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WAEDC RTTY CONTEST
 CONTINUED FROM PAGE 2

hours of non-operation may be taken in one, but not more than 3 periods any time during the contest. The periods need not be equal but must total a minimum of 12 hours and must be clearly indicated in the Log.

EXCHANGE: a) QSO-Nr. b) RST

POINTS - Each 2xRTTY with stations within one's own Continent will count 1 point, with stations outside one's own Continent, 3 Points. Contacts of non-European with Europeans will count 5 points for non-Europeans but 3 points for Europeans. Each station may be worked once per band. Each QTC given or received will count 1 point.

MULTIPLIER: is determined by the number of countries worked on each band. The European Country List and the latest ARRL Country List will be used. In addition each call area in the following countries will be considered a multiplier. JA, PY, VO, VE, VK, W/K, ZL, ZS, UA9, UAO.

SCORING: The final score is the total QSO points plus QTC points multiplied by the sum total countries from all bands.

QTC TRAFFIC: Additional point credit can be realized by making use of the QTC traffic feature. It is a report of a QSO that has taken place earlier in the contest and later sent back to another station. After a number of stations have been worked, a list of these stations can be reported back during a QSO with another station. An additional 1 point credit can be claimed for each station reported.

A QTC contains Time, Call and number of the station being reported, i.e. 1300-DJ3KR-50, means that at 1300 BMT you worked DJ3KR and received No. 50. A QTC can be reported only once and not back to the originating station. Only a maximum of 5 QTC's to a station is permitted per band. You may work the same station several times to complete this quota. Only the original contact, however, has QSO point value.

Keep a uniform list of QTC's sent. QTC 3/5, for example, would indicate this was the 3rd series of QTC's, and that 5 QTC's were reported.

CONTEST AWARDS AND CLASSIFICATION OF WINNERS:

a) Up to 200 watts DC input. b) more than 200 watts. c) SWL. Certificates are awarded to the highest scorer in each classification and in each Country and Call area mentioned above. Continental leaders will be honored and 2nd and 3rd place winners certificates will be given in areas of sufficient participation. There is no minimum of operating time, but a reasonable score required for an award.

SWL Scoring: For points, multiplier and scoring refer to paragraphs 7, 8 and 9. Each station may be reported once per band and 5 QTC's per station per band may be reported.

WAEDC Plaque Winners will be each continental leader in each category, but the minimum requirements for the RTTY-WAEDC Plaque are:

- a) 27000 points for Single Operator.
- b) 30000 points for Multi-operator.
- c) 15000 points for SWL.

DISQUALIFICATION: Violation of the rules of the contest, or unsportsmanlike conduct, or taking credit for excessive duplicate contacts will be deemed sufficient cause for disqualification.

LOGS: must contain: bands, exchanges sent and received, call signs, QTC's sent and received, points and multiplier. Use a separate log for each band. Enclose a summary sheet showing the scoring, rest period, classification, your name and address in **BLOCK LETTERS!!!**

DEADLINE: June 10th, 1975.

The decisions of the Contest Committee are final. Mailing address:

WAEDC - Committee, Post Box 262,
 D-8950 Kaufbeuren, West Germany

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

FIRST CLASS MAIL



RTTY

April 1975

JOURNAL

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Dayton Hamvention RTTY Forum

by Keith B. Petersen, W8SDZ, moderator

This year's Dayton Hamvention RTTY forum is scheduled for Sunday, April 27, from 9 a.m. to Noon. Many different subjects will be covered which should be of great interest. Some are: UARTs, FIFO's, digital recording of RTTY on magnetic tape, programmable read-only memories, microprocessors, solid-state RTTY and CW message generators, automatic station control systems, selective calling units, RTTY code conversion, solid state memory systems, electronic editing facilities to allow the elimination of typing errors, and many more interesting and useful devices. The speakers scheduled are: James A. Prest, WA8SEL, design engineer with Leland Associates; Roger Amidon, K2-SMN, project engineer with Optel Corp.; and John Souvestre, WA5NYY, digital systems design engineering student.

In addition, we hope to have other well-known RTTY experts available for a question-and-answer session.

See you there!

Want a Model 28ASR

Joe Tolbert, WB4VCX phoned us about the availability of about 30 Model 28ASR teletypes from the United-Intermountain Phone Co at Kingsport, Tenn. details available from Jess McLaughlin % the same company at Bristol Tenn. Phone (615) 968-8278 the machines are available only to amateurs, \$250.00 and MUST be picked up at Kingsport.

WAEDC CONTEST

THE 7th RTTY WAEDC CONTEST - 1975

The Deutscher Amateur Radio Club (DARC), the sponsor of the RTTY WAEDC, and the Deutsche Amateur Fernschreib Gruppe (DAFG), the manager of the RTTY, WAEDC, invite RTTY Amateurs world-wide to participate in the 7th RTTY WAEDC Contest which is always held on the 3rd weekend of April.

CONTEST PERIOD - April 19, 0000 GMT - April 20, 2400 GMT.

CONTEST BANDS - All Bands 3.5 thru 28 MHz.
CLASSIFICATIONS - *Single operator, single tx
Multi operator, single tx

REST PERIOD - Only 36 of 48 hours of operation are permitted for single operator stations. The 12

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Microprocessor on TV

by Keith B. Petersen, W8SDZ

Texas Instruments has announced presentation of two hours of Microprocessor technical lectures, to be presented by their Texas Instruments Learning Center. Starting April 15 and continuing through April 18, four half-hour television sessions will be presented - one each morning, Tuesday through Friday.

The TV programs will be presented in the following cities:

CITY	CHANNEL	TIME
Boston	7	6:20am
Chicago	9	6:00am
Cleveland	8	6:00am
Dallas	5	6:00am
Dayton	7	6:00am
Denver	4	6:30am
Detroit	2	6:00am
Houston	11	6:30am
Los Angeles	11	6:30am
Miami	4	6:00am
Minneapolis	11	6:30am
New York City	5	6:30am
Orlando	6	6:00am
Philadelphia	See newspaper TV listing	
Phoenix	5	6:00am
Rochester	10	6:00am
San Diego	6	6:30am
San Jose	11	6:00am
Seattle	11	6:30am
Washington, D.C.	5	6:30am

The programs consist of the following:

Tuesday, April 15 - SYSTEM ARCHITECTURE.

A discussion of digital computer system architecture as a basis for understanding microprocessors. Evolution of microprocessors. . . peripheral controllers. . . parallel processors. . . direct memory access.

Wednesday, April 16 - MICROPROCESSOR LOGIC.

What type? Chip fabrication technologies are reviewed - including most MOS forms, TTL, Schottky TTL and the new integrated injection logic (I²L) which has the density and power dissipation of MOS and the speed and driving capabilities of bipolar.

Thursday, April 17 - POTENTIAL APPLICATIONS FOR MICROPROCESSORS. Guidelines for using microprocessors, including both advantages and limitations for certain types of equipments. Shows how microprocessors can lower costs, shorten design cycles, improve performance and reliability in practical applications.

Friday, April 18 - USING MICROPROCESSORS IN COMMUNICATIONS SYSTEMS. Discusses problems of digital communications and typical hardware solutions. In-depth applications guidelines show how microprocessors can be used economically within this broad field.

Texas Instruments is offering a 200-page "Microprocessor handbook", which they recommend you read before seeing the television shows. The handbook covers: ALU's, controllers, memories, timing, microprocessor comparison chart, in-depth discussion of I²L technology, digital computer system architecture, chip fabrication technologies, how to use microprocessors, potential applications and limitations, microprocessors in communications, microprocessor supplier listing, glossary of microprocessor terms, bibliography. If you are interested, order your copy now to allow ample time for delivery before TT's April 15-18 telecast.

Send check or money order to:

Texas Instruments, Incorporated
P.O. Box 3640, M/S 84
Dallas, Texas 75285

The price is \$24.95 each (Texas residents add five percent sales tax). The name and number of the book is "Microprocessor Handbook (LCB1761)".

One Chip AFSK Generator

DON PURLAND, WØLZT
8201 Northwood Pkwy.
NEW HOPE, MN. 55427

Here's a one chip AFSK generator! This chip, the XR-2206C, made by EXAR, is a monolithic function generator integrated circuit capable of producing high quality sine, triangle, and square waveforms was specifically designed with FSK in mind. The useful frequency range is 0.01 to 1 MHz. With a few modifications this circuit can be made into a beautiful function generator. The chip has excellent temperature stability (20 ppm/c) and power supply sensitivity (0.01%/v). The chip has the built in ability to select between 2 resistors used in the frequency time constant - ideal for AFSK'ing.

Circuit Description

Figure 1 shows the complete AFSK generator. U2 is an opto-isolator used to convert the loop current pulses to voltage pulses at pin 9 of U1, the AFSK function generator chip. In marking condition, the loop current flowing will have the LED, in U2, on and that will turn on the photo-transistor (of U2) and U1's pin 9 will be low. This will cause U1 to select the resistors on pin 8 (mark freq.) C1 is the timing capacitor and a good mylar capacitor should be used - like C-D's WMF series. When the loop current goes off for a space pulse, U1's pin 9 will be high, selecting the resistors connected to its pin 7. Pin 7 has a switch that selects either 170 or 180 shift with their independent resistor and adjustment trim-pots.

U2 is an opto-isolator that is put in series with the 60 ma. loop of your TU. The opto-isolator is a light emitting diode (LED) and a photo-transistor in one package. The LED is aimed at the photo-transistor and turn it on when activated. The advantage of the opto-isolator is that it will isolate the ungrounded loop from the grounded AFSK generator. I have been using one in my TU (ST-6) for over a year and it has worked perfectly. These opto-isolators are very fast and can be used beyond 100 KHz, and can easily handle our slow 45-78 Hz pulses in the loop. While a regulated power supply is not required for frequency stability, it is necessary to keep the output voltage constant as the output voltage is a function of the supply voltage. A zener regulated supply

is sufficient. The supply voltage (zener voltage) can be anywhere between 10 and 26 volts. A 12 volt zener will give you 8v P-P, more than needed to drive a mike input.

Construction

A printed circuit board is available that contains everything except the power transformer and the freq. select switch. Two types are available on G10, one for chassis mounting and one for plug-in that will fit the ST-6 TU. It is recommended that the 20 turn CERMET pots be used, for the 3 frequency adjustments, to keep drift to a minimum. The frequency stability will only be as good as the parts you use.

Adjustments - Procedure

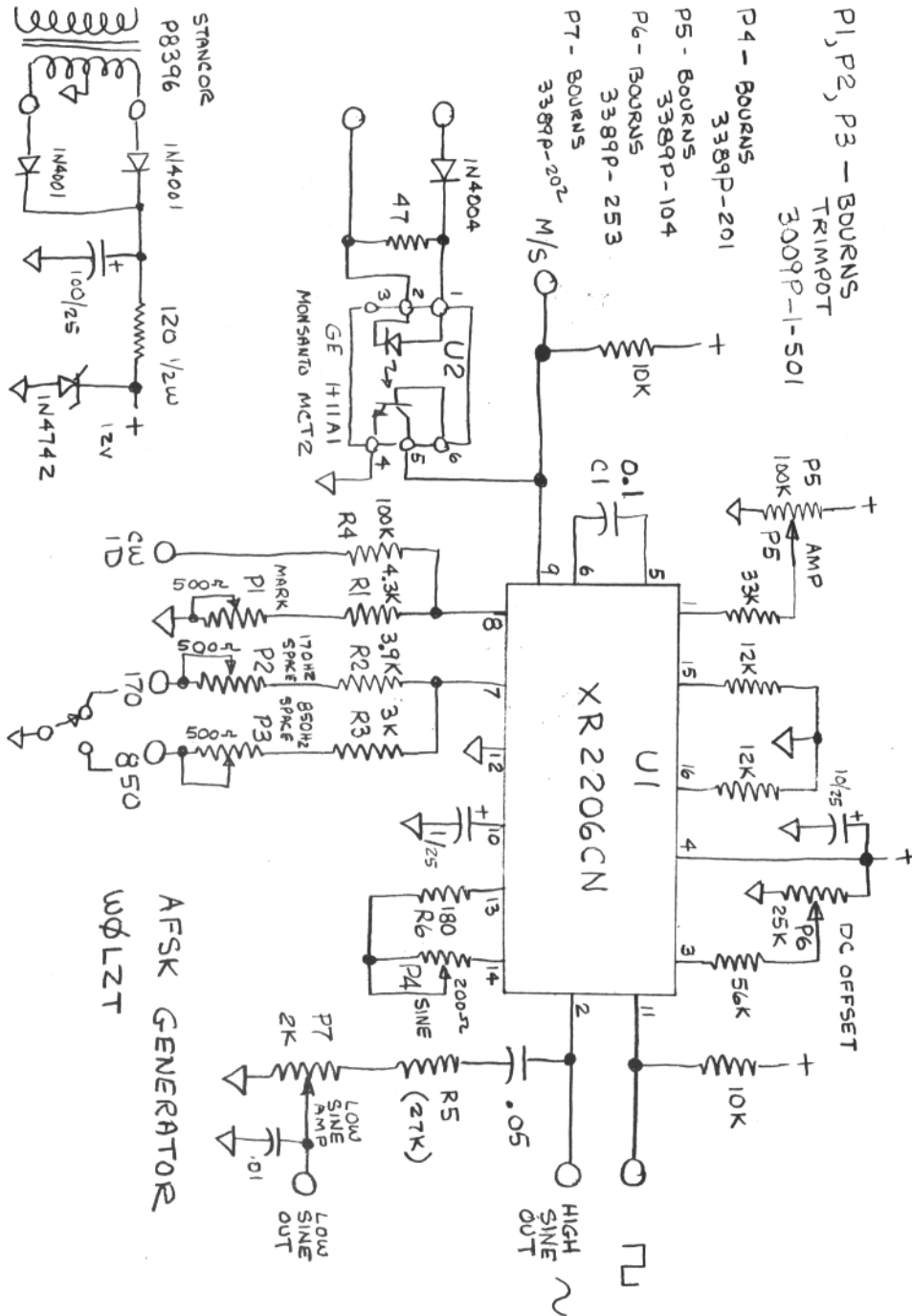
It is suggested that R1, R2, R3 be 1/2 W to increase the stability, and that they be tack soldered into the pc bd. The values for R1, R2, R3, R4 specified on the schematic may not be the ones for your particular circuit because of the tolerance of the 0.1 cap used in the timing circuit. The trim pots (P1, P2, P3) value was chosen to make the frequency adjustment less critical, and doesn't have the range of adjustment necessary.

1. Connect a counter to the square wave output, and a scope to the HIGH SINE wave output.
2. Power circuit.
3. The counter should be reading a freq. in the 2-3 KHz range (not critical) and the scope should have a sine or triangle waveform on it.
4. Adjust P4, SINE pot, fully CW for a triangle waveform. (to make it a perfect triangle wave P4 would have to be open).
5. Adjust P5, AMP pot, to increase the triangle waveform until the peak is clipped.
6. Adjust P6, DC OFFSET pot, until triangle waveform is not clipped.
7. Repeat 5 & 6 until both the plus & minus peaks are both flat and the DC OFFSET can't clean up the waveform.
8. Adjust P4, SINE pot, CCW for a sine wave.
9. Increase P5, AMP pot, until top of the sine wave flattens. Decrease P5 until sine wave is clean. This is the maximum sine wave amplitude.

Frequency Adjustment

1. Ground M/S input.
2. Adjust P1, MARK pot, for 2125 Hz. If adjustment can't be made, change R1. If frequency is too low - change R1 to

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3.9K and if too high - change to a 4.7K Repeat adjustment.

3. Unground M/S input. Frequency should change to a higher value. If not, check that the M/S input is high and that the opto isolator is not on.

4. Ground the 170 Hz terminal. Adjust P2, 170 Hz ADJ pot, for 2295 Hz. If adjustment can't be made, change R2. If frequency is too low - change R2 to 3.6K and if too high - change to a 4.3K. Repeat adjustment.

5. Unground 170 Hz terminal and ground 850 terminal. Adjust P3, 850 Hz ADJ pot, for 2975 Hz. If adjustment can't be made, change R3. If frequency is too low change R3 to 2.7K and if too high - change to a 3.3K. Repeat adjustment.

6. Recheck from #1 to 5.

7. Ground M/S input. Ground CW terminal. Check that the 2125 Hz Mark frequency is moved higher than 2225 Hz. If not change R4 to 91K.

The value of R5 will be determined by your application, so that P7, LOW SINE pot, won't overdrive your mike input circuit. I have a 27K resistor for R5, and I adjusted P5, AMP pot, so that P7 only has 200mv P-P at the top end. I adjusted P7 for 100mv P-P at the LOW SINEOUT terminal. This is sufficient to drive my transceiver and my 2M rigs. Excessive output will cause additional signals to be transmitted on a SSB transceiver. Only use enough output to have sufficient drive.

An advantage to having the AFSK generator following the loop is that it works for both receiving & transmitting. Also a

tape recorder on the AFSK output would be able to record anything on the loop. Ideal for coping those pictures and if a pic gets messed up, you don't have a pile of paper tape! I am now transferring all my paper tapes to cassettes. Also for those of you who don't like to leave their machines on auto-start when not there because the machine may malfunction, the cassette recorder can record it and you can play it back when in the shack. Get a tape recorder that has auto speed regulation and amplitude control. The one I am using is a Panasonic RQ209DAS.

The boards and chips are available at \$3.50 for the chassis mount and \$4 for the plugin, and \$6 for the chip.

Notes: -

Changing R1, R2, and R3 to 1% carbon film resistors such as Dale 1/4W EMF series will greatly improve long term stability.

Changes to make a function generator: - Remove C1 and replace with a selector switch and 100mfd, 10mfd, 1mfd, 0.1mfd, 0.01mfd, and a 1000pf capacitor. Ground M/S terminal. Change R1 to a 1K resistor. Remove P1 and panel mount a CTS VA45 10K planetary potentiometer. Lift one end of R6 and add a switch for SINE/TRIANGLE waveforms. For those that have home built counters, this unit is small enough to build it in and switch the counter to read the frequency; thereby eliminating the need for a calibrated dial!

EXPANDING THE VIDEO PRINTER

M. CROSBY BARTLETT, W9MC
5201 Knollton Rd.
INDIANAPOLIS, IN. 46208

I am admittedly very new at RTTY, yet, inasmuch as my RTTY equipment is totally without benefit of machines of any sort, and is wholly Video display, it occurs to me that some of the boys, getting their feet wet in this relatively new aspect of RTTY, may take heart in knowing that such niceties as "brag" tapes, CQ, and CQ DXC tapes can be made, and employed with any rig using an ST-6, or equivalent, equipped with an AK-1 oscillator.

I have used a relatively cheap Japanese cassette recorder, and a transfer switch made up of a 6-position, 8-circuit rotary switch. The circuit is not exactly a world shattering development, but having some of the "research" already done, may be of some help to the newly initiated

RTTY-er, such as even little old Me.

While this may be of little interest to those using one of the machines, those who live in the quiet pursuits of paperless RTTY may like the idea of having pre-recorded tapes, just as many of the boys have pre-punched tapes that they use on machines. I personally find it a great convenience, especially since endless tapes are now available in 20-second, 30-second, 1-minute and 3-minute lengths. Of course standard cassette magnetic tapes are just as useful, and serve well, where the endless variety is not readily available.

I had a time getting a sufficiently heavy recording on the tapes, with only the ST-6 output. I found that a tape could be recorded, and played back, with good pix on the screen. But when the same circuit had the added load of the mike in-

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RAM-4

JOHN LAWRENCE, W5CEG
2007 Silver Leaf Dr.
ARLINGTON, TX. 76013

RAM-4 is the name given to a Random Access Memory system that I designed to investigate the application of memory systems to Amateur TTY operation. The system is designed around 1024 bit static RAM's. Information to be loaded into the system can come from a number of sources, like punched-tape, off-the-air, TTY keyboards and etc.

RAM-4 accepts a serial input where it is converted to parallel and only the 5 information bits are used. The start/stop bits are added again in the output with the 5 information bits to form the standard serial format once again.

Figure 1 is a simplified block diagram of RAM-4. Memory is structured by "Blocks", with each block containing 1024 locations for a total of 4096 locations or 20,480 bits. Addressing is done with ten address lines which means that memory can be directly addressed by the standard TTY 5-bit code or two TTY characters, one for the row address and the other for the column address, since each memory "block" is in a 32X32 matrix of 32 rows, 32 columns.

The instruction "blocks" are provided to store the information necessary to retrieve data from memory and also to "instruct" the system operation. Here again 1024 bit static RAM's are used with each "block" containing 1024 locations for a total of 2048 locations or 10,240 bits for both "blocks".

Various control logic functions are provided as shown in Figure 1. A brief description of these functions are given below.

FULL LOAD - Full 1024 location load by "blocks"

PARTIAL LOAD - Enter at a given address in either memory or instruction register and load "X" locations

MAP - Readout of information stored in memory or instruction register in the 32X32 matrix format

READ - Program run/Data output

The above functions can be controlled manually by front panel switch closures or remotely.

Programming is done using the standard 5-bit code directly. An operational

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code system is used to provide the following:

- Memory addressing
- "Jump" instructions
- "Return" instruction
- Go to next step
- Number of repeats
- Stop
- 60 wpm
- 100 wpm
- CW

As can be seen from the above list it is possible to program either 60 or 100 wpm rates and also CW message generation. The CW op-code is used to provide CW ID at the present time, but the system can be used also as a CW message generator. When programming a particular message it is also possible to transmit part of a message at 60 wpm and then change 100 wpm and then switch back to 60 wpm if desired. The output control logic outputs the data to the correct machine/loop depending on the transmission rate. The system also lends itself to SSTV in that one "block" of memory could be used to generate a SSTV frame.

It is my opinion after working the CARTG '74 contest, general QSO'ing and now programming for BARTG '75, that a memory with a capacity of 2000 locations and 1000 locations for instructions would be quite adequate. In fact, I'm in the process now of designing a mini version of RAM-4 that will contain 1024 locations total for both the memory and instructions. With this limited system it should provide a very useful contest/general QSO'ing memory. All necessary CQ contest, station calling, contest message and etc. could be generated by that size of system.

Some of the RAM-4 statistics are as follows. There are a total of thirty 1024 bit static RAM's, approximately 250 TTL logic gates/flop-flops, etc. Power is approximately 5' amps @ 5VDC with memory requiring most of the current. The system is "pin" wired since it is continually undergoing changes, making PC board construction impractical.

I have acquired an 8-bit micro-processor and hardware design has been completed and this system is now under construction with checkout anticipated to start around the middle of March or sooner. It will have, initially, 8K by 8 of memory expandable up to 32K x 8. This system will also be accessible "off-the-air" and a special program will be provided so it will accept the 5-bit code as an input. Plans are to use this system to control the station, RAM-4, and provide "real-time" computations for

the digital processor that I developed for my T.U.

In the near future both of these systems will be available to persons that would like to conduct experiments and/or use these systems. Hopefully in the next few years the FCC will allow us to trans-

mit both 5 and 8 bit codes. After all when it comes down to a final analysis we are transmitting digital data now and with technology moving as fast as it is, the role of memory systems, as applied to Amateur RTTY is limited by the designer/user imaginations.

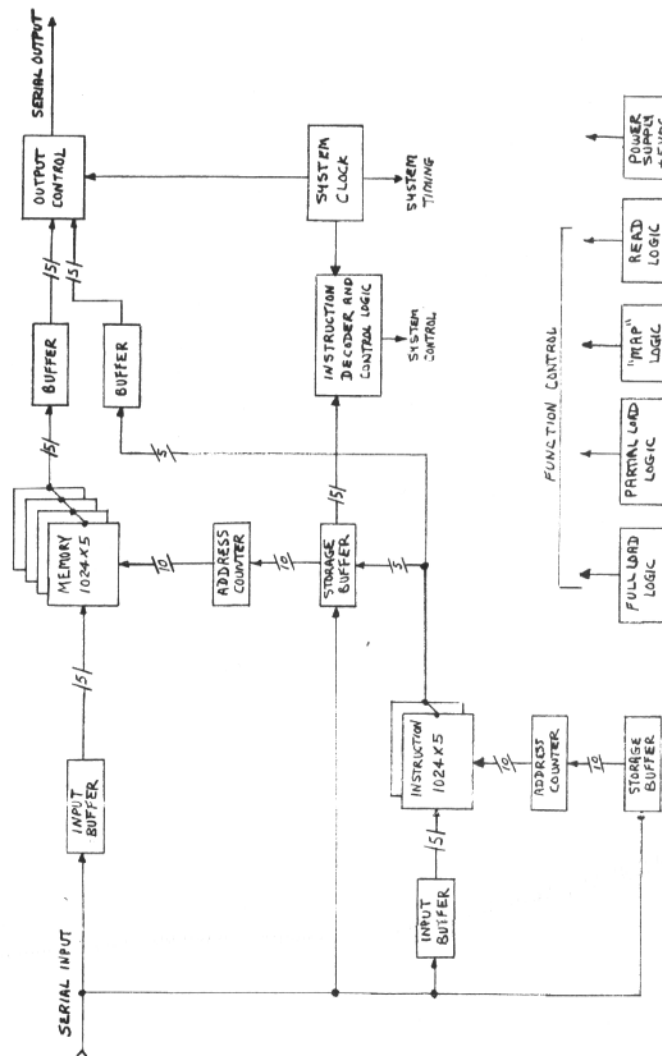


FIGURE 1 SIMPLIFIED BLOCK DIAGRAM

RAM-4

VHF RTTY NEWS

RON GUENTZLER, W8BBB Editor
212 GRANDVIEW Blvd.
Ada, Ohio 45810



This month we have only one item of VHF news: "Montgomery County, PA Civil Defense is presently operating a RTTY net each Thursday evening at 2030 hrs local time with Tom Gibson, W3EAG, as net control. NWS forecast information is punched into five level tape and transmitted on the RTTY net. These weather forecasts cover all Eastern PA. So far, we have had the following check in: W3ESQ, W3NWJ, WA3KLR, WA3RCA, W3QQH, WA3RMA, W3ZVY, and K3YWH. The net frequency is 146.835 Mhz, and we would welcome participation from any stations in the Delaware Valley Area." Thanks, Tom.

How about information from elsewhere? Must be a lot around.

Clause Sweger, W5SHC, has been asking a lot of questions about "unprintable" RTTY or RTTY-like stations on the HF bands. He received a reply from the United States-Liberia Radio

Corp., a portion of which went as follows: "However if you desire to try your luck on the 18530 kHz 60 WPM from Harbel, Liberia. Let me know if you can copy ELE28 on 18530 kHz." Thanks, Claude.

Other than the FCC proposal on wiping out most RTTY activity, there doesn't seem to be much else new this month. Let's hear about activity.

73, ES CUL, RG.

(Editor's Note)

It can be very discouraging to try and write an informative column without any information. We KNOW there is a lot of VHF activity but the localized operation cannot be monitored or reported from any central location. What frequencies, shift, number of fellows in the area, is there a repeater and if so is it voice and RTTY, what frequencies?

Have someone in your group give Ron all the details. Dusty -

Valid Signal indication From a UART

R. DAVID GUTHRIE, W8LNY
2956 London Wall
BLOOMFIELD HILLS, MI. 48013

In the last step of the decoding of an asynchronous character, a UART checks that the final character bit received is a stop bit or marking. Pin 14 outlets the result of this test:

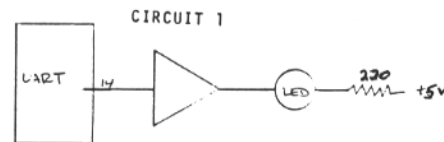
0 volts or logic low - Normal stop bit present plus 5 volts or logic high - No stop bit present.

Horr and Nurse (April, 1974 RTTY) described using this output to dump the character completely by connecting it to pin 21 of the UART. When working with multiple baud rates and normal/inverted signals from commercial stations this leads to confusing results due to random receipt of marking bits at stop time. What is very helpful is visual indication of the status of pin 14.

Simply connect pin 14 of the UART to a TTL inverter and then to a LED to give proper indication. Driving the LED directly is not a good idea due to the low current handling ability of the MOS

UART. The LED will remain solidly out when valid signals are being received and flicker when signals are not valid. The author uses the UART with a modified Radio Electronics Magazine "TV Typewriter" video display unit and has installed a switch to block the data received line (pin 19) from triggering the display. Users of the UART for speed conversion could install a switch to block the output of the transmit side of the UART from the local loop. This has been tested with the WD TR1602 and the TI TMS6011 UARTS.

Combining the pin 21 reset function and LED indication does not work due to the speed of the reset. A one-shot or other delay could be used if desired.



RTTY-DX

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



Hello there . . .

We are very pleased to report a "first" in the annals of amateur radio. A two way Trans-Atlantic RTTY QSO was accomplished on 10 February by Bud, W2LFL, and Robin, G8LT. It is also the first contact on RTTY from one Continent to another via the Oscar 6 or 7 Satellite. For the record, this important event occurred on orbit 1093 of Oscar 7. A few days later on orbit 1193 Bud made contact with Otto, DJ1QT, with additional contacts on the 20th and 24th of February. I was privileged to see page copy of the contacts and I must say that it was practically error free and as good as or better than a lot of copy obtained on the D.C. bands. The boys are to be congratulated on their technical ability and for giving RTTY a "state of the art" status in communications. Now that the "ice has been broken" we should see even more spectacular events along the same line in the near future. Many of the RTTY gang on all continents are actively engaged in or planning to use RTTY via the satellite. We hope to keep you posted as these events occur.

Way back in 1972 a ham wrote to the ARRL and to the RTTY Society of Southern California asking what this teletype was all about and as he had recently acquired a machine he was very interested in getting started in the mode. Somehow the letters ended up here and after some correspondence over the intervening years a new country is now active. Taffy, ZE1CE, electrified the RTTY-DX community when he came on 14 mhz with an excellent signal in early February. It is a tribute to amateur ingenuity in general and to Taffy in particular that he was able to do this in a town called Gatooma in Rhodesia. Just the very name gives one the impression that it must be thousands of miles from anywhere. And he did it all by himself. The machine was a "basket case" to begin with and is still held together with string and a prayer, but he did get it going, and what's more, it's right on speed. Taffy gets on mostly on Sunday

and Monday at about 2000z, but has also been active in mid week. He has a few dozen countries worked already and you can QSL to --

D. H. Evans
P. O. Box 300
Gatooma, Rhodesia

We are very pleased to announce another outstanding happening on RTTY. --- 100 Countries Confirmed on RTTY --- Plaque Nr. 17 Gus Pellegrini 15WT We are sorry to say that we have no biographical information on Gus at this writing but hope to furnish some in the near future.

This month the following station received the WAC Award.

14 Mhz. Nr. 12 Serge Remy F6ALL
Paul, DU1POL, has been quite active and his operating habits make him a good bet into Europe at the 1100-1200z time slot. He does occasionally get on at 2300z which is about right for North America. QTH is ---
Paul Lacap
11 Makaturing
Quezon City, D-503
Philippines

Paul says that they are trying to interest additional stations in RTTY. One of them is DU1EJ who has already been reported active.

Activity from VKØMS has been confirmed as coming from Casey Base, Antarctica. This shoots down the previous speculations as to Macquarie or Heard Island.

More on Craig, VK9XW. We understand that he skeds his manager, VK6RU on SSB Saturdays at about 0300z and he has even been in QSO with K6WZ at 2315z. We missed him by a gnats whisker as we had a QSO with K6WZ or 2335z the same day. Oh well!

Signals from Marcus by JH1AHY/JD1 should be considerably stronger by this time as Kato was very busy getting a quad up to replace the vertical he had been using. His QSL manager is now Mac, JH1ISF ---

105 Katayama Mansion
6-38 Horinouchi 1 Chome
Niiza City, Saitama 352, Japan

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Jerry, KS6DH is again active which is good news. QSL to ---

Gerald A. Johnson
Dept. of Education
Pago Pago, Samoa 96799

It is rumored that Doug, KX6LA is now on Wake Island using the call, WB4KSE/KW6 but we are not sure that he is set up for RTTY as yet.

From time to time we get requests for the QTH of ZS1ANT (Antarctica). The latest we have is -- Box 28117, Sunnyside 0132, South Africa.

Latest RTTY-DX on the lower bands is John, GW3IGG, who will be on 7038 and 3595 on week ends. Give a listen in the BARTH Contest too.

G3YDR is closing down and leaving for Malta in mid March and will try to be QRV with a 9H call as soon as possible. This would be a first from this rare spot.

April may see activity from XT2AE as machine repairs are due to be completed by then.

Last year a few of the fortunate ones made contact with Chester, XV5AC, during his short operation on RTTY from Vietnam. He has been in Africa for the past several months and in the Tchad Republic at the moment. The equipment available to him at the moment is geared at 100 speed with 85 hz shift and he is trying to get it going on a more compatible speed and shift for the ham bands. We can only tell you to listen closely for this one as we have no exact or even approximate dates to give you at this time. The TT8 prefix would be another first.

Uli is still planning to get activity going from Bulgaria (LZ). They are permitted to use RTTY. Uli has a machine available but needs a TU. If you can help in any way get in touch with DK3CU. He is one of the most active stations on the bands.

A ST-5 TU should soon be on its way to Gene, YO2AFB and it will be great to print him again. He has been QRT mainly due to the primitive TU he was using which locked up in the pile-ups Gene caused every time he was on the band.

The Vatican station, HV3SJ, may soon be active again on a more permanent basis. There is a machine there and some of the Stateside Boys are getting a TU to Brother Ed. Its previous activity had been generated by Contest and DXpedition Groups from various European countries.

JA1AUY is presently in Malaysia for an extended period of time and he plans to activate RTTY from 9M2 if at all possible. There have been reports of ac-

tivity by 9V1SH in Singapore but no additional info at this time.

We plan to publish the next RTTY-DX listing in the July/August combined issue. Please have your totals of WRKED/CFMD to me by the end of May. In the past the one month notice was too short a time for all interested parties to get their info here.

Many thanks to -- W2LFL, W3DJZ, K6WZ, GW3IGG, JA1ACB.

73 de John

DX-RTTY APRIL 1965

The first edition of the Alexander Volta RTTY DX Contest will take place May 22-23. In the October 1964 RTTY Sweepstakes GM3ENJ was grounded after 28 contacts by TV1. GW3TSM promises to be the first Wales station on RTTY. Activity by DL1VR from Ankara as TA1AH is due in March. The FG7XT DXpedition to FS7 postponed to April. Sergio, I1AHN latest to receive the WAC certificate.

New Handbook from ARRL

by Keith B. Petersen, W8SDZ

The ARRL has just released its newly-published handbook "Specialized Communications Techniques for the Radio Amateur". The new book costs \$3.00, and covers communication techniques, Amateur television, slow-scan television, facsimile, radioteletype, space communications, advanced techniques (such as laser fundamentals, digital communications, pulse-code modulation, time-division multiplexing, speech-recognition circuits).

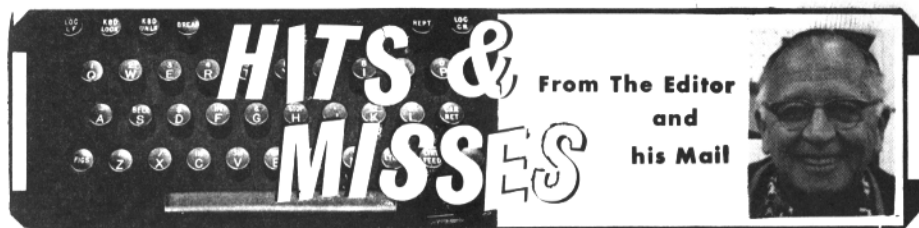
The section on radioteletype contains the following: teletypewriter equipment and hardware, transmitting RTTY, audio frequency-shift keying, receiving radioteletype, high-performance RTTY filters, the Mainline TT/L-2 FSK Demodulator, the Mainline ST-4 RTTY Demodulator, RTTY tuning indicator systems, checking RTTY shifts, station control, assembly of equipment, operating procedures, handling traffic by radioteletype, and fun with tape.

Although the book is largely a reprint of articles which have appeared in "QST", the editor, Jerry Hall, K1PLP, has added additional and up-dated information, making it an excellent source of information on any of the specialized fields it covers. It is the opinion of this writer that the book deserves your consideration.

One note: The article on the Mainline TT/L-2 in this book contains one error in the schematic on the main unit. In the ATC/DTC circuit, there is a resistor connecting to the left end of S-6B which is incorrectly labeled as 6200 ohms. The correct value is 620K, five percent.

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10 APRIL 1975



We knew it -- Murphy was not satisfied working around our home equipment - he took off and visited the printer. The column headings are kept at the printers and inserted each month. Last month the VHF and Hits and Misses headings were transposed. If you wonder why I was talking about VHF and Ron about the restructuring docket - blame the printer. He apologizes, Ron apologizes and I apologize. Murphy says he intended it that way.

If you have received your questionnaire from the ARRL regarding your view on the proposals, be sure to express your thoughts on the above question. The league answer will be based on this questionnaire and is your chance to say what you think. Very few of the league members are interested in RTTY so it is up to those that are to make their point known.

Clyde Keenan, Rte. 1, Box 309, Lakebay, WA 98349, K7WTQ, who kindly supplied us with reprints of the original UARTarticles now has available large - 17 x 22 prints of the UT-4. Send SASE with 20¢ surface or 26¢ airmail on a 5x8 or 8x10 envelope for a copy.

Dayton Hamvention is about a month away. If you haven't made reservations yet do so now - rooms are still available through the Dayton Reservation Bureau, Box 44, Dayton, OH. 45401. Do not write to the motels direct. The RTTY JOURNAL suite will be in the Imperial North Motel, ask for it, or some near by motel if the rooms are all gone there. Look for the RTTY gang at the "South ROOM" Friday and Saturday evening. Keith Petersen is moderating the RTTY session on Sunday April 27. Details of the speakers will be found in this issue. It should be interesting.

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.

The ONLY back issues available are listed below. 30¢ each.

1971- JULY- SEPT. [2]
1972- APRIL-MAY-SEP. -OCT.-NOV.
DEC.- [6]
1973- COMPLETE- [10]
1974- JAN.-FEB.-NOV.-DEC.-[4]
1975- JAN.-FEB.-MARCH.-[3]

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Sorry but postal regulations
Make it impractical to ship
except to U.S. and Canada.

RTTY JOURNAL

Box 837
Royal Oak, Mich. 48068
Editor & Publisher 'Dusty' Dunn, W8CQ

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APRIL 1975 11

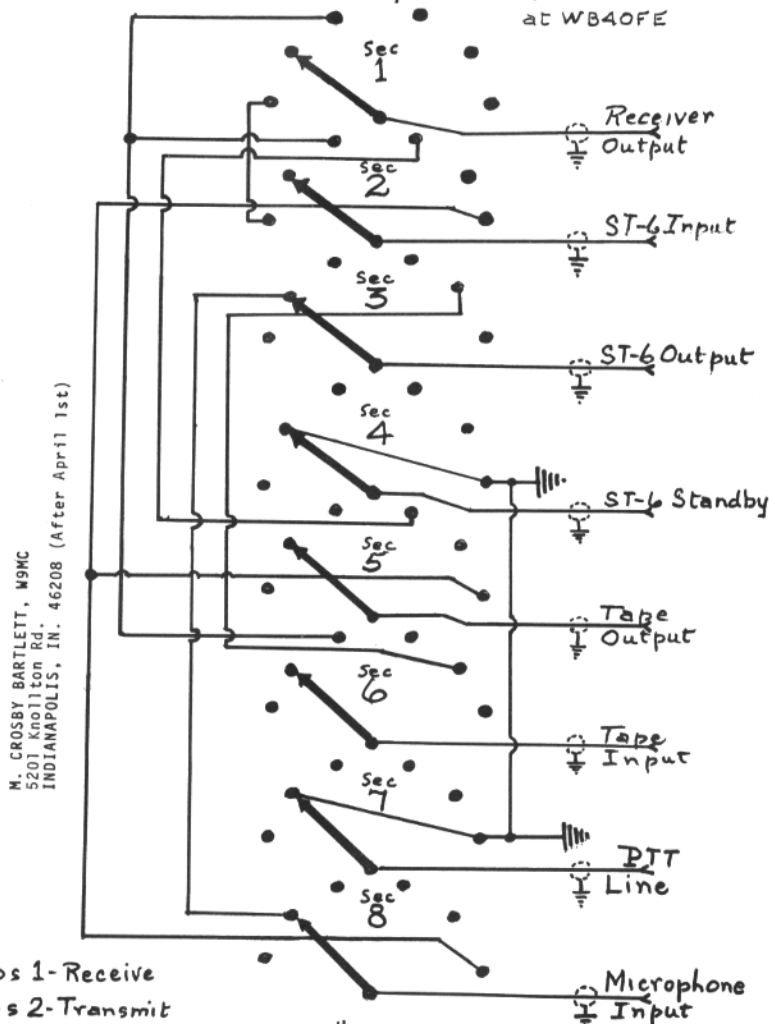
Video

CONTINUED FROM PAGE 5

put, there was no readout, and no transmission. I got my hooks on another cassette recorder that had a variable recording input level feature, and by feed-

ing this second recorder with the available tape recording, and running the gain up on the second recorder, a recording level was obtained that does a good job with both the ST-input and microphone input loads, and the readout is perfect.

6-Position - 8-Circuit Rotary Switch For AFSK Inter-connection of Tape Recorder, Receiver and Transmitter at W4A0FE



- Pos 1-Receive
- Pos 2-Transmit
- Pos 3-Record off Receiver
- Pos 4-Playback Only
- Pos 5-Record off Keyboard
- Pos 6-Transmit off Tape

• Switch shown in No.2 position for "Transmit".
 • \perp = Common ground point.

A Letter with Ideas.

800 Fifth Avenue
Mendota, IL 61342

Saturday -- February 8, 1975

Hi Dusty:

Has been a while since I've had any communication with you, I guess. Hear you on 80 meters once in a while when I happen to tune off of 3617.5KHz auto-start, but don't really do that very often.

Lately been working with the UART and it's a fantastic chip. I hope that Irv's articles in the Journal get people really going on this thing. I would guess that HAL will come out with a modification kit for the ST-6 and also include it in another version maybe an ST-6A or something. I'm using it for both transmitting and receiving by splitting the keyboard out of the loop circuit putting it in so my typing then looks like any other signal to the UART. Takes a little getting used to since the machine responds one character later producing the "echo" sort of effect.

Also, in the logic associated with the UART I've added the circuits for non-overline and auto car ret/line feed. The thing I like about this is that I can now disable the non-overline feature simply by throwing a switch. For a while I had the mechanical non-overline modification on my 15, but finally removed it since with some of the sloppy sending habits the print got bad on the left margin plus the strikes half way across the page as the carriage was returning. So now with the electronic non-overline I can have my cake and eat it too, so to speak.

Briefly, what happens is the UART logic looks at each character coming in. If a CAR RET is received it is ignored and a LTRS character inserted into the UART and sent it to the printer. If the very next character is another CAR RET, it gets processed normally and the carriage goes back. This assumes that two CAR RET's in a row really means for the CAR RET to respond. However if the next character after the first CAR RET is a LINE FEED it is processed and then forces a CAR RET into the UART for the very next character.

The auto car ret/line feed simply counts characters coming in and when 72 have been counted, the circuitry locks out the incoming signal and inserts a CAR RET/LINE FEED on the next two characters coming in. Then back to normal copy. Any LINE FEED

before 72 characters resets the counter to zero to start over.

All of this brings me to what I originally started to write to you about, hi! Since many of us are using the non-overline feature in one way or another, I think it would be appropriate if you could run a few lines in the Journal about the proper end of line sequence; i.e. TWO carriage returns, a line feed and then a LTRS character (or other non-printing character). Seems like a few years back everybody on the air was doing it that way -- apparently having read something about RTTY before they put the printer on the air. The QST series by IRV back in 1965 is especially good. He talks about the proper end of line sequence in one of the very first articles in the series I think. Now I notice in some casual tuning on 80 and 20 that very few stations are sending the proper end of line thing. As a matter of fact, some time back I was copying W1AW RTTY bulletins and after putting the mechanical non-overline feature on my machine, I noticed that they were not sending two CAR RET's, etc. etc. I wrote to ARRL about it, and they did indeed make the change and about two weeks after I wrote I noticed their tapes then did it right. I then got a letter from George Hart telling me what they had done, thanking me for advising them of that.

So, if you could fit it in your editorial space some time I would appreciate it. I'm sure that a lot of other people would too. If you don't mind, please don't mention my call with this item -- just run it -- I do think it's called for!

73,
Cal Sondgeroth, W9ZTK

(Editor's Note) Cal - we agree with you so are publishing your name and if there are any objections they can blame us. After sending a lot to owners of video print out (who prefer no CR and LF) I find myself getting in bad habits. I promise to do better. TWO CR a LF and a lettrs.



"Heinz" DL8CX

CLASSIFIED ADS-- 30 words \$2. Additional words 4¢ ea.

Cash with copy, Deadline 1st of Month.

TECH MANUALS -- \$6.50 each: TT-63A/FGC, CV-591A/URR following manuals \$8.50 each: TT-47/48, R-388/URR, USM-50, 51J4, FR114/U; following manuals \$10.00 each: R390A/URR, SRR-11, 12, 13, USM-32, URR-35C. Special manuals (Limited quantity): TM-03345-15 TGC-14/14A \$10, Navships 95898 TT-298A/B, TT-299A/B \$12.50, Navships 0967-170-8010 UGC-38, 40, 41 \$12.50. Model 14 TD manuals \$2.50 each. Thousands more in stock. Send 50¢ (coin) for large list. W3IHD, 7218 Roanne Drive, Washington DC 20021

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.

OA-5 SOLID-STATE TU. See February and September issues of "RTTY Journal." Drilled and plated boards, \$15.00; board with parts, \$100.00; complete unit, ready for air, \$210.00. FOB. WA8ETX, Ken Simpson, 3700 Mountview, Alliance, Ohio 44601.

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.

NEW MOD KITS TO CONVERT M28 sprocket-feed to friction-feed, \$45.00. New M28 LESU loop supplies, \$10.00. M28 Stand-alone TD with cover, motor, \$125. Model 15-19 friction-feed conversion, \$13.00. M28 typeboxes, \$20.00, WX, COMM, or Fractions. 28ASR motors, \$25.00. M19 covers, \$15.00. M15-19 bases, \$7.00. Complete M28 machines, SASE for complete list & Prices. Motorola T53GKT, mint, \$225.00. Lawrence R. Pfeiffer, P.O. Box 21956, Milwaukee, WI 53221.

UT-4 COMPONENTS - See March ad for full semiconductor "economy" kit and options. New - Kit of 12 TTL IC's plus 14 1k resistors for XB-6 dual section xtal clock \$9.50, w/200 MLO pins \$11.50. Set of four edge connectors for K7WXT PC boards \$6.00. UART's now \$9.00 (GI or TI as available). Fairchild 33512 FIFO's \$13.00, 2/\$25. Motorola 1408L-6 \$6.50. All prime material, postpaid. No surplus. Attempting to obtain low-cost \$33.50 postpaid XB-6 xtals - inquire. Peter Bertelli, W6KS, 5262 Yost Place, San Diego, CA 92109. 714-274-7060.

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 217-367-7373

"UT-4 PC. BOARDS Set of four plated and drilled G-10 epoxy glass boards (not thru hole plated) 2 7/8" X 7" with provisions for 12 pin edge connectors. Boards include XB-6 Dual Clock, Two UT-4 boards, and power supply board including plus 5 volts, minus 12 volts, and plus 12 volts. All boards are two sided with the exception of the power supply. \$15.00 Postpaid. Clyde Keenan, Rte. 1 Box 309, Lakebay, Washington, 98349 1-206-884-3838"

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

WANTED: AN/SPR13A RECEIVER or other suitable receiver for RTTY. Must be mint. C. Cherman, WAUER, 1135 Constitution Dr. Tarentum, PA. 15084. (412) 224 7691.

DAYTON HAMVENTION at HARA Arena April 25, 26, 27, 1975. RTTY Forum scheduled on 27th. Write for information if you have not attended the last two years to HAMVENTION, P.O. Box 44, Dayton, Ohio, 45401.

SELL ST-5, ST-6. New ST-6, Hal boards, Hal cabinet, with wired jack for UT-2/4, ready to use with or without your UT-2/4; with AK-1 and 170/425/850, \$290. New ST-5 with auto-start, black/chrome cabinet, 170/850 with switched filter resistors and capacitors, \$100; same without auto-start, \$65. All shipped UPS your expense. Fred Firestone WB9IEE 806 N. School St., Normal, Illinois 61761, 309/452-4032.

HAL COMMUNICATIONS CORP. announces the new RVD-1005 Visual Display Unit, with the features of the proven RVD-1002 and some new features to boot, such as: Automatic CR-LF on space after 34th character (prevents splitting of short words), and speed indicator circuitry which times the incoming signal and causes an LED to light to show which speed switch to select. Low and low level inputs for compatibility with any TU. Combine the RVD-1005 with the DKB-2010 or the RKB-1 for the ultimate in noiseless, reliable, reception and transmission of Baudot coded TTY. BankAmericard and Master Charge accepted. HAL Communications Corp., Box 365RJ, Urbana, Illinois 61801. Phone 217-367-7373.

SALE: MODEL 28 TYPING REPERF. type 315/UG Code LPR-35 or TT317/UG code LPR-37, tape data 11/16" wide, Chadless or fully perforated; Good \$25.00; 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 motor PD/82U 115 V AC 60 cy Synchronous type unused with connector \$18.00; High Speed Magnetic Tape Reader Ferranti Good \$15.00; TT Socket wrench 5/16 with 12" handle .75¢; Kleinschmidt allen wrench on 12" handle Unused .95¢; GEARS 60 wpm for Model 14 T.D. with 18-- rpm Syn motor, Set Unused \$5.75 Model 14 Typing Reperf: Gears for 60 wpm for 1800 rpm Syn motor, \$6.75. Also available Model 14, 15, 19, 28, 32, 33 Machines as well as Lorenz Model 15. Send us a list of your needs. ATLANTIC SURPLUS SALES CO. 3730 Nautilus Ave Brooklyn New York 11224 Tel: (212) 266-2629

RTTY PICTURE PERF TAPES. Hundreds to choose from; from Rembrandt to Star Trek's USS Enterprise - even Christmas bell music. Error-free, no extra LTRS, FIGS, etc. 11/16" chad type (fully punched, no lids). Same-day service, postpaid. Send 16¢ in STAMPS for catalog and full details. This is NOT an illustrated catalog. Joe Dickens, WA9UGE, 601 S. Dodson, Urbana IL 68101. SEE YOU AT DAYTON BOOTH.

BUILDING A REPEATER? Check out Hale Electronics' new Model IDC-100 fully automatic repeater identifier. All solid-state CW audio ID and control circuitry mounted on 3x6" PC board. Unique activity sensing circuit allows ID only at end of transmission - no ID over conversation. Economically priced. Inquire today. Hale Electronics, P O Box 682, Cape Girardeau MO 63701.

CLASSIFIED ADS-

UART's AY-5-1013 NEW GENERAL INSTRUMENTS. \$10.00 each or 10 for \$85.00, all postpaid. Martin Geisler, WA6TIC, 11300 Hartland St., North Hollywood, Calif., 91605

NS-1 PLL DEMODULATOR (Oct. '74 Journal) complete unit wired, tested \$25.95 ppd. less switch, meter, power supply. Board only undrilled \$4.75. NatStinnette Electronics, Box 1043, Tavares, FL 32778.

CHICAGO AREA OPERATORS, EXPERT REPAIR work performed at reasonable prices. Cleaning and lubrication; printers \$11.00, Keyboards \$6.00, Reperfs, \$8.00, Repair work, any model teletype apparatus; \$17.00 plus parts. Phone (312) 392-2358. Contact Neil.

HAL COMMUNICATIONS CORP. has moved to bigger facilities to serve you better. Our address is the same, but please make note of our new phone number 217-367-7373.

SAROC Hawaiian Convention Holiday new dates, July 17-24, 1975. Deluxe rooms all seven nights Sheraton-Waikiki, Honolulu. Exhibits, Technical sessions, cocktail party and banquet. Limited number reservations on Western Airlines from Los Angeles and Oakland. Reservations available from mid-west and east coast principal cities. Travel arrangements by Del Webb World Travel Company. SAROC Las Vegas Hotel Sahara, January 8-10, 1976. Direct all inquiries to SAROC, POB 945, Boulder City, Nevada 89005.

CIRCUIT BOARDS: CW ID October Journal \$8, Frequency Standard Feb. 1974 Ham Radio magazine \$8, Digital Clock QST November 1974 \$8, RAM Message Generator January 1975 Ham Radio \$10. Limited supply of relays for message generator probably will be gone by time this ad appears, also no more RTTY Counter, AFSK, Digital Autostart, or receiver boards. All boards high quality G-10 Epoxy, plated, but undrilled. Parts list included. Sent postpaid in US and Canada only. Bert Kelley K4EEU, 2307 S. Clark Ave. Tampa, Florida 33609

HP-5103A solid state frequency synthesizer: DC to 10MHz in steps. Use instead of crystal oscillator or PTO. Easily FM'd or FSK'd in any frequency decade. New condition with manual. \$2500/ trade or make offer. Collins 30S-1, \$895. Tektronix 531A, \$375. WA6FAD, 528 Bonita, Pleasanton, CA 94566 (1-415-846-1459)

HAL COMMUNICATIONS CORP. will show THE line of electronic TTY equipment at Muskegon and Dayton. Phone your orders for pick-up at the show. We'll look forward to seeing you there. Phone 217-367-7373.

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TTL/2 Demod. Professionally built by J&J Electronics. 170/850 shift, autostart Tuning Eye, 19" rack panel. Little Use. Excellent Condition. \$10.00 fob. W1FUF/6 D. Stamps, 293 Reindollar Ave., Marina CA 93933

Will buy your NOT working condition R-390A or any units for same if price is right, will pay shipping. Describe units offered thoroughly. George Tate W4AIS 306 Thornwood Drive, Taylors, S.C. 29687. NO PLAIN 390 Wanted.

ANY ISSUE OF RTTY JOURNAL reproduced \$1.00 PP. I have a complete file of all issues. R. Wilson, WBQESF, 4011 Clearview Dr. Cedar Falls, IA. 50613

TELETYPE, KLEINSCHMIDT, MITE, Gears, manuals, machines, parts, tools, cranks, tuning forks, motors, keytops, pallets, toroids, re-inkers. SASE for list. Typetronics Box 8873, W4NYF, Ft. Lauderdale, FL. 33310. Wanted: parts Manuals, late machines.

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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 217-367-7373

Drake R4C, T4XC, AC4, MS4, 4NB, FL500. Factory fresh, only four months old. Immaculate \$1095.00. Heath SB610, SB630 both excellent \$69.00 each. Teletype 28KSR MKIII floor console excellent \$250.00. TTL-2 RTTY TU excellent \$125.00 Mark K7HPH 801-561-443-. 438 Roosevelt Street, Midvale, Utah 84047

DRAKE 2B RCVR AMATEUR BANDS-PLUS five additional 600 kHz segments, up to 30 MHz. Very Stable, 600 ohm output. \$170. and 1 ship. Rich, WA5YXS, Box 392, Los Fresnos, TX. 78566.

WANT: PRE-1974 RTTY JOURNALS, Kleinschmidt ADS-321 or AN/FGC-140 circuit boards. TV-2 tube tester. Joe Ottinger, 106 Sheridan Ct. Leavenworth, KS. 66048, (913) 651-5832

SALE: LORENZ Model 15 KSR in operating condition \$75.00; Lorenz KSR with built in reperfator \$95.00; Lorenz full ASR operation with Reperf. and T.D. built in. Good condition \$125.00. All Lorenz machines come with Built in here-is answerback unit. Perforator tape 11/16" box of 10 rolls \$3.90; case of 40 rolls \$10.90; Copholder for Model 28 cabinet \$4.75 unused; Distortion test set with scope type TDA-2, 115 V AC 60 Cy good \$29.95; Distortion set, set type TS-2B/TG 115 V AC 60 Cy very good \$39.00; Model 15 platen unused \$4.50. Model 28 Typing Reperf with keyboard TT 253A/UG complete with counter, end of line light, Chad type of punch. 115 V AC 60 Cy, Typing reperf is a LPR53 BWA, and motor in unit is a LMU-3 type. Unit complete with cover. \$165.00 good but now checked; checked \$215.00. ATLANTIC SURPLUS SALES CO. 3730 Nautilus Ave. Brooklyn N.Y. 11224.

UPDATE YOUR RTTY STATION with Hale Electronics' new solid-state character generator, Model CG-256. Uses ROM to generate RTTY message up to 32 characters long, or CW ID or message to 256 bits. Perfect for WRU or CW ID. Directly compatible with ST-6, adaptable to any installation. 3x4 inch PC board contains all parts except power supply (requires 5vdc 2 150 ma). CG-256R - reed relay output - \$34.95 wired, \$26.50 kit. CG-256 - open collector and TTL outputs - \$31.95 wired, \$23.50 kit. PC board, memory, and manual - \$16.50. Board and manual only - \$7.00. All kits (except board only) include custom programmed ROM. QSL card brings complete details. Hale Electronics, P O Box 682, Cape Girardeau, MO 63701.