#### 16 February 1973 RTTY JOURNAL **CARTG Results--**101. OK2OP 15,840 \*102. WA9UGE 15,291 Continued from Page 2 **I8AMP** 14,456 103.86. W7UX 66,860 \* 58. PA0SCH 238.534 K6TV 10,120 104. 237,576 226,236 87. K4JAF 61,068 W7LPM 59. 105. K1SGU 7,576 60. K4EYD 88. VE2LO/W6 60,740 \*106. VE4SC 6.834 \* 61. HB9AKA 216,175 VK4MJ 89. 58,976 \*107.4X4MR 6,300 \* 62. HA5FE 215,830 90. W7CBY 58.512 108. OZ80 5,586 63. W0HAH 179,895 WE5LG 91. 58,512 HA5FA 109. 4,326 G3LDI \* 92. 64. 190,075 VE6AWW 58,380 110. VE5SC 2,557 W7BCT 175,900 \* 93. VE2AXO 65. 51,325 111. OK1AMS 1,632 \* 94. W7HFH 168,346 66. 9Y4VU 46,408 HG9APL 990 112.OZ2CJ \* 67. 166,822 95. K2RYI 46,270 113. VE6ANE 795 SM0OY 68. 158,700 \* 96. K8KAG 45,350 W6CP 114. 424 69. I5CW 148,712 97. VE5DO 40,700 WB6SFP 120 115.W3EKT 143,350 70. 98. JA1EUL 34,430 \* 71. HI8XRM 139,140 \* 99. PA0WDW 26,860 \* 72. VO2AF 134,610 DL8CX 100.21,456 PY1DCB 129,445 73.\* 74. OK1MP 111,520 **SWL Printer** W6AEE 110,940 75. 1. Peter Boer NL687, Holland 901,148 105,328 VO1EE 76. 718,350 2. Paul T. Menadier, U.S.A. 104,230 \* 77. HK3SO 3. Walter G. Meier HE9HXW. 102,520 DL8RW 78. 526,008 Switzerland VE5TO \* 79. 98,640 4. Paul Kung HE9FUJ, 80. PY2CBS 96,340 464,222 Switzerland 81. WAOTLT 90,660 340,200 5. Lee Reynolds, England K2CY 86,650 82. 6. G. Kiss HA5-185, Hungary 1,020 G3RQY 84,280 83. 7. Alberto Marchesini, Italy 473 EA7PZ \* 84. 83,640

\* 85. HX1DL 79.564
For complete summary and statistics send 2 IRC toCARTG 85 Fifeshire Rd. Willowdale, Ontario, Canada.M2L-2G9

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

# IRST CLASS MAIL



# RTTY

February 1973

#### **JOURNAL**

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VOLUME 21 No 2

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'Norm' W1GKJ

#### 'Emile' 9G1WW



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## RESULTS - CARTG "Maple Leaf Sweepstakes." 1972

Single Operator

No. Station

ZS3B

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\* 50.

\* 39.

\* 41.

\* 44.

31.

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22.

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25.

LU2ESB

YV5AS

KZ5LF

KZ5BH

KH6AG

I5MPK

I1BAY

JA1BK

K4AGC

I6CGE

ON4BX

W4YG

G30ZF

I5CLC

K2PAR

K5ARH

VP9GE

KL7GRF

W2LFL

VE7UBC

W4ODR

VP7NH

K6WZ

CE3EX

W3KV

**I1EVK** 

VK2EG

IS1AOV

XE1YJ

FO8BO

W5EUN

DL1VR

W6CEO

W1KJL

VK3DM

K7BVT

K4VDM

WA6WGL

PY2CYK

K7MNZ/7

DJ5PN

W6JOX

W5CEG

DJ9MJ

YA10S

ON4CZ

ON5WG

WOMT

SM6AEN

ZL2ALW

W7IU

DK7AQ

ZS6BBK

SM4CMG

WA2YVK

Score

4,454,284

2,682,618

2,300,580

1,871,580

1,805,720

1,718,956

1,717,460

1,600,248

1,599,628

1,554,904

1,509,100

1.404.232

1,369,906

1,365,028

1,342,490

1,335,896

1,306,912

1,113,952

955,688

940,540

930,876

861,420

858,448

839,600

831,532

724,800

679,246

671,238

661,830

648,920

612,154

586,080

585,584

580,400

524,252

507,682

498,328

470,680

447,936

432,178

430.424

416,830

405,060

345,612

338,950

332,912

313,390

308,800

281,574

273,765

279,104

258,594

257,838

254,748

254,360

928,792

With propagation generally good the CARTG contest once again was exceptional. There were more stations, more countries, more logs and higher scores than ever before. Without a doubt this is the oustanding DX contest. Lack of time and space keeps us from a detailed report but we are happy to publish the results in full. Our thanks to Gwen and her CARTG group that does such a good job.

#### Canadian Amateur Radio Teletype Group "Maple Leaf Sweepstates" Awards Oct. 14 - 16th, 1972

1. ZS3B, S.W. Africa, 4,454,284 Plaque, "C.A.R.T.G."

2. LU2ESB, Argentina, 2,682,618 Plaque, "RTTY JOURNAL"

3. YV5AS, Venezuela, 2,300,580 Plaque, "C.A.R.T.G."

4. KZ5LF, Canal Zone, 1,871,580 Plaque, "RTTY JOURNAL"

5. KZ5BH, Canal Zone, 1,805,720 Plaque, "C.A.R.T.G."

6. KH6AG, Hawaii, 1,718,956 Plaque, "C.A.R.T.G."

7. I5MPK, Italy, 1,717,460 Plaque, "RTTY JOURNAL"

8. I1BAY, Italy, 1,600,248 Plaque "C.A.R.T.G."

9. SM4CMG, Sweden, 1,599,628 Plaque, "RTTY JOURNAL"

10. WA2YVK, U.S.A., 1,544,904 Plaque, "C.A.R.T.G."

11. WA2YVK, U.S.A., 1,554,904, Gold Medallion & Ribbon, "RTTY JOURNAL" High Score, U.S.A.

12. VE7UBC, Canada, 861,420, Gold Medallion & Ribbon, Canadian Director's ARRL Award, High Score - Canada.

 I5CLC, Italy, 1,306,912, Plaque -"RTTY JOURNAL" - Low Power under 100 w.

 VP9GE, Bermuda, 940,540, Plaque, Sidney Burnett Memorial, "Green RTTYer" - never been in RTTY Contest before.

15. Peter Boer, Holland, 901,138 Plaque, "C.A.R.T.G." SWL Printer.

 ZS3B, S.W. Africa, 152,576 Plaque, "C.A.R.T.G.", High Score 10 Meters

17. HA5KBF, Hungary, 170,192 Plaque - "RTTY JOURNAL", Multi-Operated Station.

18. Certificates to be issued to the top scores in each U.S.A. and Canadian District, and each Country\*\*\*\*\*\*\*\*

57. W5TZB 240,282 Continued on Page 16 RTTY JOURNAL

#### RTTY's NEW LOOK and SOUND

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

When first viewing Hal Communication's electronic TV readout and electronic keyboard at the 1971 Dayton Hamvention, the decision was made that things were going to change at W9WKC. Accordingly, an order was placed with HAL Communications (then HAL Devices) shortly after the Hamvention and a little over a year later the RVD-1002 (character generator), the RKB-1 (keyboard) and the Panasonic VTR Monitor (9 inch TV set) were installed in the shack. From long experience as a dedicated gadgeteer, I find that a year is about normal time to go from an engineering sample to production.

I do like the HAL equipment fine, but it does require an operator re-adjustment or operator re-orientation from the former use of mechanical teleprinter

equipment.

The memory retention of the RVD is twenty lines of fifty characters per line. The Characters are permanently displayed until new characters are written or until the power is turned off. A Cursor indicates where the next character will be written. When the line being written is full, the display shifts up one line and the cursor returns to the left end of the bottom line, and new characters will appear on that line. If there are twenty lines being displayed, the top line disappears as the twenty first line appears.

Practically all mechanical machines use a line in the neighborhood of 72 characters. This means that on the received display there is one line of 50 characters and one of 22. It is no problem in receiving since the RVD inserts a CR and LF very precisely at the end of the 50 character TV line. There is no "lousing up" the last letter in the line such as we get from auto CR and LF on a model 19 or 28 printer. On receiving, the only disadvantage I see, is that the memory display is not fully utilized by having one line of 50 and one of 22 characters; that leaves 28 characters of blank space on every other line. Otherwise, the TV screen is fully compatible with the page printer.

The nine inch screen seems quite adequate for normal viewing. I put a piece of tape at the bottom of the TV monitor at the end of 22 characters which helps

me to know when to send CR and LF for the other fellow's page printer. When I contact someone who has auto CR and LF I usually ask him to just type continuously to make maximum use of my memory display.

I am informed by Hal that to make the RVD generate a full line of 72 characters would up the price considerably and greatly reduce the market amongst the

ham fraternity.

The only installation problem encountered was the derivation of the required interface voltage for the RVD-1002 of minus 5 to 15 volts mark and plus 5 to 15 volts space from the 180 volt loop of my Electrocom FSC-250. Sounds simple, but actually did need a lot of experimentation. During the course of which, I burned out an input resistor on the RVD. HAL solved the problem for me by building a loop interface network into the RVD. The loop interface is now a standard option on the RVD allowing a connection to be made to the normal teletype loop.

The RVD ignores any incoming CR's but supplies one when it receives a LF. A number of RTTYers have their machines adapted in this way when installing auto-CR, LF, non-over print, etc. I had my own Model 28 rigged to ignore the first incoming CR but not the second.

The RVD-1002 has four speeds available at the press of a button, 60, 66, 75 and 100 WPM; plus "Unshift on Space", a "Letters" button and a "Line Feed" button. The "Letters" and "Line Feed" controls are momentary buttons but the "Unshift on Space" can be left permanently engaged.

I use the HAL VTR Monitor for the display since I did not have a spare TV

February 1973

set to modify for reception from the RVD-1002. Modification of a TV set is quite simple and full instructions for so doing are given in the RVD manual. The HAL Monitor can also be used as a normal TV set at the flip of a switch. This is a feature I find quite handy, especially when the neophyte RTTYer with his brand new tape gear announces that he is going to send me a picture; without checking to see if I even want the picture, or could I receive it if I did. I know I am then good for at least a half hour of something more entertaining on the commercial TV channels.

This is going to be a very bleak Christmas without being able to play my "Jingle Bells" tape since there are no bells in the TV Monitor. The RVD does, however, print a cute little picture of a bell whenever the "bell" signal is received.

The RKB-1 Electronic Keyboard requires considerable operator re-orientation from the normal familiarity with a mechanical keyboard. At least it does for me; I have about 12 years experience with a Model 28. The RKB-1 is a standard four row typewriter keyboard which closely resembles the IBM Selectric. The most noticeable difference when first using the RKB-1 is its absolute silence. Many people have trouble typing on a silent keyboard as I do; I am not sure whether I really hit a key or not. That problem I solved fairly easily by just turning up the loudspeaker enough to monitor my typing, so that I don't hit the next key until I hear the last one.

The RKB-1 is most unforgiving to the "burst" typist and I am afraid I have to place myself in that category. A "burst" typist is one who hits certain combinations of letters much faster than others. The mechanical keyboard will restrain you from typing any faster than the fixed 60 WPM. The RKB-1 has no built in restraints; whenever the 60 WPM is exceeded, it just doesn't print those letters at the faster rate. For instance, if I send the word "good" my finger is already on the letter "o" for the second transmission of it and therefore I hit the second "o" more rapidly than I would either the "g" or the "d" and hence the word comes out "god". That is, the second "o" just isn't transmitted.

Since we have four rows of keys with the numerals on the top row, there is no operator induced "upper" and "lower" case. The keyboard supplies the upper case signal just prior to transmitting a numerals key signal and similarly supplies the "lower case" signal just prior 4 February 1973 to sending a "letters" key signal after having been in upper case. With successive keys after being in either upper or lower case, the extra signal is ignored. I also find this additional signal somewhat upsetting to my cadence because of having to wait for the extra signal. But, here again, it is just something we have to get used to. I can well remember when starting out in RTTY that it was quite a problem to get used to punching three keys to just get one numeral in a call sign. So, in this case, we substitute time for the actual depressing of the key.

One other point about the keyboard; it lacks a "break" key which I always found quite nice to have to check the space signal or to tap out the CW Ident. There are several extra keys on the board and it shouldn't pose any serious problem to any enterprising ham to put one in. It just breaks the loop circuit.

When transmitting at 100 WPM I find that most of my problems with the keyboard disappear. Then the small fractions of time necessary for the upper and lower case signals become minute and the problems of "burst" typing are gone. since in no way can I approach 100 WPM in typing. There are a few of the lads on now with 100 WPM capability and when I find one, using the RKB-1 is just pure pleasure and I have not known the mechanical keyboard to equal it. I am sure that most will agree that typing is much faster on a keyboard perforator with its 120 WPM capability than it is on a machine limited to 60 WPM. One gets just about the same "feel" to the RKB-1 at 100 WPM as with a keyboard perforator. That is, the only limit to your typing is your own ability and the machine is not holding you back.

As to the problems or equipment failures I have had in the four months of operation, I would say they have been remarkably few for gear of a wholly new design. My biggest problem was in getting the interface voltages from the TU. The only actual equipment failure was an intermittent loss of memory display which was tracked down to dirty contacts on one of the plug in circuit boards of the RVD-1002. With that exception, I would have to say the electronic gear is just as reliable as any mechanical gear which I have used and it certainly won't require the maintenance of a mechanical machine . . . And it is a pleasure not to have to worry about supplies of paper and ribbons.

The RKB-1 puts out an annoying signal at 3620Kh and slowly drifts up to RTTY JOURNAL

3633Kh, which is right in the RTTY part of the band. An easy solution to this problem was to use shielded wire for the loop.

One other question I am frequently

asked is: "Is it compatible with mechanical equipment in the same loop?" Yes, of course it is. Any mechanical gear such as another printer or TD can go right in the loop with it.

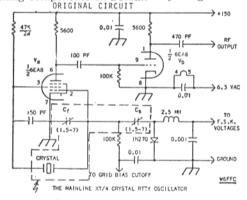
#### XT-4 Modified for Multi Channel Use.

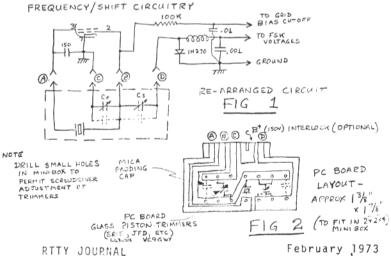
WERNER FEHLAUER, KL7HKB 392 Kenair Ave. APO SEATTLE,98749

Having built an XT-4 per Irv Hoffs article in the RTTY Journal and being well pleased with its performance, I was nevertheless faced with the problem of coming up with some additional frequencies. The idea of duplicating the XT-4s did not seem practical. With a little rearranging of components it was possible to place all the frequency and shift determining components on a small

PC board. The XT-4 was modified by adding a small 6 pinPC board edge connector on standoffs, as close as possible to pins 2 and 3 of the tube socket.

A schematic of the modified XT-4 and an example of the PC board is shown in figure 1 and 2. With this modification I am now able to change frequencies by just exchanging the small PC board. Frequency and shift stability have proven to be excellent, with little or no noticeable drift. The additional PC boards should be kept at a reasonable close temperature as the entire XT-4 package.





#### S.O.R.C.A.R.S. self operating RTTY contest amateur station.-

#### Part 3 of 3 Parts

JOE KASSER,G3ZCZ/W3 1/01 East-West Hwy, Apt.205 SILVER SPRINGS, MD. 20910

#### OPERATION WITH RESPECT TO CONTROL MODULE

Assume that all modules are operational ready for a typical contest. As C Hour (Contest Start Hour) approaches, the operator goes into the shack and briefly scans the bands to check on conditions. He sets the Bandswitching Module to switch the transceiver to the appropriate band for the various times of day that the contest operation will cover

The contest begins at C Hour. Suddenly the bands are full of rtty signals. The operator pushes the 'start' button and relaxes. (Of course the start signal could have been supplied by a timeswitch, but we don't want to replace the operator entirely). When the "start" button is depressed, a pulse is transmitted to the tuning module causing the vfo to begin tuning the band while the elapsed time counter begins to count.

A rtty signal is detected by the terminal unit! The tuning is stopped and a pulse sent to the call recognition module causing it to begin to look for a CQ call. No CQ is copied in a ten second period. The data module sends a "data invert" pulse to the tu in case the signal is being transmitted using inverted tones (this pulse is also sent to the afsk module so as to keep the transmitted signals in phase with the received ones). No CQ is copied during the next ten minute period. A pulse is then sent to the tuning module to continue tuning the band. After investigating three such signals a CQ is found. The CQ is copied by the call recognition module and a pulse is sent to activate the memory module. The call sign of the station sending the cq is compared with the calls stored in the memory (as this is the first, the memory is clear). Since the memory identifies the station as one that has not been worked, an "attempt qso" pulse is sent back to the control module. When the sending station signs the control module sends pulses to the afsk module, the transceiver, the memory module and the standard information generator module, and a call is sent. Typically it would be "FOWM FOWN FOWN DE G3ZCZ/W8 February 1973

G3ZCZ/W8 G3ZCZ/W8 K''. A pulse is sent to the **CW ID module** and a cw id generated. SORCARS then reverts to a listening mode. A pulse is sent to the **call recognition** module instructing it to look for its own call coming back at it (G3ZCZ/W8). Nothing is heard for ten seconds so the **control module** repeats the sequence.

An answer is received; typically "G3ZCZ/W8 G3ZCZ/W8 G3ZCZ/W8 DE FOWN FOWN 59002 PARIS G3ZCZ/W8 DE FOWN K" The recognition of G3ZCZ/ W8 resets the memory module to look for a "DE space" sequence, compare the incoming call with the one stored in the memory; namely the one that SOR-CARS is attempting to establish contact with. If they are the same the incoming signals are printed out on the printer. The qso counter module, the report giver module and the standard information generator module are pulsed in turn by the control module to generate the following message; the transceiver being held on for the duration of the message, "FOWN FOWN FOWN DEG3ZCZ/ W8 G3ZCZ/W8, QSL, UR 590001, JOE, DETROIT, MICH, 73. FOWN DE G3ZCZ/ W8 SK." The message is repeated once and the qso counter module is then pulsed once to advance its count to 002 ..... and so on. The control module routes control pulses and data between the other modules according to the flow chart of Figure 2 using standard digital techniques. The bandswitching module sends the control module a pulse when it determines that it is time for a bandchange. The controle module stores that pulse and only implements a bandchange when no qso is in operation, preferably after a short listening period to determine that no other station is calling in.

Each time an on the air transmission is made, the control module ensures that the time and frequency data generated by the clock and frequency counter module are printed out on the page printer (but are not transmitted).

#### **SUMMARY**

SORCARS can now be seen to be a mixture of simple and complex modules, some of which are already in use in the average RTTY station, connected together so as to give an automatic opera-

Continued on Page 9 RTTY JOURNAL

#### Paper-Out Switch for the

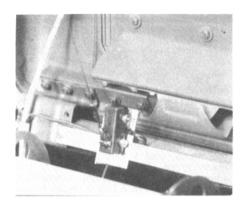
ROBERT CLARK, K9HVW/WA4VYL 823 Jones Ave. MARYVILLE, TN.37801

After printing for an hour or more on the platen, one begins to think about the possibility of a switch to disable the printer when it runs out of paper. When it happens the fourth time, ideas become action! I monitor the 14075 khz autostart frequency on a twenty four hour-aday basis. One of the nice things about autostart is that it requires only occasional attention. On many an occasion, I have completely ignored the printer for a period of days when other matters were more pressing than ham radio.

The Teletype Corp. has a nice little modification kit for the job at something in excess of \$12. Examining the kit, it seemed a bit high-priced considering what was supplied with it. It was therefore concluded that a homebrew switch would have to be the answer. The switch described here is quite a bit simpler than the Teletype version and I believe has two advantages over the more expensive version (three, if you include price).

The switch is not mounted on the printer proper, but on the cabinet of the KSR. A piece of Reynolds "Do It Yourself" aluminum bar (3/4" x 1/8") twelve and a-half inches long was drilled to accept the screws from the lower inside corner of the two cover hinges (figures one and three). A piece of Reynolds aluminum angle (1" x 1" x 1/16") two and a-half inches long was "Pop"riveted to the bar three and a-half inches from the left end. A SPDT micro-switch was attached to the angle with number six

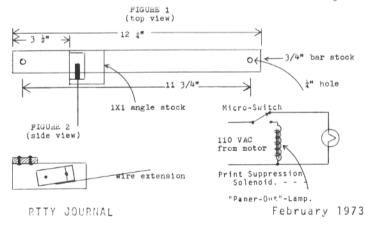
Model 28KSR Printer



hardware (figures two and three). One of the two holes in the angle was enlarged into a slot with a small file so that the position of the switch could be adjusted. The leaf on the micro-switch was not long enough to rest on the paper, so a stiff wire was passed through a hole in the end of the leaf and soldered in place. The source of the wire was an old magazine binder, but a suitable replacement should not be difficult to find. The leaf and wire extension extend six inches from the swivel point on the switch.

The switch may be used to disable the printer in several ways. The method chosen here was to place the switch in series with the print suppression solenoid. A lamp was also used to indicate that the machine was in non-print due to a low paper supply (figure

Continued on Page 11



## VHF RTTY NEWS

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

This month we have several miscellaneous items donated by readers.

From Smitty, K4RJ, Route 7 - Box 315, Franklin, NC: "My connection with RTTY started while up in the Washington area, when I "inherited" a Model 15 from a friend who moved. Curiosity was too much, and I had to find out what made it go. This required the help of several more knowledgeable hams, hence an introduction to RTTY J. When I found back issues were hard to come by, I subscribed.

"In due course I got it on the air, and made a few contacts both DX and stateside, also a few on MARS freqs. Also I made 1 QSO running straight

FSK on 144 MHz.

"Shortly later I really got going on 2304 MHz, heard my own echoes, and then worked W4HHK, all on CW of course. By this time I had the idea it would be fun to print my own RTTY echoes from the moon. But at that time I had already contracted to sell my house in MD and buy this one in NC. So there wasn't much

I could do about it.

"Moving was a real problem (28' dish and a few other little things!). I discarded a home-brew TU, but kept a mil surplus one which I thought was better. Here in NC I got the moon-bounce gear running on CW first. Then when I tried out the surplus TU I found it was great for 850 shift, but not much good for anything else. For RTTY via the moon I think I need 170 shift or less. So the MARS got it back, leaving me with no TU at all.

"So far as I know, no ham RTTY sigs have ever been copied by moon reflection. And so it was a bit of a disappointment when my ad in a recent RTTY Jour-

nal produced no results . . .

along this line. What I need right now is a good parametric amplifier diode to raise the S/N of my echoes a bit. After that I may start figuring how to build the cheapest TU which is good for copying through random noise. (On UHF we have no QRM, no QRN, no line noise, no ignition noise, at least not when pointing at 8 February 1973



the moon.)

"New UHF CW record. 2304 MHz CW via moon reflection. 22 NOV 72. 0619 - 0646 GMT. W6YFK CA to K4RJ NC. Terrestrial distance 2080 miles equals 3347 km. This breaks the record of 750 miles set in OCT 70 by W4HHK and W3GKP."

Thanks much, Smitty. If anyone can help him with ideas, equipment, or sitting at the other end, please let him know.

Eskil Hedetun, SM7DMG/7, Delphi S-317, S-22244 Lund, Sweden, sent letters containing some information and many questions, "Have this summer been introduced to a new RTTY system. It is called the ARQ-system. Unfortunately, I am not able to give any details but: It uses the normal teleprinter code CCITT no. 2 at 50 Bd. It converts and adds parity information to this. It sends the "new" code at 75 Bd. It receives and reconverts to 50 Bd CCITT no. 2 and checks for parity. If parity is OK it prints; if not OK, it requests for retransmission of the single character. This means that you have to use two different radio channels, one for the actual information, one for retransmission request. I have had the privilege of seeing this system in operation. I am quite amazed.

"For amateur radio it could be very interesting to make a converter that takes care of the parity signal; i.e., gives a blank instead of one garbled

character.

"Been to a newspaper recently, and saw their teleprinters for "press releases." It was the German Siemens T-100 RO with triple types on the type bars. That is, it could print both small and CAPITAL letters, and all the normal figures as well. Guess this is the same idea as mentioned in an early issue of the Journal, describing a Russian teleprinter. This was a wire only service. Do you know if this triple letter alphabet is transmitted on the air? By the way, it was 8-level tape out of the printer.

"As long as there will be a commercial interest in 8-level machines to be RTTY JOURNAL used as remote stations for computer systems, I guess the hams can't get the machines at a reasonable price."

We have one piece of information that is related to Eskil's letter and computers: The Amateur Computer Society publishes a news letter. For a free sample copy write to: Amateur Computer Society, Steven B. Gray, 260 Norton Ave., Darien, CT 06820.

Mel Dunbrack, W1BHD, 30 Greenleaf Street, Malden, MA 02148 sent the following information:

At my request, the local frequency committee of the North East Repeater Association, on 1972 NOV 17, has assigned a FM simplex channel frequency of 146.580 MHz (which is sandwiched between repeater input and outputs) for the primary use of RTTY, Slow scan TV and Facsimile modes of operation. W1BHD has these three modes and activity should be on the increase as many fellows are interested. RTTY will use standard tones 2125/2975 and the FM deviation will be between 5 and 7 kHz which is roughly standard for this part of the country. When organized, station schedules will be forwarded ... "Thanks, Mel.

Since we have been in the RTTY business, 146.700 MHz has been the national FM RTTY frequency. There are a few areas where activity was on some other frequency because of prior use, but in most locations it was 146.700 MHz. In the mad rush to get voice FM repeaters on the air, 146.700 has fallen as a RTTY frequency. For example, in this area there are now two voice repeaters with outputs on 146.700 MHz. Especially with one, when it is on, it precludes the use of the frequency for RTTY operation. Because the frequency is not effectively monitored by the voice users, it is common to have the repeater come on regardless of whether the frequency is already in use. As Mel indicated, the repeaters are forcing simplex operation into the space between the repeater inputs and outputs. If you have ever tried to operate simplex on a channel that has a repeater on it, you know how difficult the operation can be. Generally, the simplex operator is forced to move elsewhere.

That's it for this month. Next month, we plan to repeat the beginner's series that was run here about 4 years ago. 73 ES CUL RG.

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#### S.O.R.C.A.R.S.-

Continued from Page 6 tional facility for the contest type of gso only.

This has not been a constructional article. This has been an idea article, discussing the techniques involved in the SORCARS. For any amateur with a knowledge of both digital and teletype techniques, the construction of SORCARS would be a worthwhile undertaking.

#### ACKNOWLEDGEMENT

I would like to thank G3MYT (/W8) for his valuable help, comments and suggestions in the development of this manuscript.

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 Radio Teletype Using SSB Transceivers. D.H. Phillips W6FOO - Ham Radio - November 1970.

3. AFSK for RTTY. Irvin M. Hoff W6FFC - QST - February 1969.

4. A Clean AFSK Unit. John Lovallo WB4FMP - 73 - February 1971.

5. The Rec/Counter - K. MacLeish W7TX, H.O. Pattison W7EFV, R.C. Heghall K7QWR - QST - May 1971.

6. SIAME - Solid State Automatic Morse Encoder. Joe Kasser G8BTB-Radio Communication - September 1969.

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14. Digital Counter With Teletype Printout. R.G. Simmons W2RBN - QST - August 1968.

15. Automatic Amplifier Tuning. F. Walsmith - W8PHR - QST - September 1970.

#### **Dayton Hamvention**

RTTY JOURNAL HOSPITALITY SUITE-IMPERIAL NORTH MOTEL

APRIL 27- 28, 1973

February 1973

# RTTY-DX

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



Hello there . . .

The last flurry of DX activity for RTTY in the old year was of course the Volta Contest which took place in early December. While there was no advance notice of any exotic DX prefix that planned operation during the contest period, there were a few surprises in store for those that participated. About midway through the contest period there was a big signal coming out of Africa and it was spelling out 9G1WW. Emile had just received the proper gearing for his machine and as all the other equipment had been ready for weeks it was just a matter of changing gears and he was "off to the races". The very first contact was with Paco, XE1WU, on Fifteen Meters and after that it was Pandemonium. Emile handled the situation in grand style and many of the boys made contact with the very first station to operate RTTY from Ghana. To make things even more interesting, Cara, 9G1YA, played a few tunes on the keyboard to add to the ever increasing list of countries represented on RTTY by a YL operator. It is unfortunate however that the operation from Ghana will be of short duration. Emile and Cara are returning to the States in February and although they are trying to get other hams interested in the mode there does not seem to be a replacement available at this writing. Meanwhile, Emile and Cara are trying to make as many contacts as possible before the QRT and they may very well succeed in contacting all or most of RTTY DX gang by that time. Operating time had usually been from about 2000z until the band folds on 14 mhz and most any time on week ends. Emile indicates that they will be located in the Oakland, California area on their return and will have a continued interest in RTTY. Their QSL manager

Clifton J. Arnold, W5EGH 4868 Sierra Madre Drive New Orleans, La. 70127

The contest was the last activity for Jean from FM7AJ as he went QRT and left for France in mid December. We of February 1973

course all thank Jean for putting this rare country on RTTY and many of us had the pleasure to meet him personally on his recent trip to the States. He acquired some TÛ equipment when he visited HAL and has a machine stored in France so as soon as he gets settled look for F6BEX on RTTY. We should be printing FM7AA very soon now as he is planning to keep Martinique active on RTTY.

In the contest, activity was fairly good from all Continents with the possible exception of Asia. We never did print an Asian station here although a few of the West Coast USA boys managed a fast contact with Ian, VS6GA, during a short opening. WA6AXE/KG6 was in there for a surprise multiplier from Oceania. Joe had just finished work and decided to try a CQ before hitting the sack, not realizing what he was getting into. We imagine that his sleep was delayed for several hours. Sigge, OHONI, was very active on several bands from rare Aland Island giving a new country to many that had not worked him before.

There seemed to be a bit of confusion as to whether or not a message number was to be included in the message exchange of "RST-ZONE". Some insisted on having one and some didn't and the net result was a lot of QRM and lost time particularly during the early stages of the Contest. Next year we believe that the rules will be clearer on the message exchange.

The boys were no sooner recovering from the excitement of the Volta Contest when up pops VP2KH on the evening of December 8th with an excellent narrow shift signal from the Island of St. Kitts and the very first RTTY to come from any of the many VP2 prefixes of the Caribbean area. If this were not amazing enough in itself, the owner and operator of VP2KH turns out to be Sid May, that famous second op with Ed at 9J2ED last year. After the Zambia operation went QRT, and after a sojourn in England, Sid and his family are now located on St. Kitts and will be there for quite some time. Sid is very active and most of his old friends have already been in QSO in addition to scores of new ones. QSL direct with IRC's to -

> Sid May, VP2KH P.O. Box 184

Basseterre, St. Kitts West Indies We all wish Sid the Best of Luck in his new assignment and his presence may generate activity from many of the other Leeward and Windward Islands in the area. We do hope so.

Well, that just about closes out RTTY activity for the past year and as we sit here trying to write this column the New Year is only a day or so into 1973. I guess we would all like to know what lies ahead, particularly as to things RTTY-DX. We hope that what follows will

pave the way for things to come.

A letter from Jan, ZS6BBK, has us all excited as things look great for the early part of the year. For some time he had been gradually planning a DXpedition to some of those rare prefixes near and around South Africa. During March/April Jan plans to put the following countries on RTTY, A2C, Botswana; 7P8, Lesotho: 3D6, Swaziland: and also ZE, Rhodesia, if there has been no activity from there at the time the trip starts. Operation will be on 15 and 20 Meters only and a Mite machine with a ST-6 and a linear for the TX will be used. Modus Operandi will be as follows. Transmit frequency will 085 khz on each band and listening will be from 5 to 15 khz up the band. This is an excellent plan and should ease up the intolerable chaos that results when several RTTY stations all blast off on the same frequency, narrow shift not-with-standing. Plans are still being finalized at this writing and we will attempt to have more definite information before the trip starts. If it becomes too late for publication look for QST tapes on about 14080 khz for the latest info on the DXpedition. In closing his letter Jan says that ZS2MI. Marion Island, is now on 45 baud, RX and TX, so it should be no problem to make a contact. Look for him on weekends.

Via Lars, SMOOY, we have word that Brother Ed. at HV3SJ, is anxious to get a TU so that they can put the station on RTTY on a more permanent basis. When Carl, HB9P, and his group from Switzerland completed their operation from there for the CARTG Contest they left a machine, a LO 15, but there was no TU available at the time. If anyone happens to have an excess or surplus TU on hand I am sure that it will be put to good use at HV3SJ. Also, a few words of appreciation for past activity in a short note may help to keep the station on the

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air. Apparently higher authority is not too happy to have RTTY activity continue but a verbal show of support and appreciation may tend to soften this attitude. Brother Ed. can be reached at -

HV3SJ, Curia Generalizia Gesuiti P.O. Box 9048

00100 Roma, Italy

The last W A C Award for 1972 goes

Nr. 205 Edward L. Bruns W3EKT this makes a total of 24 issued during the year.

We close now with appreciation to, W3DJZ, ON4BX, K6WZ, ZS6BBK, SMOOY, W9BT, 9G1WW

73 de John

#### Paper Switch- --

Continued from Page 7

To adjust the switch position it will be necessary to have a nearly empty roll of paper. When the cover is closed, the wire extension should "ride" the roll of paper. The flex in the wire should allow you to use even the jumbo size rolls. The switch should be held closed by the paper roll until it has just a few turns of paper left. Then the switch will open and disable the printer. With the nearly empty roll of paper loaded, run the paper out of the machine until you get to the point where you would like to have the switch disable the printer. Adjust the switch to open at this point. Then reroll the paper and repeat. It may take several adjustments before you get it just right. One of the nice things about this switch is that when you open the cover (large cover) to change paper, the switch is raised out of the way and then placed back in operating position when the cover is closed. Another feature is that the printing mechanism is disabled any time the cover is opened. I find that quite nice when I decide to add ink to the reinker reservoir or lubricate the machine.

If you don't like the surprise of running out of paper while working that rate DX, you may wish to mount a second switch the same way to turn on the warning light a few turns before the machine is disabled. Or, since there will be three or four feet of paper remaining on the roll, you may be satisfied with a manual over-ride switch.

The switch has been in operation for several months, with an average of three rolls of paper per month. The operation has been reliable at the end of each roll and has eliminated the job of cleaning ink off the platen each time I run out of paper.

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We monitored the emergency channels handling traffic during the Nicaragua earthquake.

Frankly it is hard to sav if we were proud of the hams or disgusted with them. I guess some of both as they got the job done in spite of a great many eager beaver-nincompoops that insisted on breaking- tuning up on the frequency and insisting on getting their call acknowledged, probably so they could tell the neighbors that - "they were in it". A little listening on the frequency

A little listening on the frequency would have answered all their questions-given other spots for certain traffic and allowed the parties running the net to accomplish a lot more. The control stations and the few stations on from Nicaragua had far more patience with these "me too" stations than we would.

It was not unusual for some station to continue breaking regardless of what was going on until he was recognized - then calmly telling the guy his name was Murgantroth - and spelling it phonetically before saying he was from Podunk. Nevada. was standing by on the frequency in case there was traffic to Podunk.

Fortunately the public heard none of this and Ham Radio again served the emergency well. The publicity in all papers certainly helped ham radio. Guess it was like Johnny Carson once said we won the war, - not on finesse but by pure power.

A good RTTY station in Nicaragua could have handled more traffic in an hour then the QRMed phone bands. Too bad YNICW was not active on RTTY. There may have been some commercial RTTY operation but we don't know of it.

We have seldom delivered any sermons from the JOURNAL but maybe the emergency QRM situation has us worked up.

Not BY LAW but by custom RTTY stations have worked in certain small segments of each band. Any CW station in this segment seems to be fair game for RTTY stations to drive out even though there is room on either side for a QSO. By law this is deliberate QRM 12 February 1973

and illegal, but what do you do when there is no room for a gso unless you go into the other portions of the band. The only answer we can see is trying to educate everybody, especially CW stations that there will be no RTTY QRM if they go down the band. We doubt if even a bureau in Washington could accomplish this so the only answer seems to be using common courtesy. There is far too much of the attitude that "if I can't work him you ain't going to." Tempers flare and nothing is accomplished. Let's us stick to our portion of the bands and try to keep our cool.

We noted a recent ad for a new Kenwood TS900 transceiver that included in the specifications - built in RTTY FSK - but with a fixed shift of 850 Hz.

Curious as to the selection of a fixed frequency and especially 850 Hz when a great majority of stations are using 170 Hz we wrote the supplier for information.

Their answer stated that probably in the future 170 shift would be used but the shift can be changed by adjusting two crystal trimmers. The directions supplied suggest the use of a counter for this adjustment. A great many hams do not have counters available but with another stations help we have no doubt ham ingenuity will get the job done anyway.

There was still no suggestion as to how a choice of shift frequencies could be made in a hurry. Again someone will figure out a method. When they do let us know so we can pass it along. FSK is a much safer method for RTTY. Anyone listening to the double signals from AFSK about 3 -4 KHz down from the fundamental, and many times very strong, will agree.

#### Michigan area RTTY net-

The Civil Defense RACES groups in Muskegon - Ottawa - Kent counties are in the process of trying to stimulate interest in local county to county VHF-FM RTTY nets up here. Frequencies to be used will be those as assigned by the state RACES officer, plus 146.7 mhz.

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We hope to expand this as required hopefully to state wide on 80 meter RTTY. Those interested who may read this in the journal, please contact WA8-GVK

Also, we in these counties will be looking for RTTY activity on 80 meters for the SET (ARRL Simulated Emergency Test) on the weekend of January 27-28.

#### **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.

1966- Oct.-Nov.-Dec.- [3]
1967- None.
1968- March-[1]
1969- Oct.-Nov.-Dec.- [3]
1970- None.
1971- Jan.- May.-June.-July.Sept.-Oct.-Nov.-Dec.-[8]
1972- Jan.- Feb.-Apr.-May.-July.
Sept.-Oct.- Nov.-Dec.-[9]
1973- Jan.-[1].
[MAY-June] - JULY-August] are combined issues....

#### RTTY JOURNAL Box 837

Royal Oak, Mich. 48068

Editor & Publisher 'Dusty' Dunn, W8CQ

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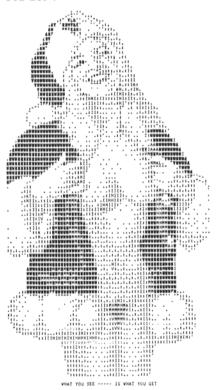
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RTTY JUURNAL

#### What You See -- Is What You Get . . .

In case you didn't see anything you wanted in the pix by Don Royer, WA6PIR, entitled "What you see - you get" that we ran last month. Look again now.

It is all our fault, the pix should require overlining and we ran it on our machine which has anti- overline protection. The good fairies that take care of such things have agreed my stupidity should not penalize everybody so you can all make another wish. "What you see-You Get".



#### AK-AL-AZ- ?

Having noticed the odd looking state abbreviations in brand X and Z amateur radio magazines, I checked with the Post Office. The man said, "That is right but you don't have to use them yet". He said that he had a notice around somewhere but couldn't find it. Lots of us dragged our feet with other changes, remember the condenser, "Nertz to Hertz", the ZIP code? As communications people, I suggest that we help this time.

WB2CZL

February 1973 1

#### CLASSIFIED ADS- 30 words' \$1. Additional words- 3¢ ea.

Cash with copy, Deadline 1st of month.

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

DIGITAL COMPUTER EQUIPMENT CATALOG: IC's, Computer Units, photo resist, etc., 50c (refundable), Postpaid U.S., MNH - Applied Electronics, P.O. Box 1208, Landover, Maryland 20785.

11/16" PERFORATOR TAPE, 40 roll case - \$7.95. Sprocket feed paper, \$3 per box (FOB). "Teletype Equipment, Supplies and Information for the Radio Amateur." FREE LIST. BVE, POB 73-R, Paramus, NJ 07652.

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

TECHNICAL MANUAL for Model 14 TeeDee, that long searched for complete description, adjustment, lubrication and parts book all in one for only \$2.25 Postpaid. BVE Enterprises, "Communications Equipment, Supplies and Information for the Radio Amateur", POB 73, Paramus, NJ 07652. (Send for free list of other goodies.)

WANTED: STELMA PC-334, PC-336 or PC-403 PC plug in or any information on these, G. S. Naniwada, JA1ACB,3-4-8, Izumi, Hoya, Tokyo 188, Japan.

HAL COMMUNICATIONS CORP: 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 now available. For budget TTY, it's the ST-5 for HF or VHF. 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 Corp., Box 365RJ, Urbana, IL 61801. Phone 217-359-7373.

SELL: STELMA TELETYPE REPEATER TT 63A-FGC/7A MINT, WITH BOOK, \$35.00. Northern Radio Frequency and shift monitor, type 106 model 4, perfect, \$35.00. Instruction books AN URA 8A-B CV189A or AN URA8-CV60 URR, \$6.50 each prepaid, specify type, W3KA, 10406 Insley, Silver Springs, MD, 20902

DIGITAL LAB. Design your own logic circuits after completing the 20 lesson LOGIC-T basic lab course. Learn digital logic from the ground up beginning with fundamental gate operations, JK flip flop characteristics and working up to applications of coders decoders and multiplex circuits. Features visual and audio response, solid state (LED) lamps. Best value. Write: STELCOMP SCIENTIFIC, 4600 Duke St., Alexandria, Va. 22304

KLEINSCHMIDT TT-4A TG printer, keyboard, used, good, \$48.00 with 60-100 gears. Freight \$20, east of Miss. \$10. west of Miss. Also have ASR, KSR typing punches. Mark Space Systems Co. 3563 Conquista, Long Beach, CA. 90808. (213) 429-5821.

RTTY PICTURE TAPES WANTED; Send me one on reel magnetic tape, any speed, or cassette, using 170 or 850 shift, 60 wpm, and I will send your tape back with another recorded on it using same shift. Or swap paper tapes. Prefer longer, more elaborate pix. WA9UGE, 601 South Dodson, Urbana. III. 61801

R-390A MFGD BY COLLINS RADIO \$525.00. #28 Receive only typing reperforator single base, without cover, ready to operate, 100 WPM, \$49.00. 60 WPM gears \$10.00. LRX Reperforator transmitter, two 3 speed gear shifts, ready to operate \$145. Altronics-Howard Co., Box 19, Boston, Mass. 02101 (617-742-0048)

WANTED: ODD TYPE ARRANGEMENTS - I am looking for teleprinters with foreign type such as Russian, Chinese, Greek, Japanese, Arabic, or any non-English arrangement. G. White, 703-683-4019, Box 3227, Alexandria, Va., 22302

1.5 KW POWERSTATS, 220 volt ok on 110, 60cps \$15; 88mh unpotted toroids, 5 at \$2.00 ppd; WAO/ TJR, D. R. Kelley, 1490 Yaqui Dr., Florissant, Mo. 63031

KLEINSCHMIDT MANUALS - for TT-4, TT-100, TT-76, TT-107, etc. Mite KSR teletypewriter supplies, gears, parts, covers. Wanted Teletype manuals. Send SASE for list. Typetronics, Box 8873 Ft. Lauderdale, FL. 33310. W4NYF.

"AFSK GENERATOR" - PCB and all components except input output jacks, power supply and chassis. S6.60. P. & M. Electronics, Inc. 519 South Austin, Seattle, WA 98108 (23 words)

FOR SALE: RADIATION TDMS Series receiver and transmitter both units have built-in 3" scope. Transmitters have built-in "Fov" machine. Units measure and transmit distorted signals. Units, less power supply \$19.95 ea. Power supplies \$9.95. 28 compact nylon gear shift, can be converted for ASR for less than \$20.00, in like new condition with 3 speed gear shift \$39.95. TT-2A "Fox" machine \$29.95, Stelma TDA-2 distortion test set for 60/75, 100 WPM \$29.95, 0.5B exciter for RTTY, fax or FM 1.5 to 6 MHz hetrodyne type, \$49.95, Teco-PO Box 1050, Garland, TX, 75040

M15KSR STAND & PWR SUP PLUS M14 Tee-Dee Both Good Cond. Extra typing Unit. Tee-Dee & 100 WPM Gears. Pwr Sup for parts 875. USM-32 Scope 3" Freq. 10 Hz-4MHz. Rise Time 0.08 usec. Driven sweep 10-200,000 usec. Markers at 1.10,1000,10,000 as selected, usec. Synch: EX, Line or V Amp Sig or either polarity. Int Trig. CAL: V Amp & avail at CAL OUT jack. Good Cond. \$60. EICO scope 5" good. \$35. Dumont 5" \$45. USM-24 for parts \$30. Gen Radio Ant. Bridge. Good \$125. K4K0F. Anne Burras Ln. Newport News. Va. 23606 (703) 596-7100

WANTED 28KSR must be in good working condition Console or Table model write Ray Ravere 5384 46th Street North, St. Petersburg, Fla. 33714 or phone 813-527-6954

BIG SALE ON MODEL 28 Typing - reperforator - transmitter (RT) mounted on a tape handling stand which includes large take up spool and supply reels as well. As an intermediate storage bin. O A dimensions, 20" long, 36" high, 8-1/2 inches wide. Both LAXD trans. dist. and LPR typing reperforator come equipped with three speed gear shifts, allowing down as well as up speed conversion. Synchronous motor LMU-12, used, excellent. \$85, while they last. Atlantic Surplus Sales, 580 3rd Ave., Brooklyn, N.Y. 11215.

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#### CLASSIFIED ADS-

DOVETRON TELEPRINTER SPEED CONTROL-LER - The DOVETRON TSC-1000 Teleprinter Speed Controller is an all electronic, solid-state motor controller that functions as an electronic gear shift for any teleprinter equipped with 100 WPM gears and a 50/60 Hz synchronous motor. Speed control is accomplished by varying both the frequency and amplitude of the power supplied to the motor. A five position front panel switch allows selection of 60-67-75-90-100 WPM operation. The keyboard automatically sends at the same speed as the receiving speed of the typing unit. No buffer storage is required and printer maintenance is reduced to a minimum, because the teleprinter runs only as fast as the received signal. A front panel Range control permits copy of any speed between 50 and 110 WPM with no loss of mechanical range. Copy is greatly improved on weak DX-type signals, and under severe conditions of selective fading, multi-path propagation and keyboard distortion by "synching" to the incoming signal. This Range control also permits answering a station running at a non-standard speed, giving him better copy of your signals. The AUTOSTART circuit provides remote turn-on/turn-off capability and current limiting protection for the terminal unit's autostart components. May be used with any character unit code (7.0, 7.42, 8.0, etc.). Operates directly from 110vac #10%. 40 to 400 Hz. Since the output of the TSC is not affected by line frequency variations at the input, stable speed control is provided for Field Day and other locations where portable or emergency power supplies exhibit line frequency instability under changing load. Attractively packaged in an 8 x 8 x 11 inch custom enclosure. 15 pounds. (21 pounds shipping). \$129.50 FOB. (Calif. residents: \$6.50 sales tax). DOVETRON, 1015 Fremont Avenue (PO Box 267), South Pasadena, Calif., 91030. 213-682-3705.

FOR SALE: Model 28 KSR Table Top Teletypes, as is -- \$150.00, Reconditioned -- \$275.00. FOB Dallas. Acoustic telephone couplers, new, \$89.50. WANTED: Model 33 and 35 Teletypes, any condition. Cash Available. Contact: Vardon & Associates, 930 N. Beltline, Suite 140, Irving, Texas, 75062. Phone: (214) 252-7502.

HAL COMMUNICATIONS CORP: 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 Saroc, Wheaton and Muskegon. Get the details from HAL Communications Corp., Box 365RJ, Urbana, IL 61801. Phone 217-359-7373.

SALE; KLEINSCHMIDT PAGE PRINTER TT271/FG, send receive. 60-75-100 wpm, used good. \$40.00 each. Typing reporforator model 28 TT315/UG code LPR-35 tape data 11/16 wide chadless or fully perforated, used good, \$25.00 each, Model 14 typing reperforator, send receive sync. motor, end of line indicator, tape retainer, used good, \$18.00 each. Model 28 sync motor LMU-12 used good, \$9.00 each. Synchronous motor for Mite page printer 115V, 60 Hz. unused \$17.50 each. FRXD-10 combo typing reperf and TD, sync, motor, no cover or retainer, \$17.00 each. Send us your requirements. Atlantic Surplus Sales, 580 3rd Ave., Brooklyn, N.Y. 11215.

CHICAGO AREA RTTY OPERATORS: Expert repair work performed at reasonable prices. Cleaning (any teletype printer) printer unit alone, \$7.50 with keyboard \$10.00. Phone 312-631-6889, ask for Neil

"RTTY SPEED CONVERTER" A drilled, fiberglass 4" x 6-1/2" printed circuit board now available for the WA6JYJ speed converter in the DEC 71 issue of HAM RADIO. \$6.00 postpaid. Complete parts kit including PCB, \$40.00, postpaid. P & M Electronics, 519 South Austin, Seattle, WA 98108. (41 words)

COMPUTER CRT TERMINAL PARTS: new 14" Corrac industrial grade solid-state video monitor, 64-key ASCII-encoded keyboard, and enclosure - \$250. Digital video generator and refresh memory not included (see Hal Devices RVD-1002). Doug Jensen, 9758 Rich Rd., Bloomington, MN. 55437.

TECH MANUALS: TT-107, TT-109, TT-98, TT-99, TT-100, \$6.50 each; TT-117, TT-118, TT-119, \$10.00 each; Model 14 TD's \$3.00; R-220/URR, R-389/URR, CV-591A/URR, TT-63A/FGC, CV-116/URR \$6.50 each. Hundreds of Model 28 manuals in stock. S. Consalvo, W3IHD, 4905 Roanne Drive, Washington, DC 20021

WANTED: COLLINS 500Hz filter for 75S-3 rcvr. either plug-in or solder type. Will sell or trade 200Hz filter. Don Runmark-WONP, 3035 N. Quail Ave., Minneapolis, MN, 55422

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CIRCUIT BOARDS. Receiver, December Ham Radio and September Journal, \$10. Auto line feed, January '73 Ham Radio \$7. TTL AFSK, September '72 Journal, \$8 PP. G10 expoxy, plated, with clear photo. Bert Kelley, K4EEU, 2307 S. Clark Ave., Tampa, Florida 33609

WANTED: M28 typing reperf and M28 TD. Both complete with covers and prefer both have 3-speed gear shifts. Must be working and in good condition. Submit best price to Herb, W6GQC, 1057 Moana Drive, San Diego, Ca. 92107. Phone 714-224-8065.

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