated that its purpose is to present a signal of constant strength to the remainder of the unit essentially independent of the audio signal being supplied to the TU by the receiver. This is a desirable situation because at some point within the TU a decision must be made as to whether a Mark or Space is being received so that the loop being controlled by the TU can be closed or opened, respectively. The decision-making process is uniform when a signal of uniform strength is presented. The limiter not only presents a uniform-strength audio signal independent of "volume control" setting on the receiver, but it also corrects for one tone being louder than the other; this can result from many causes including the frequency response characteristics of the receiver.

So far, the limiter does nothing but good; however, what happens when a noisy signal is being received?

In order to gain some insight into the answer to this question, digress for a moment. Frequency-shift keying, be it carrier frequency shift keying (FSK) or audio frequency shift keying (AFSK), is a form of frequency modulation. The "better" FM receivers normally use two or more limiters before the detector stage. With FM receivers, when two signals are present simultaneously, the louder or stronger of the two signals "captures" the receiver and will almost totally suppress the weaker signal unless the two signals are very nearly the same strength. If a signal and noise are present simultaneously, they can both be thought of as signals and whichever is stronger will capture the other. The net result is that when working with FM signals (RTTY, voice, or music) the desired signal is either there and of good quality or not there at all. This is because when the signal is stronger than the noise, the limiters tend to suppress the noise; when the noise is stronger, the limiters tend to suppress the signal. (The so-called "noise free" characteristics of FM have led to two common fallacies: 1) FM is noise free, and 2) FM is better than AM. Actually: 1) When an FM signal is strong, it swings, and 2) When the going is rough, AM is better than FM.)

Now back to the TU. So long as the noise is less than the signal, the limiters do their job of equalizing levels, and, in addition, tend to suppress noice. However, when a signal gets noisy, the limiters tend to suppress the signal in favor of the noise! The obvious solution appears to be that the limiters should be dispensed with. In general, this is not the answer, although it does, upon occasion, have benefits; i.e., "limiterless" or "AM" operation of the TT/L-2.

A large improvement can be gained by reducing the noise before it gets to the limiters. This can be accomplished by using a bandpass filter before the limiters.

The information in a RTTY signal is contained in a small band of frequencies centered around the Mark and Space frequencies. The interfering noise is spread over the whole bandpass of the receiver. (The actual spectrum of noise is dependent upon its source, the type of detector in the receiver, and the audio bandpass of the receiver.) For example, assume a typical "wide-shift" RTTY signal is being received in the presence of "white noise". The RTTY signal as it appears from the receiver will occupy, approximately, a bandwidth from 2125 to 2975 Hz (a bit wider because of keying rate and waveshape). The noise will occupy the frequency spectrum from, perhaps, 300 Hz to 3300 Hz.

If a bandpass filter is placed between the receiver and the TU, and its bandwidth is adjusted to be just wide enough to pass the RTTY signal, the noise getting into the TU will be reduced by a factor of four times! Generally, the improvement is even better because the noise coming from the receiver tends to be very strong at the lower audio frequencies and relatively weak at the higher frequencies where the RTTY tones are located. The limiter is not frequency dependent. Therefore, by eliminating the very strong low frequency noise components a great increase in receiving performance is gained. Incidentlly, a major argument in favor of "narrow-shift" has just been made!

LOW PASS FILTER

The signal in the receiving loop is supposed to consist of on and off pulses of 22 millisecond duration, minimum. When noise is present, the loop may open and close erratically at intervals of less than 22 ms; this can "junk" copy. The effect of noise can be reduced by somehow restricting the speed at which the loop can open and close (change from M to S to M). This can be accomplished by placing a low pass filter between the detector (in the TU) and the loop keyer. In the case of the Twin City TU described last month, it would go somewhere between the outputs of the voltage doubler rectifiers and the polarized relay.

LOOP KEYER

The output loop should be either open or closed (S or M) and nothing in between. When it is opened, the current in the loop should decay rapidly, and when it is closed, the current should build up very rapidly. (Preferably 1 ms or less). About a year ago (1967 DEC, 1968 JAN & FEB), we discussed in this "column" some of the aspects of this problem.

The Twin City TU contains a polarized relay that keys the output loop. The relay contacts are either open or closed, thus meeting the criterion that no "half-way" state exist. So long as the power supply feeding the loop is at least 130 volts and so long as there are not too many selectors in the loop (2 is enough), the current rise time will be satisfactory. Therefore, the output loop is indeed theoretically very good. However, it does have three drawbacks: 1) The polarized relay is a precision device and must be carefully and accurately adjusted (An I-193C test set will do this), 2) The contacts on the relay may generate noise that is difficult to eliminate, and 3) Some people just hate polar relays (prejudice).

The relay can be replaced with devices such as vacuum tubes or transistors, but when this is done two criteria must be met? 1. Only two states must exist in the output loop, on and off, and, 2. The current rise and fall times must be short; i.e., 1 ms or less.

The second criterion is easy to meet. One method is to use at least a 130 volt loop power supply (and a transistor that is capable of working at 130 V or higher). A better, but more complex, solution is to use a "constant current mode" device or devices to key the loop.

The first criterion has to be considered because vacuum tubes or transistors can operate in a partially-conducting state. A relatively simply way to meet this criterion is to place an electronic "switch" immediately preceeding the output device. Usually, a Schmitt trigger is used. It is a circuit whose output is either "on" or "off" although the signal applied to its input may have any value.

SUMMARY

Three basic improvements can be made to the "basic" TU described last month. They are, in order of decreasing importance: 1. A bandpass filter placed before the limiter in order to reduce the amount of noise appearing at the limiter, 2. A low pass filter placed after the detector and before the output keyer; the filter reduces rapid opening and closing of the loop when noise is present, and 3. An electronic loop keyer to replace the polarized relay; the keyer must include a switch before it and the keyer must have the right time constants.

***

RTTY-DX

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

Hello there. . .

Not too much to report since we last met. With the traditional Holiday Season upon us people are apt to be preoccupied with other things. However, with the present gasoline (or petrol, or benzine, as the case may be) shortage pretty much a world-wide thing we can perhaps look forward to increased week-end activity on the ham bands in the weeks (or months?) ahead.

Previous reports to the contrary, it now appears that HG5A is a perfectly valid station and QSL cards are currently being received by the many stations that made contact with them on RTTY. It is the call of the "Radio Club of Budapest", and QSL's can go direct to. . .

P. O. Box 2
Budapest 134
Hungary

The recent new prefix of "HW" being sent by French amateurs is to commemorate the 50th Anniversary of the first Transatlantic two way tests made by Leon Deloy, F8AB, in 1923. Belgian amateurs recently had a one day celebration marking the 50th Anniversary of amateur radio in that country and Belgian hams were able to use the prefix ON4-50 before their call.

Since we are on the threshold of the New Year, 1974, one starts to wonder what may be in store for the RTTY'er during the months that lay ahead. Making predictions is a pretty dangerous game for the layman and can best be left to Gods and Fools, and I make no claim to being one of the former. The "predictOR" (that's me) can usually be wrong more than fifty percent of the time if he gets specific as to dates and times and the "predictEE" (that's you) gets boiling mad after sitting up all night waiting for the station that doesn't show. Therefore, we will deal in generalities based upon recent input and at the end of 365 days we can tally up the score and see how we came out. So, we predict, that in 1974 the following should take place.

Sid, VP2KH, finally has an "all clear" and should have already put the island of Montserrat on RTTY for the first time as VP2MKH. This operation was to have taken place around the 4th of December, but after this column was sent to the publisher, so we are still predicting you see. Dave and George, of FP8SS FP8AO fame had such a great time DXpeditioning that they are looking over maps of the Caribbean area for places that have never been on RTTY before (or SSTV, in deference to George). JD1ACX, Bonin, and JD1AGZ, Marcus, although now QRT will be making another tour of these islands this coming Spring. Due to severe mechanical problems, they only a few contact with the boys on RTTY on their first visit to these islands but they learned a lot from their experience and things will go more smoothly this time around. It is also quite probable that JH1ISF will operate RTTY from Nauru Island (C2 1) at around this same time. Gus, SM7CLZ, maintains weekly SSB schedules with his good friend ZD3M in the Gambia and is trying very hard to get him to go on RTTY. Watch for developments in the months ahead. So much for predictions.

Now for what is going on at the present time. Edgar, DM4PL/DM3ZOL has been very active and a new country for all that contact him. DM4PL is the call sign of the club station where the RTTY equipment is located and DM3ZOL is Edgar's own call. He requests that you QSL him at. . .

Edgar Baehr
August-Bebel Str 30
8245 Glashuette
German Democratic Rep.

Early November saw renewed activity from the Canary Islands by Antonio, EA8FF. At first Tony could receive RTTY only and did the sending on CW. Soon after however, he got the transmitter to FSK and now has a good narrow shift signal. Cards can go to. . .

P. O. Box 860
Las Palmas
Canary Islands

A new station active from Korea is HL9KK, who is WB8GUB stateside. So far he has been worked in Japan and other areas should listen for him at appropriate times for Far East propagation.

If you want to try for ASIAon 80 meters Gin, JA1ACB is usually around 3608 khz when on that band. Gin says that 3620 and vicinity are cluttered up with commercial stations.

In a recent column we made some reference to using 60 hz sync motor driven machines on 50 hz power lines. Gin sent a letter covering this subject in greater and more accurate detail as it applies to Mite and Kleinschmidt machines. The information is too lengthy to include here so we will type it up and send it to Dusty to put on other pages of this or a future issue.

At this writing, Henri, LU2ESB, and formerly FO8BS, will be back in Tahiti for several weeks vacation. We understand that he will try to set up a club station and no doubt will be QRV from the station of his friend Phillipe, F08BO while on holiday.

Paul, chief op at KJ6BZ is now back in the States after his tour of duty on Johnston Island. The gear was left there intact but at this time it is not known who will be behind the keyboard.

The following stations are to be congratulated upon receiving the W A C Award.

Nr. 217	Tom French	KG6JBG
Nr. 218	Int. Telecom Union	4U1ITU
Nr. 219	Harold Beebe	W9OEQ

We would like to add that Tom is now stateside as WA4BZP in Georgia. The WAC for 4U1ITU was accomplished by DJ8BT and the Group during the CARTG Contest and will be presented to the station trustee by Hans. W9OEQ was one of the last contacts with YA1OS before his QRT during the SARTG Contest.

We have not been publishing any WAS activity for a few years as it seemed that interest was minimal. However, over the past few months we have received requests as to how to come by some of the more elusive States. Much in demand at the moment seems to be Rhode Island and West Virginia. Are any readers from these states presently QRV? If so, please send in your operating times and frequencies used and we can perhaps assure you a lot of answers to your calls.

The Volta Contest occurred too late for publication but hope to have a summary next month. Next one coming up is the "Giant Flash", January 19th and 27th for two 8 hour periods. (see last month for rules). Following that comes the BARTG Spring RTTY Contest; week-end of March 25th. Full rules in this or the following issue of the Journal.

RTTY-DX January 1964

John, KR6BE, says he is again QRV from Okinawa. Bruce, ZL1WB, proudly announces that he had 210 QSO's in 1963. He is also putting a pair of 4x250B's in readyness for Oscar III (note-Bruce has since followed all Oscar shots closely and presently has had several RTTY international contacts via Oscar VI). ZK1-BS now retired and spending some time in N.Z. Eric, VK3KF, had a three way with DL3IR and 5A5TR.

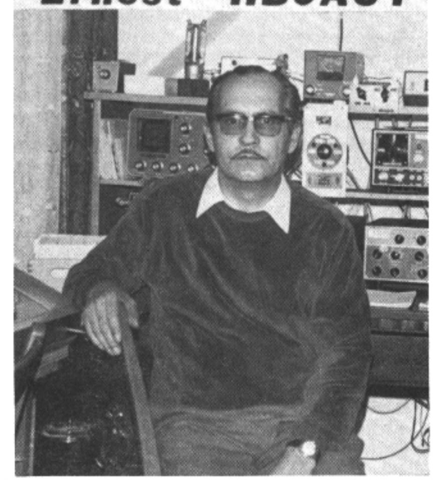
Closing with many thanks to W2LFL, W3DJZ, K6WZ, WØMT, ON4BX, and JA1ACB.

73 and HAPPY NEW YEAR
de John

***

"Marv" W6OQI

"Ernest" HB9AUY



HITS & MISSES

From The Editor and his Mail

Another correction to the article on "Proper identification" in the November issue. It stated that phone could be used on ten meters. The article was rerun from a much earlier issue when RTTY was not allowed in the ten meter CW band. Now that most operation is around 28Ø90 (CW portion) CW identification must be used - and as our first correction stated no faster than 20 WPM.

***

Looking for Rhode Island on 80 meters for a WAS on RTTY. W1ZXA is on again, around 3620, 850 shift at present (hopes to be on 170 soon).

***

Several of the newer exotic trans-ceivers have built in RTTY. How the engineers can be so up-to-date on solid state art and so far behind on RTTY knowledge is hard to figure. The Signal One received and transmitted up-side down, the Kenwood is a fixed 850 shift (and took some fancy adjustment to change to 170). Frankly with good side band suppression most everyone is using AFSK anyway and although we are glad to see RTTY recognized, me thinks the expense could be used to better advantage - for instance - a simple outlet for a foot switch or external push to talk.

***

Speaking of narrow (170) shift a little listening will show that at least 90% of all signals we have heard are using it. Overseas stations are about 100%. We are aware that there are probably more RTTY stations listening that never transmit but except for some few commercials they must be equipped to receive narrow shifts at least. We are not sure what shift MARS stations are using, much of the operation is at 75 WPM we understand and assume that narrow shift will eventually used if not already in operation. It seems to us that W1AW the ARRL station could shift to narrow for the bulletins with a supplementary running on wide shift, just the opposite of present schedules.

***

Another Hamfest with RTTY forum, we hope to attend is the Great Lakes ARRL Division Convention on March 22-23 at Muskegon, Mi. Write PO Box 691, Muskegon, MI. 49443 for brochure and details.

***

Speaking of Hamfests, SAROC the fun convention at Las Vegas is Jan. 3-6. There is just time for you to empty the piggy bank, get your reservations and take off. There must be a tower or new exciter you can use with your winnings. But get a round trip ticket. . .

And don't forget Dayton--See you at our hospitality room "Imperial South Room" at the Imperial North Motel. April 26-28. . .

***

We might mention again that seldom can we answer any questions on articles that appear. A letter to the author is usually much faster and rewarding. And DON'T forget to include a SASE envelope with your inquiries. This is not only a courtesy to the author but often brings a faster answer because of convenience.

***

Want a complete set of RTTY Journals from Vol. 1 through Vol. 16. E.J. O'Brian, 11110 S. Colima Rd. Whittier, CA. 90604. is liquidating an estate and will ship to first check for $22.50 plus shipping charges.

***

Information needed on Western Union equipment? Danny Smith, % Western Union, PO Box 118, McLean, IL. 61754. offers to help hams when possible.

***

If you are building or have an ST-6 demodulator, The new instruction manual from Hal Communications is a dandy, Large clear drawings and many clear photos as well as detailed instructions on all phases of construction as well as adjustments. Available separately for home builders although the HAL boards are used as models.

***

At a recent Swap and Shop locally we came across a RTTY handbook that we had never seen. Published recently - 1972 - By TAB Books, what impressed us was that much of the information was for the beginner and all information necessary to put a printer on the air was detailed in simple terms. Also included are a lot of information on reperfs, printers, TDs, and construction articles for several demodulators and other equipment. both solid state and tubes. Copies can be obtained from K8WKE, 47160 Condor Ave. Utica. MI 48087. The cost is $6.00 PP.

***

Last but not least may we wish you all a very Happy Holiday Season. We hope that Santa brings you lots of goodies. Maybe if you leave a can instead of a stocking on the mantle he will fill it with fuel oil or gasoline.

***

Effects of Power Line Frequency on Machine Speeds.

G.S. NANIWADA, JA1ACB
3-4-8 Izumi, Hoya
Tokyo, Japan

Although what follows applies specifically to Mite and Kleinschmidt machines the same reasoning can be applied to most any type of machine in current use.

In general a printer equipped with a 60hz synchronous motor runs at 3600 or 1800 RPM with a 60hz power line frequency. The same motor will run at 3000 RPM or 1500 RPM with a 50hz power line frequency, a speed reduction of 5/6. By installing 75 WPM gears in a machine equipped with a 60hz synchronous motor and running the machine from a 50hz line frequency the machine speed will be 62.5 WPM. This is about 4% faster than the normal 60 WPM but well within good printing range for both receiving and transmitting.

On the same machine if 67 WPM gears are used and run at 50hz line frequency the 5/6 speed reduction will result in 55.556 WPM or about 9% slower than the normal 60 WPM. It can readily be seen that if a choice is available the 75 WPM gears are the best ones to use.

Kleinschmidt machines use both sync and governed motors but here governed motors are not always to obtain. There are two types of 60hz sync motors, one will run very well with 50hz line frequency but the other will heat up badly causing frequent cut out of the thermal relay. The good one for use on 50hz power line is KL part Nr. 70598A.

Kleinschmidt also supplies 50hz gear sets in 60, 67, 75, and 100 WPM. The gears do not show part numbers but show - character interval units - baud- and motor rpm, such as: 7.42 R 45.5B 3000; 7.42 R 50B 3000; 7.42 R 56.89B 3000; 7.42 R 75B 3000.

It is hoped that this will be of some help to 50hz power line members.

***

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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1973--Complete- [10]

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Editor & Publisher - 'Dusty' Dunn, W8CQ

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TELETYPE, KLEINSCHMIDT, MITE, gears, ribbons, supplies, parts, manuals, tuning forks, motors; tape $9.00 per case. Mite 66 wpm printer set, ditto. SASE for list Typetronics, Box 8873, Ft Lauderdale, Fl. 33310. W4NYF. Wanted- Northern Radio 107 teleprinter parts.

BACK ISSUES OF RTTY JOURNAL - I have a complete file of all issues from Vol. 1 No. 1 to date. Will reproduce any issue for $1.10 pp. Add 25¢ for air mail delivery. John Isaacs, 3175 Val Verde Ave., Long Beace, CA. 90808.

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

RTTY FREQUENCY STANDARDS --- Three brand new Tuning Forks, better than 0,0005 accuracy, especially designed for complete adjustment of TU filters and/or AFSK oscillators at 2125, 2295 and 2975 --- available separately at $7.40 each or set of three $19.90 postpaid. Henry Frankel, Box 535, Bellmore, NY 11711.

"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. $6.00 postpaid. Complete parts kit including PCB, $40.00, postpaid. P & M Electronics, 519 South Austin. Seattle. WA 98108.

SWAP: Excellent #28 ASR with gear shift, other goodies, for restorable Model A Ford Roadster body with doors. Don't care if the chassis & engine are shot but body must be in fair shape. I have several receivers, demods, other ham, RTTY goodies to trade if you know of a decent '30-'31 around. G. White, Box 3067, Alexandria, Va., 22302 703-683-4019.

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.

RTTY-VIDEO DISPLAY UNIT. 1,000 characters, Plugs into loop or logic circuits. ASCII or BAUDOT available. Works with any TV set. Leland Associates, 18704 Glastonbury Rd., Detroit, Michigan, 48219

WANTED URGENTLY. I will pay top dollar for your LPR50ARE or LPR10ARE twin shaft typing reperf in good working condition. Also need entire base mounting for dome mounted Aux. Reperf in 28ASR. John E. FAIL, Box 1196, Petersburg, Alaska 99833.

ST-5A Boards only $5.25. Parts kit $54.00 (includes boards) Mod. kit for up-dating ST-5 to an ST-5A, $9.00. ST-6 boards only $18.00 (8 original by Irv Hoff W6FFC). Pemco 50A frequency counter semi-kit $125.00, Pemco SC250 frequency pre-scaler kit, $30.00. ST-5A, AK-1, ST-6 boards are 12 pin plug-in. All boards etc. shipped postage paid. All boards G-10FR4 glass epoxy and plated, all boards are drilled. Please write for details. Pemco, 422 18th St N.E. Salem, Oregon, 97301.

COLLECTOR wants back issues of RTTY Journal before 1969. W6ISQ, 82 Belbrook Way, Atherton, Cal. 94025

QSL'S MADE FROM YOUR LAYOUT (camera ready) One color, $22.50 per 1000 - Sample catalog 20¢. N & S Print. PO Box 11184, Phoenix, Ariz. 85061

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

TYPEWRITER RIBBON RE-INKER; Hand operated model now only $3.50. K575 or K764 ink available at all National Cash Register Stores. 75¢ per tube. Walter Nettles, W7ARS, 8355 Tanque Verde Rd., Tucson, AR 85715.

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.

TTY Distortion analyzer, Stelma TDA-2, needs work, $30. Rack mounted 48 VDC power supplies, 5 ea, model CA1502/2, $10 ea. All items postpaid. Also M28 cabinets and bases, M15 parts, and M14/15 manuals, info on request. Bering Sea Communications, Box 32, Nome, Alaska 99762.

WANTED: M28 reperf (ROTR) and M28 TD. Both should be complete with covers and in working order. Mint condition preferred. Submit best price to Herb W6GQC, 1057 Moana Drive, San Diego, Ca. 92107. Phone 714-224-8065.

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11/16 PERF. TAPE, 3.00 box of 10, 8.00 per case of 40 rolls FOB. New nylon ribbons @ 6 for 3.50, 12 for 5.50 PPD. Model 14 typing reperfs w/KBD, running but sold as is - 10.00 FOB. P. Davis, 1830 Toepfer Rd., Akron, Ohio 44312.

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OA-5 SOLID-STATE TERMINAL UNITS for sale. All of the function of ST-6 but on one circuit board. Board with parts list and layout, $15.00. Kit of parts, less cabinet, but including circuit board, $100.00. Circuit board aligned and tested, ready for your cabinet, $160.00. Complete unit, ready to put on air, $210.00. Ken Simpson, WA8ETX, 3700 Mountview, Alliance, Ohio 44601.

FOR SALE: COMPLETE 28KSR/ paper winder, $200.00 4-1000 tube and blower socket $80.00. Complete set of adjustment, parts and theory of operation tech manuals for ASR, $10.00 each. Good condition - URA-8 $80.00. All items plus shipping from N.Y. Dan Hammer, WB8IGX, PO Box 796 NSC, FPO, N.Y. 09544.

FOR SALE: EVERY ISSUE OF 73 MAGAZINE. All offers considered. John Hill W4WXJ, 2885 Lyncrest Drive, Nashville, Tennessee 37214.

COLLINS MP-1 Mobile Power Supply, New Never Used, Trade For Motorola HT-220, HAL ST-6, Bird mdl 43 wattmeter or what have you. WB8IJX, Fred Slaughter, 3636 Douglas, Toledo, Ohio 43613 (419-474-7484)

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SELL COMPLETE 28KSR -also have 100 WPM-60Hz and 60 WPM 50Hz, want 60WPM gears for 28KSR. Emile Alline, 1119 Penn, Slidell, LA. 70458.

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HAL COMMUNICATIONS CORP. is the place to order the ST-6, ST-5, ST-5A, AK-1 and the ST-6 425 Hz discriminator if you want to receive a complete kit containing all parts and a complete manual. New 46 page ST-6 manual now available for $4.00 ppd. BankAmericard and Master Charge accepted. HAL Communications Corp., Box 365RJ, Urbana, Ill. 61801. Phone 217-359-7373.

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TELETYPE, KLEINSCHMIDT; TT100, TT117, & TT179 w/ all cables, Ready to Go, 60 or 100 WPM @ $89.95. Double Tables, $34.95, Single Tables, $19.95, Paper Winders @ $14.95, 7/8 tape or paper @ $1.00/ roll. FOB Houston. Andy Electronics, Inc., 6431 Springer, Houston, Texas 77017 (713) 641-0576.

COME AND GET 'EM. MODEL 19 - $69.00, Model 14TD - $15.00, Two Desk-Fax-both for $15.00. All good condition. F.O.B. Chicago. G. Koppelmeier, 8025 N. Kolmar, Skokie, Ill. 60076.

FOR SALE: MITE TELEPRINTER MODEL tt-532/UG, 60-67-100 WPM gears, spare motor and plug in circuit board and all plugs, also instruction book. Wired and relay added for auto start. $250. FOB Los Angeles, W6BRD.

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