

16 MAY 1972



'Harold' W2LFL
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RTTY

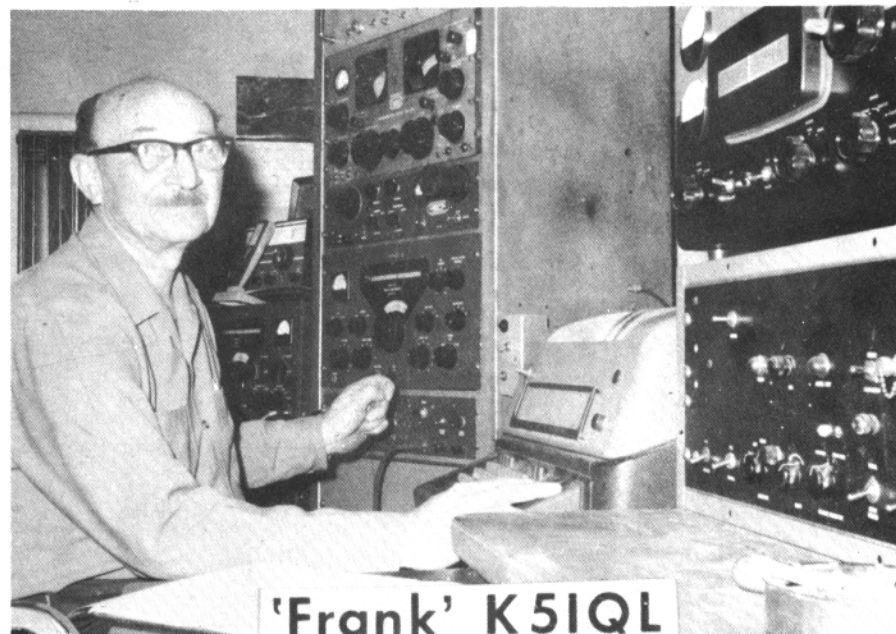
May-June 1972

JOURNAL

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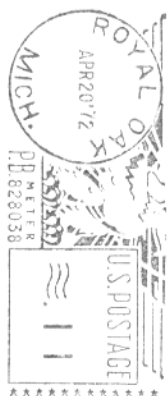
'Frank' K5IQL

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RTTY TU Design and Operating Guidelines-

The Minneapolis area Radio Amateur Teletypists Society, RATS, conducted a panel discussion concerning RTTY Terminal Unit Design and Operating Procedures. The following guidelines were established:

1. If a receiver with a selectable bandwidth is used for RTTY, use the minimum bandwidth for the shift you are printing, i.e. 200 or 400 Hz for 170 Hz shift, 1000 or 1.2 KHz for 850 Hz shift.
 2. If the receiver used has a variable bandpass, position it such that the RTTY signal is centered within the bandpass.
 3. Select a fast AVC or turn it off.
 4. Provide a means of signal isolation to insure that your speakers will not act like a microphone when you are printing RTTY.
 5. Match the output impedance of the receiver with the input impedance of the terminal unit. This can often be done simply with a 4 ohm to 600 ohm transformer.
 6. Bandpass filters will help to reduce hum and reduce the false capture of unwanted subharmonic tones by the limiter.
 7. A Saturating Limiter, in which the sine wave input is converted to square waves, as used in the ST-6, produces odd harmonics of the input signal and therefore a logarithmic amplifier or non-saturating limiter could be advantageous. A non-saturating amplifier would have extremely high gain when the input level is low and low gain (or no gain) when the input signal amplitude was high. Distortion of the waveform would be kept at a minimum.
 8. Discriminator filters should be as narrow as is feasible to eliminate noise and co-channel interference. 170 Hz filters can be approximately 35-45 Hz wide at 3 d.b. and 850 Hz filters should be 60-85 Hz wide. A rule of thumb would be to say "the narrower the better down to about 20 Hz" but everyone unfortunately does not have a 170 Hz or 850 Hz precisely-tuned shift, therefore, the discriminator filters must be wide enough to accommodate the various mistuned shifts which might be encountered.
 9. Discriminator filters should have the same shape ("area under the curve") for best noise cancellation. This
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involves modifying toroids, selecting capacitors, and matching impedances.

10. If a diode detector is used, Germanium diodes are recommended because of their lower forward voltage drop, 0.2 volts versus 0.6 volts for silicon. The diodes should, however, be tested to see that they have a high reverse resistance, the higher, the better. This prevents the signal from one filter getting into the output of the other filter. This is referred to as "spill over" and can adversely affect the filter performance.
11. A high impedance FET follower prevents loading of the filters which consequently would broaden the bandpass. By using the FET followers, a single toroid section discriminator filter can be used with a series resistance to broaden the filter to the desired bandwidth.
12. If an oscilloscope is used for tuning, it must have a high input impedance such that it will not load down the discriminator filters. Horizontal input impedance is usually lower than the vertical input impedance. The scope usually can be coupled through a one megohm resistor without loading the discriminator.
13. A low pass filter should be used to eliminate noise from the signal before it enters the Schmidt trigger or Switching circuit. A simple toroid or solid state filter is sufficient.
14. The recently-introduced phase-locked loop (PLL) integrated circuit has many interesting possibilities for RTTY. As a discriminator, detector and Schmidt Trigger, it would perform satisfactorily if preceded by a bandpass filter and non-saturating amplifier. It has excellent signal-to-noise characteristics but has only a 25 mv sensitivity.

In conclusion it was agreed that nearly any converter would perform satisfactorily on the VHF frequencies but if a unit was to be designed for eighty meters it would have to be able to reduce the effects of noise, receiver hum, selective fading, and co-channel interference.

We hope that the above listed information can be of help to you the next time you consider building or buying a terminal unit.

Bill Ham, WA0ACI

RTTY JOURNAL

A Precision Audio Standard for RTTY Tones --

IRVIN M. HOFF, W6FFC
12130 Foothill Lane
LOS ALTOS HILLS, CA. 94022

For various RTTY purposes, it is often convenient to have precise audio tones such as 2125, 2975, etc. These tones allow filters for the demodulator (TU, converter) to be constructed, or a.f.s.k. oscillators to be tuned properly.

Various schemes have been proposed in the past. Normal audio generators are usually unsatisfactory since they are not nearly accurate enough on their readout. That is, most audio generators run from 2000 to 20,000 on the same scale, and it is difficult to read them within 50-100 Hz. If they can be zeroed against an accurate reference, they are quite useful, and normally are stable enough to hold the same frequency within a Hz. or two if warmed up a few minutes first.

In the "New RTTY Handbook" by Byron Kretzman, a tuning fork oscillator is described, wherein a 400 Hz. tuning fork was modified for 425 Hz. and then placed in an oscillator. This system will give harmonics allowing 850, 1275, 2125 and 2975 to be used. However, it is difficult to set the tuning fork accurately in the first place unless some other known standard is used, and even then the system has some drawbacks -- for one thing modifying the tuning fork is not the easiest thing, another thing it is not always simple to find such a fork.

Of course a digital counter is an ideal system, when used in conjunction with a stable audio generator, but only a few have taken RTTY seriously enough to invest in a digital audio counter. Certain musical tones come very close, but this means you would have to drag the musical instrument into the shack, which is not always convenient.

Musicians use tuning forks to determine how to tune their instruments. Any store can sell you a "440 Hz." which is "A" above middle C. This is not of much use, but illustrates a point. At one time this type of tuning fork was available for special tones such as 1275, 2125, 2295 and 2975. Inquiries from some of the advertisers in the classified section of this magazine might turn up such devices. The tuning fork is struck sharply

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and placed close to the ear or held against a large object such as a table, while its tone is matched with that of the audio generator. This method can be quite accurate and is rather inexpensive. It's surely the quickest and easiest way to find the correct setting on the audio generator.

The purpose of this article is to point out an exceptionally accurate method of obtaining precision tones of extraordinary accuracy.

In November 1968 QST, we introduced the "Mainline FS-1 Secondary Frequency Standard." This precision device uses a 4000 kHz. high accuracy crystal in a very stable Colpitts circuit. Through the use of micrologic decade dividers, precise outputs of 1 MHz, 100 kHz, 10 kHz, 2.5 kHz, and 1 kHz, are obtained. These outputs are rich in harmonics and are useful up to at least 500 MHz. It is used by many RTTY operators for precise markers to spot autostart frequencies such as 3612,500, 3637,500, 14075,000, etc. It will hold to within 1-2 Hz. of WWV at 15 MHz. by the month. The author, using such a device, recently placed in the top category of ARRL's frequency measuring test, when he missed three frequencies by a grand total of only one Hz.

At any rate, it is not generally realized that this precision high frequency device is useful for audio frequencies as well. If the FS-1 is adjusted properly to agree with WWV at 15 MHz, then the accuracy at 1000 Hz. is nothing short of phenomenal. Let's say you are two Hz. off at 15 MHz. (it's simple to adjust the FS-1 a lot closer than this, by the way). In this case the error becomes 1 part in 7.5 million. By the time you get down to 1000 Hz, it's absolutely ridiculous, and no normal digital counter could possibly measure the error.

Now, here's the icing on the cake. If you remove the 4000 kHz. xtal. in the FS-1 and replace it with a 3400 kHz. crystal instead, now in the last position on the FS-1 (normally 1000 Hz.) you get 850 Hz, and in the next-to-last position you get 2125 (formerly 2500 Hz.). Again you can imagine the accuracy involved.

If you want some tone other than those just mentioned, just multiply that tone by 1.6 and read directly the value of the xtal you would then use, in kHz.

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For instance, let's say you wanted 2295. Well, multiply 2295 times 1.6 and the answer becomes 3672 kHz. or if you wanted 2975, it would be 4760 kHz.

There is enough output from the FS-1 at these frequencies to run a pair of headphones adequately, and the output impedance is quite low, so headphones will not load down the output or change the frequency.

Of course once you get the FS-1 properly set against WWV with the 4000 kHz. xtal, you will not want to change the trimmer for these other crystals, nor is it necessary.

Even the cheapest crystal you can buy will probably be accurate to at least 0.01%. At 3400 kHz, this is something like 340 Hz. maximum, and probably much better. Let's say you buy this inexpensive crystal and insert into the FS-1 without touching the tuning arrangement for the 4000 kHz. crystal. It can be shown that

the 850 Hz. frequency will not be in error by more than that same 0.01%, which is something on the order of 0.085 Hz. at 850. Consequently even with the cheapest crystal you can buy plugged in with the previous setting, you should be accurate to a ridiculous amount. If you had or were thinking about getting the FS-1, suddenly it becomes a precision tool not only for autostart frequencies, frequency measuring tests, but also as an extremely accurate audio standard.

CONCLUSION: For those demanding extremely precise tones of 850, 2125, etc. you can get this for almost free if you have a FS-1 frequency standard. It only involves buying an inexpensive crystal to temporarily use in place of the 4000 kHz. xtal normally used in the FS-1. If ordering any of these auxiliary crystals, be certain to specify room temperature and 32 pf. load.

LIST of ARTICLES From past RTTY Journals-

Ralph McQuade, W8WRL has kindly sent us a list of most of the articles that have appeared in the JOURNAL. Unfortunately most of the back issues are no longer in print but as many have files for a number of years it may save a lot of searching. One of the advertisers in the classified section will reproduce any back issue also for only a buck so if you are particularly interested it is possible to get a copy of that issue from him.

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RTTY NETS -

SCM of Eastern Florida, W4ILE in Miami is pushing for a statewide RTTY traffic and rag chew net - to tie in with the National traffic system. All Florida and other amateurs interested are urged to drop Regis Kramer, W4ILE, 195 N.E. 76th St. Miami, FL. 33138 a line.

Another net we have just heard about is the "Virginia RTTY Net" operating on 3625kHz daily at 0100 GMT. The net is loosely affiliated with the NTS and looking for more QNI/QTC to increase interest. Jerry, KØPIV, is acting as RM at present.

(We would still like to hear of other RTTY nets.)

TAPE SPLICE

I have found any glued surface such as the glued part of an envelope or brown kraft paper cut to 11/16 and run through the perf with an all ltrs combination makes an excellent splice tape for torn sprocket holes. K9WRL

We need some little items -

to fill these little spaces-

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ARMED FORCES DAY

The communication tests will consist of military-to-amateur crossband operations, using continuous wave (CW), voice (SSB) and radioteletypewriter (RTTY) modes of operation and "CW" and "RTTY" receiving tests. Special QSL cards confirming crossband communications will be forwarded to those amateurs who establish two-way contact with participating military stations. Certificates will be awarded to those who aptly demonstrate their operating ability and technical skill by receiving an acceptable copy of the Secretary of Defense originated "CW" and/or "RTTY" message(s) transmitted during the receiving portion of the communication tests. Anyone who has the equipment and the ability may copy the Secretary of Defense messages and receive a certificate.

MILITARY-TO-AMATEUR CROSSBAND TEST

The military-to-amateur crossband operations will be conducted from 20/1400 GMT to 21/0245 GMT. The military stations, WAR, NSS, NPG and AIR will transmit on military frequencies and listen for amateur stations transmitting in the portions of the amateur bands indicated below. Additionally, consistent with operational and training commitments, a U.S. Navy aircraft using the call sign NSSAM, will conduct crossband operations on frequencies listed below while flying at 21,000 feet over various cities at times indicated. Amateur operators should monitor the frequencies plus or minus one hour.

RTTY RECEIVING TEST

A Radioteletypewriter "RTTY" receiving test will be conducted for any individual amateur or station possessing the required equipment. This is a test of the operator's technical skill in aligning and adjusting his equipment, and serves to demonstrate the growing number of amateurs becoming skilled in this method of rapid communications. The "RTTY" broadcast will consist of a special Armed Forces Day message from the Secretary of Defense to all radioteletypewriter enthusiasts. The message will be transmitted at 60 words per minute in accordance with the following schedule:

TIME	TRANSMITTING STATION
20 May 1972	
21/0335 GMT	WAR - Army
20/2335 EDST	NSS - Navy
20/2035 PDST	NPG - Navy
	AIR - Air Force

FREQUENCIES (KHz)

4030, 6997.5, 14405
4012.5, 7350, 14385
4010, 7347.5, 13922.5, 148.41 MHz
7305, 13997.5

SUBMISSION OF TEST ENTRIES

Transcriptions should be submitted "as received". No attempt should be made to correct possible transmission errors.

Time, frequency and call sign of the station copied as well as the name, call sign (if any) and address, including zip code, of the individual.

OSCAR 6 & RTTY

PART 4

AO-C AUXILIARY BEACON

An auxiliary UHF beacon transmitter has been added to the equipment list for the AO-C amateur satellite scheduled for launch this summer. This downlink transmitter will be used for special purpose experiments. It will also be used for tracking and telemetry when the satellite battery charge is too low for continuous operation of the 2-to-10 meter linear translator. The beacon transmitter will provide approximately 400 mW output at 435.10 MHz and can be modulated by either the Morse code telemetry data or CODESTORE (selectable by ground command).

MORSE CODE TELEMETRY DATA

Last month the Morse code telemetry data format was described. Recall there are 24 channels of data transmitted by CW, with each channel represented by a three digit number. The first digit is simply a line identifier for the six lines of data. The remaining two digits in each number indicate the value of the measured spacecraft parameter.

To enable the amateur receiving stations to decode the telemetry data, the parameters and range of values are tabulated below for each channel. The number of channels devoted to solar cell monitoring provides not only cell performance information, but also a means of measuring the satellite orientation and tumble rate. Most telemetry channels are linearly encoded; that is, a straight line relates the transmitted number (00 to 99) to the parameter value. Knowing the range of measured parameters is sufficient to decode these linear channels; however, temperature and power measurements are not linearly encoded. Temperature is essentially linear only over the range of -30 to 50 degrees centigrade, while RF power measurements are encoded as squared functions of the telemetered number. For convenience, approximate equations to calculate parameter values are given in the table. Just plug the telemetered number (N) into the equation for that channel to calculate the parameter value.

As an example, consider the following sequence received during a satellite



ELMER MOORING, W3CIX
9318 Millbrook Rd.
Ellicott City, MD 21043

pass:

--357 464 451 454 482 545---

Decode the third number above (451). The first digit indicates the fourth line of data and inspection of the adjacent numbers show that it is the second channel on line four. The channel number is determined by remembering there are four channels per line; thus, 51 is the encoded value for channel 14. From the table, this is the temperature of the power amplifier in the AMSAT 2-to-10 meter linear repeater. Using the equation for channel 14, the temperature is readily calculated.

$T = 95.179 - 1.471(51) - 20.158 \theta C$
The equations in the table are approximate and will be refined during the environmental testing and calibration of the satellite prior to launch. AMSAT members are preparing computer programs to automatically process all telemetry information, and even bits and pieces of received data will be appreciated at AMSAT headquarters.

The received numbers should be relayed, not the decoded parameters.

Channel	Measured Parameter	Measured Range	Approximate Equation
1	Composite Array	0 to 500 ma	$I = 5 N(\text{ma})$
2	+X Solar Panel	0 to 100 ma	$I = 1 N(\text{ma})$
3	+Y Solar Panel	0 to 200 ma	$I = 2 N(\text{ma})$
4	+Z Solar Panel	0 to 400 ma	$I = 4 N(\text{ma})$
5	-X Solar Panel	0 to 100 ma	$I = 1 N(\text{ma})$
6	-Y Solar Panel	0 to 200 ma	$I = 2 N(\text{ma})$
7	-Z Solar Panel	0 to 400 ma	$I = 4 N(\text{ma})$
8	Battery Charge	-1/2 to +1/2 amp	$I = 10 N - 500(\text{ma})$
9	Unregulated Bus	18 to 30 volts	$V = 0.12 N + 18(V)$
10	Battery Center Tap	0 to 15 volts	$V = 0.15 N(V)$
11	Regulator	0 to 15 volts	$V = 0.15 N(V)$
12	Battery Temp.	-30 to +50 C	$T = 95.79 - 1.471 N(C)$
13	Baseplate Temp.	-30 to +50 C	$T = 95.79 - 1.471 N(C)$
14	Translator Temp.	-30 to +50 C	$T = 95.79 - 1.471 N(C)$
15	+X Panel Temp.	-30 to +50 C	$T = 95.79 - 1.471 N(C)$
16	+Y Panel Temp.	-30 to +50 C	$T = 95.79 - 1.471 N(C)$
17	+Z Panel Temp.	-30 to +50 C	$T = 95.79 - 1.471 N(C)$
18	Translator PA	0 to 500 ma	$I = 5 N(\text{ma})$
19	Translator Reg.	0 to 30 volts	$V = 0.3 N(V)$
20	SPARE		
21	Translator RF	0 to 10 Watts	$P = 0.001(N)^2(W)$
22	UHF Beacon RF	0 to 1 Watt	$P = 0.1(N)^2(W)$
23	Translator AGC	0 to 3 volts	$V = 0.03 N(V)$
24	Midrange Calib.	0 to 1 volt	$N = 50 \pm 1$ for 0.5 volts

(Note: N - the last two digits of channel number received)

Table of AO-C Morse Code Telemetry Data



'Bob' W3SWZ

VHF RTTY NEWS

RON GUENTZLER, W8BBB Editor
Route 1, Box 30
Ada, Ohio 45810



We have two problems here, one of which is related to the following letters.

T. Pappan, WA8ZTY, P.O. Box 147, Corunna, MI 48817, writes: "I'm just getting into RTTY, picked up a machine, got a TTL2 going, started a sub to RTTY Journal going 1 Jan and started looking around VHF FM for some action. I heard a lot of talk about it before I got the gear together and the idea of an autostart system going on a clear FM channel seemed a great idea.

"The only thing is, where is everybody??? I've gone thru a dozen channels, a week at a time, leaving the machine on autostart 24 hours a day and nothing. Well, almost nothing on 146.700 MHz. About two weeks ago I picked up some guy tuning up and working on his tones for almost two weeks (mostly in the afternoons and at night). He never did ID on RTTY, but he did on CW, but I was never close enough to the rig to catch it. I got about 3 feet of paper on him, but that's it. What's the story on VHF FM in this neck of the woods? On a clear channel (not .94), I can copy East into VE3 land, South into the Northern half of Ohio and Indiana West to Chicago and Wisconsin, and North to the northern portion of Michigan. This range is typical of what I can do from here and have done on phone QSOs. The point being that I can hear if there is anything to hear.

"Hints on what freqs are in use and any groups or associations of VHF FM RTTY enthusiasts would be appreciated."

From Jack Hart, WA2HWJ, 133 William Road, N. Massapequa, NY 11758, comes: "Would like to ask thru you if there is any real organized RTTY on 2 meter FM in the NYC-LI area. Have a 28ASR. I'm dying to use it, but no room for the low-band gear at this QTH. Have always wanted to play with autostart and the rest, but not sure if it's worth buying the xtals for the Prog-Line to listen for the RTTY on 146.700. If possible, have any interested parties contact me."

When we started this column about 5 years ago, the idea was to act as a

"clearinghouse" on VHF RTTY operating information. As it turned out, most issues are devoted to technical topics. The reason for discussing mainly technical topics is that there just isn't much news. However, as the above letters indicate, newcomers are constantly getting into the VHF phase of RTTY, and they would like to know where the action is. Unfortunately, we usually can't tell them because no one has told us! In both the above cases, some information was supplied, and, hopefully, it was adequate/accurate, but it was old information - about two years old.

So what? Well, if we can gather information, we can send it along to those wishing to get on. But, we can't send along nothing! So, please let us know what is going on where. A post card is adequate to outline briefly where and what and when the activity is. For example, the mode (FSK, AFSK, AM, FM), the frequency of operation, type of polarization (vertical or horizontal), and typical operating times. Of special importance is the use of autostart and the hours the autostart is operating. Also, when testing, please give call letters from the keyboard (as well as the required voice or CW, ID). A printed record is useless as WA8ZTY indicated, if no idea whence it came is given.

The second problem is related to technical topics. What would you like to know about? We have written about just about every phase of RTTY that we are familiar with. The only thing that we can't talk about is FSKing specific transmitters because we have had no experience with them. Coming up with a fresh topic every month is somewhat of a chore - especially when many non-RTTY things have to be written about as part of one's job. Suggested topics are always welcomed.

Again, please let us know what is going on where and what topics are of interest.

We seem to chronically overlook the following references: "Principles of Modems," NAVSHIPS 0967-291-6010, 1968, \$0.65. "Principles of Telegraphy (Teletypewriter)," NAVSHIPS 0967-255-0010, 1967, \$1.50. Both were available

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from: Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Just request the titles with the NAVSHIPS number and enclose a check for the price listed. Foreign

purchasers are to include 1/4 additional for postage. We do not know whether they are still available. They are excellent.

73 ES CUL, RG

Using a 15 Printer with a 14 Reperforator

Bv - Howard Cohran - K9IUG
6419 Carlisle Rd.
Terre Haute, Ind. 47802

(Reprinted from the April, 1967 issue of RTTY JOURNAL)

I am enclosing a diagram for those that might be interested in using the model 15 printer with the model 14 reperforator to obtain similar results that the model 19 offers. The reperforator can be of the receive only or transmitting type.

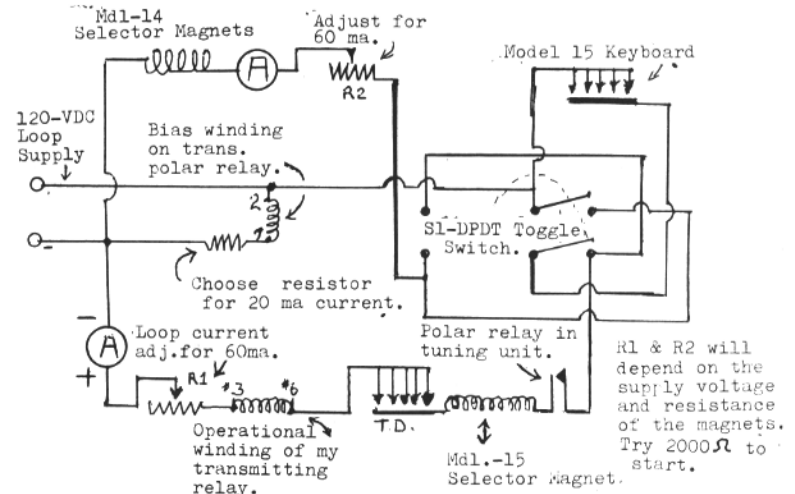
After careful study of the included wiring diagram you can see that it is possible to punch tape with a 15 keyboard while receiving copy on the page printer. With additional thought and some more wiring it could be arranged for local copy on the 15 while punching tape, assuming of course you are not printing an incoming signal. This would correspond to the both position on the Mdl-19 keyboard control switch. If you are interested in punching a tape of an incoming signal, this too can be arranged. More wire required though.

The diagram illustrates the loop arrangement in use at K9IUG's QTH. The switch (DPDT toggle) is shown in the key-

board only position. This position places the keyboard in series with the Mdl-15 selector magnets and the other equipment in this loop. When transmitting the keyboard will break the loop thus causing the page printer to print what has been typed. At the same time the transmitting polar relay will function and its contacts will key the station transmitter. In the meantime the Mdl-14 will remain in closed condition.

With the switch in the other position (Punch tape), the keyboard will now be placed in series with the Mdl-14 selector magnets. Any character typed on the keyboard will cause the Mdl-14 reperforator to function punching the typed character on the tape.

While the keyboard is in the punch position it is in the Mdl-14 reperforator loop and no longer in the Mdl-15 loop. The Mdl-15 loop has been connected back to the positive side of the supply by the toggle switch. If you have been thinking of getting on with tape now you can pick up one of the inexpensive receiving only reperforators and get the job done. Hope to see you on the green keys soon, 73'as K9IUG



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RTTY-DX

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



Hello there ...

This month we are happy to announce that the 4th "100 DXCC-RTTY" Plaque goes to Bob Deseck, ON4CK. It is a tribute to Bob for his operating excellence in RTTY and also a tribute to the radio amateurs of Belgium who now have two of their members that have received this difficult Award. Bob needs no introduction to DX'ers as his fb signal has been very consistent for the past several years both for a pleasant QSO and a contest multiplier. Bob's submission of 101 cards all checked out and we noted that the dates of the contacts were spread over a seven year period, the earliest being for contacts in 1965. Newcomers to RTTY will no doubt be aghast to think that it will take this long to accumulate 100 countries but we hasten to point out that the increased activity and availability of machines in just the past two years has made dozens of new countries available and the time between country Nr. 1 and country Nr. 100 will narrow considerably in the months ahead. One of the fastest ways to increase the country totals is to get involved in one or more of the Contests that are currently available on RTTY. There is literally one or more for all seasons so you should have no trouble in fitting one or more into your schedule.

Just completed prior to this writing was the Annual Spring Contest sponsored by the British Amateur Radio Teleprinter Group. This is one of the original contests solely for RTTY and dates back to March 1965 when the first one was held, with FG7XT the winner. The conditions for this one seemed a bit below average with the propagation a bit unpredictable on some of the bands. There was no lack of activity however and quite a few will have made WAC from the following selection of choice DX that was available. VU2KV, YA1OS, JA1ACB, ZS3B, 9J2ED, CE3EX, PY1DCB, FM7AJ, KL7GRF, KZ5LF, KH6AG, KX6IT, VK2KM, UK4FAD, UK2GAX, SV0WO, and OK1MP represents a few from the various continents that were on. In past BARTG Contests we always wondered where all the "G" stations were. There

* 100 DXCC WINNERS *

NR. 1 ON4BX	108 Confirmed
NR. 2 W3KV	103 Confirmed
NR. 3 IIKG	100 Confirmed
NR. 4 ON4CK	102 Confirmed

DX HONOR ROLL

1. FG7XT 110/102	44. EA7PZ 55/37
2. K8YEK 87/85	45. ZL2ALW 48/37
3. W8CQ 90/83	46. HB9AKA 48/36
4. W4YG 86/80	47. I5CLC 53/35
5. W5QCH 82/80	48. PY2CBS 51/35
6. DK3CU 75/71	49. W3CIV 43/35
7. W2LFL 76/68	50. 9Q5BG 37/35
8. F9RC 73/68	51. ZS3B 53/34
9. W5EUN 71/66	52. CE3EX 43/34
10. WA6WGL 72/64	53. HWT 43/34
11. K8QLO 68/62	54. VE4FG 35/34
12. W1GKJ 70/61	55. SM4CMG 60/33
13. WA3IKK 77/60	56. VK3NR 51/33
14. G6JF 82/59	57. HB9ADM 43/33
15. VE3AYL 63/59	58. SMOOY 43/33
16. WA2YVK 66/58	59. I6CGE 42/33
17. W3ISE 63/57	60. W9BT 40/33
18. CR6CA 60/56	61. VE4BJ 33/33
19. DJ6ZBA 75/55	62. WB6QFE 37/31
20. DJ8BT 59/55	63. K3SWZ 36/31
21. K4VDM 56/55	64. K9BJM 32/30
22. I1ROL 63/54	65. WA2EXP 34/27
23. SV0WO 61/54	66. WOHAA 51/25
24. W9AE 59/53	67. G3IYG 33/25
25. WB6RXM 61/51	68. FY7YQ 29/25
26. W4EGY 57/51	69. ON5WG 28/24
27. DL8VX 63/50	70. HK3SO 28/22
28. KL7GRF 61/50	71. W21DX 42/21
29. K8JTT 51/49	72. 9J2ED 36/21
30. K4VDM 51/48	73. W1KQY 32/21
31. E15BH 54/46	74. 4X4MR 34/20
32. ZS6BBL 53/45	75. G3LDI 33/20
33. OK1MP 49/45	76. OZ6OB 33/19
34. SM5BO 52/44	77. DL3NO 21/19
35. HA5FE 50/44	78. ON4CZ 30/18
36. K6YUI 54/43	79. WB6TLA 24/16
37. XE1YJ 48/42	80. WA0WST 32/15
38. W5VJP 42/41	81. 9Y4VU 25/15
39. I1CAQ 43/40	82. W6BTU 20/15
40. W8CAT 41/40	83. WB2NRU 18/13
41. LX2BQ 45/39	84. K1LPS 25/12
42. VE5LG 46/38	85. K1SGU 20/7
43. VK3DM 44/38	86. WB8SNJ 15/4

The next listing of RTTY-DX Honor Roll will appear in the September issue. At that time the list will be revised

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and stations not contributing for a one year period will be deleted. PLEASE LET ME HAVE YOUR LATEST TOTALS BY MAIL OR OVER THE AIR BY AUGUST 1ST.

was a good turn-out this year however with G6JF, G3SBA, G3OZF, G3RQY, G3LDI, and G3IGG available on most bands to assure a multiplier from England.

At this time we would like to bring your attention to this column in the February issue in which we reviewed the agreement made with Ted Double, G8CDW, Contest and Awards Manager for the BARTG. In affect, it states that if you made WAC in this Contest you will also be eligible for the WAC Certificate issued by the RTTY Journal. So the important thing to do is to send your score in and if you think you are eligible for the WAC point this out to Ted and he will check it out against the other logs submitted and send me a verification and in due course you will receive the certificate. We also remind you that your QCA standing can also be increased from your Contest log. So we repeat. Send In Your Log!!

A letter from Lamberto, I1ROL, RTTY Manager for the ARI tells us of the 5th National meeting of Italian RTTY Amateurs to be held on May 27-28 at the Ariston Hotel in Lido di Camaiore (Lucca). The accompanying brochure shows this location to be a beautiful setting right on the Mediterranean. The scheduled activities include a technical session, equipment display, Contest and DX, International RTTY Groups, and a cocktail party and banquet to close the session. RTTYers from other countries are particularly welcome and further details can be had from --

Lamberto Rossi, I1ROL
 P.O. Box 50
 56021 Cascina, Italy.

March seemed to be a popular month for travel, at least for RTTYers. Bud, W2LFL, was very pleased to meet with Ole, OZ6OB and Gunnar, SM5QV on their visit to New York City. Also, your scribe and the xyl had an opportunity to "get away from it all" for a brief visit to the islands of the Caribbean. In our case it was a pretty crowded schedule but we did have a very pleasant visit with Ike, PJ2CR and his lovely wife and family while on Curacao. It was our first opportunity to hear what it's like on the other end of the line at a DX location and we certainly did enjoy that visit.

During the Contest Cliff, SV0WO in-

formed us that he will be closing down his station in May and will return to the States in June. If you still need Greece you had better find Cliff quickly as he was the only active station there for the past three years and there is no one to carry on in his place at the moment. Speaking for the gang, we certainly appreciated his efforts in getting this rare country on RTTY and Cliff spent a major portion of his available operating time at the keyboard both for rag chewing and Contest QSO's. Stateside he will be signing W4CQI from the State of Virginia.

Thanks to Carl, WB6RXM, for the QTH of KG4FK which follows --
 Chuck Greer Box 39 FPO
 Norfolk, Va. 23593

John, W9DDD/HK3, writes to say that he was caught up in an economy move by his company and is now back in the States. John will be happy to send cards to all that do not have one as yet if you send yours along with a SASE to --

John Koster 385 N. Sycamore Dr.
 Canton, Illinois 61520

Some recent activity from those rare countries of the British Isles. Cliff, SV0WO was in QSO with GM3DJT on 15 meters and Dusty, WA3IKK was the first RTTY contact for Arnold, GW3KNZ recently on 20 meters.

From far off Zone 29 Alan, VK6PG can usually be found on 20 meters at around 1200z.

Can't imagine that anyone has missed Alaska with John KL7GRF so active, but just in case, you may possibly find KL7GDU from time to time.

The British Amateur Radio Teleprinter Group will be holding their first Convention at Meopham in Kent on Saturday, May 20th, 1972 from 1100 till 1900 local time.

It is hoped that the B.A.R.T.G. Call-sign will be activated for the first time using the call sign G4ATG (Amateur Teleprinter Group). Operation will be centered around 14090 kcs with 45 Baud speed and anyone wishing to make a sked for this event should write to: Jim Heck, G3WGM, 5 Hartsbourne Avenue, Bushey Heath, Hertfordshire, England.

FLASH! - A few of the boys have had QSO with KS6DR, QSL to Aaron Farr. Pago Pago, American Samoa, 96920. DOUBLE FLASH! Finland has granted licenses for RTTY operation on the 1st of May, 1972. Several stations are all set to go. Also OH0NI is ready from Aaland Island.

And with that we say

73 de John
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Anyone that has ever been responsible for publishing a column, a club bulletin or magazine knows that there are times when not enough space is available for all the things you have to say. At other times everything goes blank when you start to write and you wonder what happened to all the things you were going to say when you had room. This month seems to be our blank one.

One sure cure for this problem is to talk about yourself, there is always something to say on this important issue.

After 28 years of running our own business it suddenly wasn't fun anymore so we have sold out and retired. As an expert on retirement (3 days) we are looking forward to it and really wonder how we ever had time to work. To answer the 3 questions everybody asks first - we are NOT moving anywhere - we are NOT going to travel anymore than usual and as to what I intend to do - Ham Radio - publishing the JOURNAL - work in our greenhouse - play with our ceramic equipment - play a little golf (?) with congenial friends - catch up on some of our reading - babysit and pamper our 20 year old cat Patches. Frankly I doubt if there will be time for all of this but we can try. Certainly at this point there is no time to worry about keeping busy. For 36 years we have paid our taxes for social security and now we are on the other end so a short plea to all you younger squirts to be faithful with your payments while we lobby for bigger and better ones.

See you on the Geritol net ...

We enjoyed attending the Michigan ARRL convention at Muskegon last month. An exceptional turnout of about 1700 enjoyed themselves although the RTTY meeting was canceled due to a last minute - no show - of the party running it.

Mr. Dannels the new president of the ARRL was in attendance and we think he will be a dandy one. Grass roots - is the best way we can express our impression of Mr. Dannels. He plans on doing

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a lot of traveling and is congenial, listens and yet serious about doing the best job for the entire membership, we say this even though he voted against the RTTY awards hi. If he appears at a hamfest or club meeting in your area try to attend and meet him. We think "you'll like him."

The ARRL directors voted down a motion by director Haller to issue a DXCC for RTTY. In talking with George Hart of headquarters we understand that there is discussion now of issuing only one DXCC - for any or all modes rather than separate phone and CW endorsements. If this happens, and the DX honor roll is combined for all modes we cannot expect RTTY to have a separate spot. If this is not done, and WAS and WAC is not combined then we can still see no reason why RTTY should not be considered. Certainly it is a separate mode along with CW and Phone. AM, FM, Mobile are all one of the above modes and we can see no reason why granting a RTTY award should open the way for a raft of separate awards. This is not a burning issue but if you talk to your director you could explain your wishes. The directors do listen, but with comparatively so few RTTY fans everyone will have to make an effort to promote the issue. Another thing we would like to see is a section in the Sweepstakes for RTTY operation but we have mentioned this before with very little response.

we are writing this during the Easter vacation of school and are babysitting for our granddaughter. It used to be mixing formulas, seeing that meals were eaten and listening outside the bedroom door to see if she had gone to sleep (and Crys checked to see if she was breathing). Now at age 13 it is gin rummy, stamp collecting, baking cookies and popping corn, answering questions that only a 7th grader can throw at you and then trying to get her to bed at least by the time we go. One nice thing - she is getting good at helping us with the circulation records - at a price.

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Taylor Croft, VE3OR, has charge of the distribution of surplus 28 tele-types in Canada. He has a number of machines available, some of which parts are being acquired to bring into good operating condition. Prices are very reasonable and machines are available to Canadian amateurs only. For complete information and prices write Taylor Croft, 60 Pineglen Cres. Ottawa, Ontario K2g-0G8.

Please note that this is a combined issue - May and June, in line with our announcement last fall. The next issue will be July-August, mailed about the 20th of June. Subscribers expiring in June will receive the July-August issue as the last one on their subscription.

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 30c 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. 30c each.

- 1966- Sept.-Oct.-Nov.-Dec.-
- 1967-None
- 1968-March, May, Sept. (3)
- 1969-Oct., Nov., Dec. (3)
- 1970-None
- 1971-Jan., May, June, July, Sept., Oct., Nov., Dec. (8)
- 1972-Jan.-Feb.-March-April-(4)

RTTY JOURNAL
Box 837
Royal Oak, Mich. 48068

Editor & Publisher 'Dusty' Dunn, W8CQ

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DX FLASH!

April 13th, 1972

Dear Dusty and John--

Just got word yesterday that I will be leaving for the Trust Territory on Wednesday the 19th. Which of course means that I will have to QTA the Dayton Hamvention. Very disappointing, indeed. Had everything all set with room reservations and tickets.

I should be out in Micronesia for the next four or five weeks and will be on the air as much as possible. I estimate that I will spend approximately one week on each island in this sequence-- Majuro, Ponape, Truk, Yap, Koror and then maybe a few days at Saipan prior to returning. So you can listen for me around 080 on each of the bands (14, 21 and 28).

Looks like I will be on the island of Ponape for the WAE contest and will try to be on as much as possible during the contest and will send in a log to confirm all contacts made.

See you in Dayton next year

Paul KH6AG

PRINTER HANDLING

Some of your readers might be interested in the little hint and kink I use here for the 19 & 28ASRs. . . as you know these machines are quite heavy to move around and the use of an under-slung caster type dolly would help as it only adds an inch or so to the overall height of the key board. A set of four 3 caster dollies were found at Sears & also Montgomery Ward for a nominal price of \$5.25 to \$5.50 and places 12 casters on the floor to keep the TTYs more easily managed.

On the 28s KSR or ASRs you may take out the leveling bolt which normally comes with the machine and by the use of two or three washers between the TTY and caster dolly bolt same to the TTY and no more worry of the TTY slipping off the dolly. The Dolly already has a center hole and no drilling needed. On the 19ASRs it is a little different but a small spacer that will just fit up into the leg of the TTY table may be bolted directly to the dolly and then slipped into the leg which will also retain the dolly with the TTY. An extra set around the shack also is very handy to move the TV etc. With 12 casters on the floor to hold the weight of the ASRs no trouble was experienced with dig in to the floor.

73, s W7GPP

R.D. Dawson 1308 F Street
The Dalles, Oregon 97058

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CLASSIFIED ADS Rates-\$1.- 30words. ADDITIONAL Words 3¢ ea.

CLOSING DATE FOR ADS - 1st of month.....

NEW HAM MAGAZINE!! Interested in public services, humanitarian actions and international friendship? Sample issue free. Published every three weeks. Worldradio, 2509 Donner Way, Sacramento, Calif. 95818 WB6AUH

MORE RTTY! THAT'S RIGHT. In 1970 there were more feature RTTY articles in HAM RADIO Magazine than any other general amateur magazine. You need RTTY Journal, but you need HAM RADIO also. \$6.00 per year; \$12.00, 3 years. Ham Radio, Greenville, N.H. 03048

BACK ISSUES - RTTY JOURNAL - Have all issues from Vol. 1, No. 1, will reproduce any issue for \$1.00 PP. John Isaacs, 3175 Val Verde Ave. Long Beach, Cal. 90808.

HAL COMMUNICATIONS: HEADQUARTERS for MAINLINE Solid State RTTY equipment. You can do no better than the ST-6 demodulator at any price. Screened, punched cabinets for the ST-6 will be available soon. For budget TTY, consider the RT-1 for VHF, the ST-5 for HF. And the best in AFSK is provided by the AK-1. Our new model 1550 electronic keyer, or the MKB-1 Morse Keyboard, will automatically identify your RTTY station at the push of a button. The extra values are available from HAL COMMUNICATIONS, Box 365RJ, Urbana, Ill. 61801. Phone 217-359-7373.

WANTED-COLLINS 399C-1 PTO Console. 32W-1 exciter. National HRO-7 receiver. All in any condition. G.S. Naniwada, JA1ACB. 3-4-8. Izumi, Hoya, Tokyo 188, Japan.

TTL SELCAL drilled Fiberglass P.C. Boards. See RTTY Journal DEC 1971-JAN 1972. Double sided, solder coated. Shipped with instructions. \$15 each. K7WJC 7234 East Papago Drive, Scottsdale, Arizona 85257.

BUYING? SELLING? TRADING? Don't make a move until you've seen our new publication. Free sample copy! Six issues \$1. HAM ADS, P.O. BOX 46-653J, L.A., Cal. 90046.

WANTED: TELETYPE #28, 32, 33, 35 page printers, keyboards, cabinets, covers for 28 Reperforators. Cash, or trade for new Drake equipment. Sell LRX #28 typing reperforator-transmitter with two 3 speed gear shifts. \$100. checked out \$145. LRP #28 Typing reperforator without cover \$49. checked out \$69. Alltronic - Howard Co., Box 19, Boston, Mass. 02101 (617-742-0048).

9 MHz CRYSTAL FILTERS: XF 9B, 8 pole, 2.4 kHz, \$32.85; XF 9A, 5 pole, 2.5 kHz, \$23.00; XF 9D, 8 pole, 5.0 kHz, \$35.40; XF 9M, 4 pole, 500 Hz, \$24.49; XL 10M, 10 pole, 500 Hz, \$65.64. 9 MHz crystal discriminators for RTTY \$16.95. Complete RTTY demodulator (9 MHz in, m/s out) with crystal discriminator \$26.95. Also, 10.7 MHz filters and discriminators for FM. SPECTRUM INTERNATIONAL, Box 87, Topsfield, MA 01983.

FOR SALE: Pair of 28 Delta Sets. One has complete relays and 100 speed gears, other has one relay panel and 60 speed gears. Complete with full set of schematic prints and maintenance manuals. Spare motor base, 8 level punch and 8 level TD. Jim Stevenson, K8PZL, North Branch, Michigan 48461. (313-688-2633).

WANTED - COLLINS 32S3 and 30L1 linear amp. Good condition. Gwen Burnett, VE3AYL, 85 Fife-shire Rd. Willowdale, Ontario, Canada.

WANTED - FOR USE BY DEAF PEOPLE - TELETYPE MACHINES Model 15-19-26-28-32. Must be in reasonable condition, complete with keyboards. Can pick up anywhere. Send information to R.H. Weitbrecht, W6NRM, PO Box 555, Belmont, CA. 94002. Phone numbers - 213-793-4780 - 415-592-1622.

HAL COMMUNICATIONS: Announces the revolutionary new RVD-1002 and RKB-1 solid state RTTY system. Provides the ultimate in noiseless, reliable reception and transmission of Baudot coded TTY. The RVD-1002 visual display system receives demodulated TTY pulses from the ST-6 and provides video output to a video monitor, or modified TV set. One thousand (1000) characters are displayed in a 20 line, 50 character per line format, at 60, 66, 75, and 100 WPM if your TU will copy it. The RKB-1 combines reliable TTL circuitry, a high quality commercial keyboard, and a rugged case to provide the best Baudot TTY keyboard available. The electronics is arranged so that you type as if you were using a typewriter. See them on display at Dayton. Get the details from HAL COMMUNICATIONS, Box 365RJ, Urbana, Ill. 61801 Phone 217-359-7373.

FOR SALE; MODEL 28 TYPING REPERF LPR with three speed gears, including cabinet, mint condition, \$140.00. Want 3 speed gear for ASR, C. Keeler, W2NQW, 66 Franklin, N.Y. 12771.

WANTED: WIRING DIAGRAM W.D. - 2496 for a FRXD 10; also, schematic for Philco F.M. A.M. Generator, Model 7170. Contact W.A. Jaqua, 1218 Chimes Blvd., South Bend, Indiana 46615.

WANTED: MODEL 28KSR KEYBOARD, LP printer, LESU, Prefer MarkIII. For Sale, QST's 1940-64, CQ's 1952-70, 73's 1961 - 71, \$2.00 per year. Prefer to sell in sets. Ed Wagner, 208S. Monroe, Stoughton, Wis. 53589.

WANTED WANTED Model 28 ASR .. Friction feed paper or conversion of a Model 15 to sprocket feed ... 6 meter and 2 meter converters transistor into the Broadcast Band ... Ed Galovic K8OXO, 86 Egbert Rd., Bedford, Ohio 44146.

BE PATIENT! Only 170 days left before the gala opening of the Hudson Division Convention! Exhibits, Lectures, 2-meter FM, RTTY, Contests, Gabfests, New York Sightseeing, Fun. Free gift for each early registrant. Oct. 21-22. Hilton Motor Inn, Tarrytown, N.Y. Info from Dave Popkin, WA2CCF, 303 Tenafly Road, Englewood, N.J. 07631. Worth waiting for!

TYPETRONICS NEEDS YOUR unused surplus teletype parts. M 14-15- & 19 as well as M 28 and later. Please write what you have and asking price, cash or trade, to Fred Schmidt, W4NYF, Typetronics, Box 8873, Ft. Lauderdale, FL. 33310.

FOR SALE - SET OF 6 BOARDS for ST-6, never used - \$10.00 PPD. General Radio 566-A wavemeter, new \$15.00 PP, ME-61 Field strength meter, 1.5 to 24 Mhz 10.00 PPD, MX-1636/U time interval unit, plug in similar to H.P. 526B - \$25.00 PPD. Other items, SASE. J. Buckler, 29 Parkview Dr., Plains, PA. 18705.

TELETYPE DISTORTION Analyzer Model TDA-2 or TS917/GG. Excellent Condition. \$35. M. Booth, 110 Olive Ave., Piedmont, Ca. 94611.

TM11-2223 FULL Scoop on M 14 typing and non-typing reperfs. \$6.50. (Previous price in error). Many more teletype & Kleinschmidt manuals, parts, supplies & machines. SASE for list. Typetronics, Box 8873, Ft. Lauderdale, FL. 33310. W4NYF. Wanted-your excess parts.

HAL COMMUNICATIONS: ONE SOURCE FOR ALL your construction needs. Our line of resistors, capacitors, and semiconductors will fill your requirements for practically any project. TTL devices are stocked in volume to support production of our keyers, identifiers, and the fantastic RVD-1002 RTTY Visual Display System. Fast service at reasonable prices. HAL COMMUNICATIONS, Box 365RJ, Urbana, Ill. 61801 Phone 217-359-7373.

FOR SALE: M28 LBXD TD WITH CABINET, 60 wpm. like new. \$90.00 FOB Larry Kleber, K9LKA/W9CPD, Belvidere, Ill. 61008. For Sale; M28 ROTR typing reperf, 60-75-100 WMP. Excellent. No cover, sacrifice \$100. FOB Larry Kleber, K9LKA/W9CPD, Belvidere, Ill. 61008. Wanted; 902A cathode ray tube, Larry Kleber, K9LKA/W9CPD, Belvidere, Ill. 61008. Wanted M28 KSR floor cabinet dome #152767AB. Larry Kleber, K9LKA/W9CPD, Belvidere, Ill. 61008. Wanted; QST, CQ, 73, Ham Radio binders. Larry Kleber, K9LKA/W9CPD, Belvidere, Ill. 61008. Wanted Air Force manual for model 28ASR. Larry Kleber, K9LKA/W9CPD, Belvidere, Ill. 61008. For Sale; 4-1000 single band 20 M. linear. With tube. Easily converted to 15M. Illustrated in July 1970 CQ. \$100. FOB. Larry Kleber, 922 Whitney Blvd. K9LKA/W9CPD, Belvidere, Ill. 61008.

TT 337/UG TRANSMITTER-DISTRIBUTOR code LBXD-9, fixed hand multi contact, identified by a stationary tape sensing head and a single distributor, each capable of being actuated independent of the other by local or remote control. Always used in conjunction with a punching unit, because the pivot reader can move the tape reader and transmit the last character punched. Principal application of this climbing up-the-tape feature is in situations where punched information is to be transmitted in continuous tape form, without the need for tearing perforated messages from the punch head. Special customized controls are available. Consists of three Model 28 Trans-Dist. and a synchronous motor. \$125.00 each. Atlantic Surplus Sales, 580 3rd Ave. Brooklyn, N.Y. 11215.

SALE; MODEL 28 Typing Reperforator (RT) mounted on a tape handling stand which includes large tape take-up spool and supply reels as well, as an intermediate storage bin. Oa/dimensions 36" high, 20" long, 8-1/2" wide. Both LAXD transmitter distributor and LPR typing reperf come equipped with three speed gear shift. Allowing down as well as up speed conversion. Synchronous motor LMU-12. Excellent-\$150.00. ea. Atlantic Surplus Sales, 580 3rd Ave. Brooklyn, N.Y. 11215.

MODEL 28 KSR teletypes, reconditioned, \$285.00 FOB; Collins 75S-1 receiver, mint condition, \$295.00 FOB; Collins 618S-1 HF transceivers, make offer; HP-523D counter, HP-512A frequency converter, and solid state X10 scaler (1 Hz. to 100 MHz counting system), \$235.00 FOB; Hickok 512 VTVM, new, \$75.00 FOB. WANTED: Tektronics 310A or similar scope in mint condition. Ronald L. Ott, 2320C Parker Street, Berkeley, California 94704.

TELETYPES AND DATA COMMUNICATIONS Equipment Wanted. Cash available. We are mostly interested in purchasing Models 33, 35, 32, and a limited amount of 28. We are a full-time organization solely dedicated to the purpose of buying, and re-building/ reconditioning Teletypes. We also have available for sale, various types of Teletype accessories; modems and couplers, multiplexers, etc. Call or write: Vardon & Associates, 930 N. Beltline, Suite 140, Irving, TX. 75062. Phone (214) 252-7502.

WANTED; RACK MOUNT EQUIPMENT. General purpose scope, WWV receiver comparator tube or solid state, also wanted H.P. 526A video Amp. plug in, Manual for FR65/TSM-9 freq. meter (HP 524A), two meters from front panel of above freq. meter. J. Buckler, 29 Parkview Dr. Plains, PA. 18705.

RTTY JOURNAL

INTEGRATED CIRCUITS - TTL 7400 series. Liquid crystal displays, teletype equipment, test equipment, data processing equipment. Send SASE for list to: Data/Instrumentation Associates, 708 Cliffedge Rd. Baltimore, MD. 21208 -- If you are in town visit our warehouse located at 208 S. Pulaski St. between Wilkens Ave. and Frederick Ave. in Baltimore. We are open Saturdays 9 AM-4:30 PM or call (301) 566-8600.

SELLING OUT TO THE FOUR WALLS. WAREHOUSE FULL OF TELETYPE, FACSIMILE & ELECTRONIC EQUIPMENT, PARTS ETC. Model 14 KSR's \$20.00. Model 14 reperf's \$25.00. Model 14 T D's \$20.00. Model 100's \$25.00. Model 15's \$50.00. Model 19's \$65.00. 28 TDs, \$25.00, also misc 28 parts, covers etc. All items subject to prior sale. Power supplies \$10-15.00. Polar relays \$1.50. Covers \$10-15.00. Facsimile machines \$10-25.00. Loads of cabinets, tables, stands, rectifiers, meters, motors, relays, transformers, stepping switches, cable, telegraph equipment Nickel-Cadmium batteries \$5.00, chargers for same. Loads of parts too many to mention and loads of miscellaneous. I don't have a list and do not intend publishing same and hope to be sold out by August 1972. All sales CASH and CARRY. No doubt overlooked many items - so if you're in the area come look thru my JUNQUE pile and assure you there is something you can use. Miscellaneous transformers, radio transmitters etc. Phone number 312-476-8200. My usual hours are 9:00 A.M. thru 4:00 P.M. Monday thru Friday; but will be glad to come in on a Saturday or Sunday if you let me know you're coming and if I am available. C.B. Goodman & Co, 5826 South Western Avenue, Chicago, Illinois 60636. This ends ad.

HAVE HAL ST-5, HI-GAIN TH4, Want good RTTY receiver also complete model 28 set up. All letters answered. Will pick up. WA2FBL, Chenango Bridge, N.Y. 13745.

SALE: AQUADINE TELETYPE CONVERTER. 4 months old, used only few times, reverse, normal switch. Mark - space, 850-425-170 shift, Excellent new condition \$100.00 (\$140. n.f.w.). Model RTY-3. Write - Brad Lane, Matawan, N.J. 07747.

TTY - KLEINSCHMIDT TT-4A/TG lightweight (43 lb.) portable page printer (KSR) with both gear sets (60 & 100 WPM), 20 & 60 ml operation, control panel with Range, Bias, Loop current adjust, Loop meter. Standard dust cover, watertight cover, packing case, AC-DC motor, filtered motor and keyboard circuit, motor stop function, line break, CR manual override, copy lamp. Ideal as first, second machine, 100 station, mobile, portable, field, emergency. Typing unit and frame are of Model 150, TT-100 design. Mfg. by KLI and NCR. All units cleaned and checked for 100% Mech. and electrical function. We stock all parts. \$48.00, weight 80 lbs. in case. We will ship below cost, \$10 W. of Miss., \$20 E. of Miss. Cal. residents add 5% sales tax. Mark/Space Systems Co., 3563 Conquista Ave., Long Beach, Cal. 90808. 213-429-5821.

FOR SALE; AN/FGC-25 TELETYPE SET consisting of page printer and typing reperf. made by Kleinschmidt, complete with gears for three speeds, table and TM. \$150.00 pick up. \$175.00 delivered within 75 mile radius of Harrisburg, PA. Computer Measurements Co. eight digit nixie tube counter model 1376-C, excellent condition, \$95.00. Lou Carbaugh, WA30JF, PO Box 398, New Cumberland, PA 17070.

MODEL 14 TYPING REPERF with keyboard, complete. Model 14 Strip printer with keyboard, complete. Model 15KSR page printer, less cover. - TT63A Regenerative repeater, -2- BC 221 Signal generators. Your choice \$30.00 each. Send SASE for other items. Albert Newland, 206 S. Highwood Ave., Glen Rock, N.J. 07452.

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