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AMATEUR RADIOTELETYPE - COMPUTERS - PACKET

VOLUME 34 NUMBER 8 OCTOBER 1986

OLD TU'S NEVER SAY DIE!

THEY JUST FADE AWAY TO A BACK SHELF

BILL HENRY, K9GWT TALKING ABOUT OLD TU'S AT RTTY FORUM IN SAN DEIGO, CA.

IN THIS ISSUE

RTTY JOURNAL
Dale S. Sinner, W6IWO
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ABOUT THE COVER PICTURE

Bill Henry, K9GWT explaining the different TU's on the table. Reading left to right: left front is a home brew space only unit, right front the famous Mark-V. From left to right at the rear of the table: Teletype without Tears, UT-4 with speed conversion, the new ST-8000, and the mainliner TTL-II (Irv Hoff's original) also on the table was a DT-600 board only.

Roy Gould, KT1N
P O BOX DX
Stow, MA. 01775

DX - NEWS

Hello again fellow RTTY DXers. Well I had hoped to able to bring you a fatter and more juicy column this month as mentioned last month, but the news at best has been very, very light coming into the old shack. Conditions still have not improved all that much on the bands. To make this column a success I need input from all of you. So drop me a line or two about what you hear or about yourself. I have had a great deal of favorable comments about the "RTTY DXer of the Month" part of this column but I need more stories. So PLEASE sit down right now and drop me a note about what you are doing. Don't forget to include some pictures of yourself and your shack or of you in the shack. Black and white are best for reproduction but good color pictures come out good also.

HD8G GALAPAGOS ISLANDS

Ted, HC5KA and about six other HC hams are on from the Galapagos now as I write this. They have experienced some problems and are working them out hopefully. They have worked on 15 and 20 meters and also 40 meters on RTTY. They are active on all bands with RTTY/ SSB, and CW. Also planned was some Packet activity and Satellite. QSL cards go to me for this operation. Please enclose an SASE or SAE with appropriate postage or IRC's. Send to the address at the top of this column. QSL cards are not yet printed and I will of course have to wait until I receive the logs. So turn around time will probably be in December but you will get a card.

30 METERS

In a QSO with UZ2AYR the other day, they told me that they now have permission to operate on 30 Meter RTTY. So look for them on that band. What other activity is on 30 Meters? Anyone have any info they would like to share regarding this band?? Send it along. I hope to put a dipole up for it before snow flies here in New England. Which is not that far away.

PACKET

I have been on HF Packet a bit the last few weeks and there seems to be a lot of nice DX floating around on there also. I worked ST2SA and DP0GVN a German Expedition to the Antarctica. DP0GVN only has Packet and Satellite capabilities and no RTTY as the other operator Lothar, who left in the spring took the RTTY gear with him. But there seems to be more and more DX stations appearing weekly on HF Packet. A reminder that direct Packet contacts count for DX awards, NO DIGIPEATING. Looks like this one will be on the honor system, I don't know how one polices this operation. I mark all my cards that "contact was direct" and ask the other station to do the same.

RTTY CONTEST

Dale and I have been talking about a revised format and time frame for the RTTY Journal contest (Now to be co-sponsored by the RTTY Journal and CQ magazine). I would be interested in any comments you might have regarding these changes. My thinking at this time is to have it in early Fall and move away from the BARTG contest in March. What is your thinking?

Well I told you the column was short this month and it really is. I was going to go into great detail about myself with 2 pages of pictures and about all the ones I could have worked but decided to let that go for another time hi hi. George, W1DA has agreed to tell us about himself in an upcoming issue and his secrects of how he works all that juicy DX. George is at about 177 and still counting in just two years. So drop me a note or give me a one ringer for you state siders and that will bring me up on 14.095 +/- QRM. If I am home, we can chat a while. Thanks and good DX and a tip of the DX hat to the DX Bulletin, W1DA, TG9VT, WB5HBR, HC5KA, and others.

RTTY DX BANDPASS

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4Z4AB	11	AUG	2345	14.083	BAU *2
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8R1RPN	1	SEP	2200	14.099	BAU CBA
9M2OK	6	AUG	1310	14.103	PAK CBA
A4XRS	7	AUG	2015	14.088	BAU CBA
CN8CC	8	AUG	2330	14.095	BAU CBA
CO2BB	31	AUG	0030	14.093	BAU BX1
EA6KY	15	AUG	1015	14.080	BAU CBA
EA9MY	15	AUG	1015	14.088	BAU CBA
HI8MJS	10	AUG	1300	14.091	BAU *3
HI8MJS	19	AUG	0100	14.092	BAU *3
HI8DLA	19	AUG	0145	14.085	BAU CBA
KP2N	24	AUG	0000	14.092	BAU CBA
KP2AL	31	AUG	0040	14.082	BAU CBA

(cont. pg. 8)

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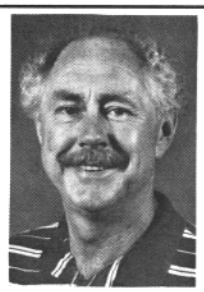

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HITS & MISSES

At the ARRL National Convention last month it was my pleasure to assist Bill Henry with the RTTY Forum. Bill had agreed to a Demodulator Museum and so I got busy rounding up as many as I could find in the Los Angeles area. The result is shown in the picture I have placed on the front page of this issue. Well we got the TU's all there and then Bill had to change his presentation slightly. He didn't really know what all I was bringing him until they were all there. Bill did an outstanding job explaining all the different types, explaining filter types, etc. There was even a UT-4 on display. Well, it was somewhat nostalgic but the plan was to talk about where we were with TU's just a few years ago and where we are at today. This made for an interesting Forum. All those older units will probably now just fade away back to the shelf from where they came from. Maybe they will be collecting dust again but their owners thought enough of them to keep them alive all this time. In one case, the TU is still used on VHF. I want to personally thank all those hams who took the time to bring these units to San Diego to share with everyone.

In this issue I have listed the RTTY Journal awards issued. This list is a continuing list that has been passed along over the years and has been adminstered by different hams over these years. Hopefully, it doesn't have to many mistakes in it. However, if you see something wrong please write to me and let me know. I'll make every effort to bring this list up to date and keep it current from now on out. The RTTY Journal will continue to issue these awards as they come in and we will publish the updates from time to time. The DXCC award indorsements program will also be carried forward. The RTTY Journal is proud to continue this program and give the proper recognition to those who have achieved the certificate qualifications, so please continue to send your request forms to us.

I have had a few requests asking if the RTTY Journal will ever be available on disk. At the present time the answer is no but if there is enough interest I will look into it more seriously. So if you are interested in this version, I would like to hear from you.

It's time to make an appeal to your journalistic talents. I'd like to publish your articles on the various digital subjects we cover here in the Journal. Don't be bashful, let me hear from you, share your knowledge with others in our family. Even if you think it might be something simple, there is always someone out there who is interested in what you have to say. This plea also goes to our family friends from other countries. If you are worried about your English skills, please don't be, I'll figure it out somehow and put it together in an article for you. I'm looking forward to hearing from you. The Journal is your outlet for our special subjects, share your ideas with others and let us send your article around the world for all to enjoy and use to help better our hobby of Amateur Radio. You may say, my idea is not new. That does not matter. If your idea has not been in print before, then it is new. Everyday, I receive mail asking about how to get started in RTTY, AMTOR, and Packet. These people need help and that is where all of us come into the picture. I also receive mail asking me about how to access MSO's, what are SYSOPs, and so on. Each day our ranks grow as more and more Hams buy new or used digital equipment. Maybe it all works the first time, then on the other hand maybe it doesn't. I guess I could ramble on and on about this but I think you all know what I mean. So please answer this plea and share your ideas, tricks, tech tips, and knowledge with those of our family who need it. Now, why not sit down and do it today for a better Ham radio tomorrow. Don't say no I can't, say yes I can and I will, then do it. I'm waiting at the mail box for your correspondence.

To help out our newcomers, the December issue will contain an index of past issues. Some of these journals can be obtained directly from us where we still have extras on hand. If we do not have originals on hand then a copy can be obtained from Red Wilson who advertises in our Classified section.

I'd like to give our advertisers an extra plug this month. They are hanging in here with us even though we are a small publication conpared to the major magazines of our hobby. When you buy a piece of gear that is advertised in the Journal and you read about it here, please mention it to the merchant you are dealing with. These advertisers spend a lot each year pushing their products and they really want to know if it is paying off. If you read about it here is the Journal or any other publication it will only take a second to mention it. On the other side of the coin, I want to thank all those who have already been mentioning our name to their merchants.

Dick Uhrmacher
K0VKH
212 48th St.
Rapid City, SD
57702

MSO'S

Hi Gang ! I'd like to congratulate Dale, W6IWO on his first issue of the "RTTY JOURNAL", and a good one it is! I like his new format, and I'm sure it will be a hit with the RTTY crowd. Summer activities, vacations, etc., have slowed MSO traffic a bit, but by the time this hits print, activities will be booming again. Band conditions appear to be improving some what, although slowly. The summer thunderstorm season will soon be over, and that will help on the low bands.

John, TG9VT, is back in Guatemala City, Guatemala, after having some very serious surgery. We all hope and pray for his quick and complete recovery, and we'll be looking for that booming MSO signal of his soon! John is a long-time MSO SYSOP, ("Guatmail" is his access code on the "National Autostart Frequency"), and one of the most avid RTTY DXer's. Give his MSO a try one of these days!

DAYTON 1987

For those of you who may be thinking of attending the 1987 Dayton Hamvention, and also thinking of staying at the "Imperial House North", be advised that the "Radisson" chain of Hotels/Motels is the new owner of the "Imperial House". I've just had a brief correspondence with their new General Manager, and she is looking forward to seeing everyone in 1987. Some guests at the "Imperial House", were a bit disgruntled at the room rent in 1986, and I think pricing will be more competitive in 1987. Although I seem to be beating the drums quite frequently about advance reservations at Dayton, you can't be too early in this case, and the "No Vacancy" sign is hung out early! Their address is: Radisson Inn Dayton, 2401 Needmore Rd., Dayton,OH. 45414. Additionally, his Imperial Highness, Chief OH-WHA-TAH Jerry,(WA1IUF), tells me that he is in the process of making arrangements for the annual "RTTY DINNER" to be held at the Radisson Inn (Dayton) during the Dayton Hamvention, and hopes that everyone can attend. (The "RTTY DINNER" list will be carried in several MSO"s starting in January 1987).

MSO OPERATING HINTS

Recently we've seen quite a few newcomers to the MSO frequencies, and it's probably time that a few operating hints be stressed:

1. Like any other operating mode, please listen on the frequency before accessing one of the MSO's. You may not hear a station close to you using one of the MSO's, but chances are that you'll hear the MSO replying to his commands. Courtesy pays!

2. Modern RTTY demodulators have very narrow front ends. Consequently it is essential that your signals be within 30 to 40 hertz of the MSO frequency for reliable MSO operation. Additionally, let your equipment warm up to minimize drifting, and frequently re-zero your VFO with the MSO if drifting continues. Most all of the "missed" commands to a MSO are because of off-frequency operation. If you do not have some kind of RTTY tuning device, you are missing out on one of the most useful items in the shack.

3. Spectrum conversation is something we should all keep in mind, regardless of the mode. Although the MSO's and CBMS's each have a "help" command, (a list of operating commands", rather than ask for repeated transmissions of this list, turn your printer on and get it on hardcopy for future reference. Also, most all of the MSO's have a "directory scan" feature, which allows the remote user to "scan" the directory for any particular letter/number sequence. Rather than have the MSO output the entire directory of files each time you access the system, command the MSO to scan it for only files of interest to you. For example, If your callsign has "XYZ" in it, then the command "SDIR XYZ" will cause the system to list only those files with that letter sequence in it. Try it, you'll like it!

4. Many of the computer based RTTY systems output data immediately when the equipment is activated, causing the receiving demodulator to miss the first few characters. And, if these first few characters are MSO commands, of course the MSO will not respond properly. A very easy way to kill two birds with one stone, is to place two carriage return/ line feeds, (that's the enter key, newline key etc., on your computer), then your station identification, (something simple like, de WA0XYZ), one addtional CR/LF, and finally the MSO command. Sounds complicated, but once you get used to doing it, you'll find error free MSO operation the result! The two CR/LF's allow for your transmitter to come up to full power, and "left justify" the following data; sending your callsign not only complies with the FCC requirements, but also gives the MSO demodulator something to chew on, prior to receiving the actual command; and finally the properly left-justified MSO command is executed and the MSO responds as it should.

5. If the MSO does not respond to your "endfile" command, there's still a good chance that your file was received by the MSO.

(cont. next pg.)

(MSO's cont.)
Do not send the "exit" command until you've tried that "endfile" command at least a couple of times. Many times QRM, QSB, etc., causes the "endfile" command to be missed, so send it a couple of additional times and many times this will result in your file being stored.

6. Having more than one MSO "open" at a time causes lots of QRM. Be sure to close up that MSO when you're finished using it, by sending the appropriate "exit" code.

MSO RAMBLINGS

Don, W5QXK, reports that he's pouring the foundation for his new tower and antenna system at this time. Look for his MSO on HF during the day, and on two meters in the evenings in the Kaufman/Dallas area. Remember, that even though the latest version of "HAL" software for the MSO/MPT system contains a "software" timer to preclude transmitter hangups, it still depends on a functioning microprocessor. Power outages, line glitches, etc., can cause the CPU to become confused. Keep an eye on your transmitter! The current ARRL bulletins are carried in several MSO's, W5QXK, WB8ICL, K5FL, and W6ZRR. Ernie, W6ZRR, and Larry, KA0JRQ, will soon have the new "HAL" RMX-3100 in operation, providing for dual usage of their MSO/MPT systems.

Russ,K1DOW/4, Arcadia, Florida, reports that Henry, K4CZ, now has his AMTOR MSO up and running on 40 and 80 meters. The day-time frequency is 7047.5 (mark), (not LSB freq.), and the night-time frequency is 3646.5 (mark). The Selcal code is "KKCZ", and the MSO activation code is: (CR/LF). CCZW(CR/LF). (CR/LF is carriage return, line feed, "enter" "newline", etc.). Russ also reports that G3PLX and HB9AK have ARQ mailboxes operating on 30 and 40 meters. "HB9AK de (your callsign)" will access his MSO on 10.146 and 7.030 Mhz. G3PLX also scans 30 meters, (freq not immediately available), and 7.030 Mhz. Thanks Russ!

I'd like to take this opportunity to welcome "Bob", W7IWO, Scottsdale, Arizona, to the "National Autostart Frequency". Bob is presently using a dipole antenna, and hopes to upgrade into something a bit better later on. He's using the "HAL' MPT3100 ASR terminal, DSK-3100 disk system, and ST-6000 demodulator as his MSO station. Welcome aboard Bob, and it's nice to have a system in that part of the states!

That's it for this month gang. See you later on, and enjoy RTTY and the MSO's! 73's
de Dick, K0VKH

ELMER

DO YOU HAVE A QUESTION FOR ELMER ? ?

(If you do, please send it to the Editor, if it isn't to long and detailed, it will be published, and hopefully someone will pass along an answer to you)

Russ Smith needs some help with his ST-6. Russ wants to use a UART for single speed 100 WPM regeneration on both RX/TX. Has limited resources financially. Contact Russ, W6ONK PO BOX 141, Brownsville,OR. 97327

Ed Wagner is looking for software to copy pix using an IBM or Compatable computer. He is usually on each weekend on the Pix frequencies. Contact: Ed Wagner, 2440 46th Ave., Longview,WA. 98632

Amrum Lakritz wants to contact anyone who has had experience in using the MacIntosh computer for RTTY, CW, Packet, etc. Wants to get started on these modes with his Mac. Contact him at 319 Bird Rock Ave., La Jolla,CA. 92037

James Stanicek, AG3Y wants to inferface his model 37 teletype with his Vic-20 computer. He wishes to use the seiral port and is considering buying a serial-parallel adaptor, adding an 8K FIFO memory plus UART to take care of the speed conversion. James is wondering if anyone has already done this or , if not, do they have any ideas to get him started. Contact James at 1028 Corbett St., Hagerstown,MA. 61240.

Ray Erickson, W0LTN, 9911 Berkshire Lp SE, Olympia, WA. 98503 has just retired and wants to get his feet really wet with RTTY. Maybe there is an Elmer near by who can help him out. Ray needs to just catch up on such things as MSO's and so on. Ray there are many fine articles that have been published in the Journal in the past, so you might want to look into some of these back issues. I hope to have an index ready for print in our December issue. In the mean time, maybe one of our digital community hams in the northwest can give you a hand.

APOLOGY

Last month I goofed and gave Don Lum a WA7ICW call. It should be WA6ICW. What a place to make a mistake, on the front page. Anyway, my apologies Don.

(ST-8000 cont. from last mo.)

Although not as smooth as the great response found in an ST-6 it is adequate for most applications where a printer is necessary.

The ST-8000 has the ability to maintain a programmed shift such as 170 Hz and track a receive signal. I have found this feature very handy when working dx or unstable commercial signals without having to use RIT on the radio receiver (some commercial HF receivers do not have RIT).

Remote control of an ST-8000 is a breeze because of the serial data port on the back panel which allows control over all parameters of the demodulator. By using simple syntax required by the intellegence of the ST-8000 I have been able to fully automate the operation of my station using a program written in BASIC. Virtually any ASCII terminal could perform this function if remote controlled operation is desired.

The configuration of the ST-8000 can be as simple or complex as required. There are many logic options that an operator can configure in the unit so virtually any amateur or commercial requirement for interfacing can be satisfied. The signal standards that are provided on the back panel of the ST-8000 are RS-232C (tx, rd, rts, cts, cd, dsr, recovered rxc), MIL-188C, and TTL.

Subjective on the air testing of the HAL ST-8000 was done in the Fall of 1985. Almost all testing was done on 20 meters with a predetermined RY block which was used on all test runs. There were five well-known terminal units used in these tests and special care was taken to properly terminate all units into the received signal source. An error was counted if a character(s) was dropped or out of place and a total of 41 test runs were given. The ST-8000 performed so well against other top line demodulators it was necessary in some sending runs to lower power levels to below 1 watt output in order to raise the relative error count on the ST-8000 and get a normal error distribution required for statistical comparison! The most pronounced performance differences between these demodulators occurred over paths which were 1000 miles or greater and which displayed different types of fading characteristics. Diversity tests using multiport spaced antenna design and a pair of matched KWM-380's achieved such a performance difference between a pair of ST-8000's and the other demodulators tested it was typical to get error ratios of 30 to 1 and these differences were so acute that only initial testing was done in diversity mode.

The ST-8000 represents near state of the art design that achieves theoretical limits of shift keying reception of HF. At a retail list price of $3200 it won't be on every amateurs "must buy" list but for those amateurs with an interest in very high performance demodulator and in a position for such a purchase the ST-8000 would be a fine addition to the shack. It performs as well as units which cost considerably more and has features which are unique in their contribution to performance. The only criticisms I have of the ST-8000 are its lack of front panel CRT controls and the overall light feel of its controls. I like to feel the click in my control switches and my general impression is that the front panel controls on the ST-8000 feel too light. However, in practice I have not run into any problems with the ST-8000 when running several of them on 24 hour duty.

For a more detailed outline of the ST-8000 demodulator contact:
HAL Communications Corp.
1201 West Kenyon Rd.
Urbana,IL. 61801-1365
phone 217-367-7373

(RTTY DX BANDPASS cont.)

LX2YD	8	AUG	1015	14.080	BAU CBA
OA4CN	13	AUG	0010	14.080	BAU CBA
WP4CNU	10	AUG	1250	14.096	BAU CBA
YO8KAE	26	AUG	1110	14.095	BAU CBA
YO7BI	29	AUG	1045	14.096	BAU CBA
ZF1RC	2	SEP	0030	14.087	BAU CBA
CP8AL	21	SEP	1230	14.095	BAU CBA
CX2BG	14	SEP	0015	14.081	BAU CBA
DP0GVN	5	OCT	2320	14.103	PAK CBA
FM5ABM	25	SEP	2200	14.091	BAU CBA
HA5VV	2	OCT	1100	14.082	BAU CBA
HH2IF	16	SEP	0300	14.083	BAU CBA
HK3DES	21	SEP	1240	14.096	BAU CBA
HP1IDP	14	SEP	2100	14.093	BAU CBA
HP1IDP	21	SEP	1245	14.087	BAU CBA
IS0MVE	21	SEP	1600	14.090	BAU CBA
LZ2KIM	14	SEP	2100	14.091	BAU CBA
OA4BQQ	15	SEP	0015	14.085	BAU CBA
OD5IG	13	SEP	1745	14.096	BAU CBA
P43SF	21	SEP	2200	14.086	BAU CBA
PZ1DZ	14	SEP	1330	14.093	BAU CBA

(cont. pg. 15)

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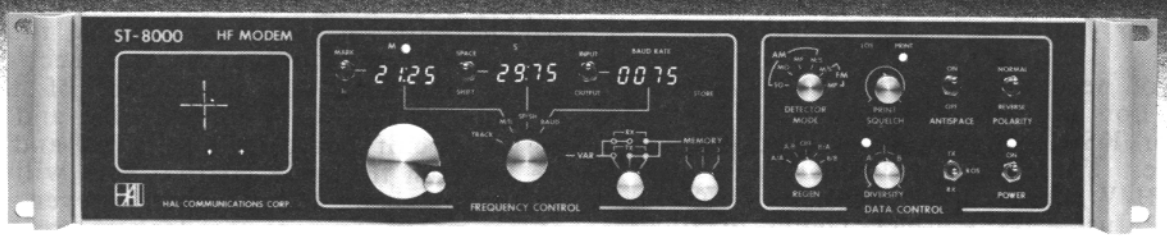

ST-8000 HF Modem

Real HF radio teleprinter signals exhibit heavy fading and distortion, requirements that cannot be measured by standard constant amplitude BER and distortion test procedures. In designing the ST-8000, HAL has gone the extra step beyond traditional test and design. Our noise floor is at -65 dBm, not at -30 dBm as on other units, an extra 35 dB gain margin to handle fading. Filters in the ST-8000 are all of linear-phase design to give minimum pulse distortion, not sharp-skirted filters with high phase distortion. All signal processing is done at the input tone frequency; heterodyning is NOT used. This avoids distortion due to frequency conversion or introduced by abnormally high or low filter Q's. Bandwidths of the input, Mark/Space channels, and post-detection filters are all computed and set for the baud rate you select, from 10 to 1200 baud. Other standard features of the ST-8000 include:

- 8 Programmable Memories
- Set frequencies in 1 Hz steps
- Adjustable Print Squelch
- Phase-continuous TX Tones
- Split or Transceive TX/RX
- CRT Tuning Indicator
- RS-232C, MIL-188C, or TTL Data
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- Signal Regeneration
- Variable Threshold Diversity
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- Signal Amplitude Squelch
- Receive Clock Recovery
- 3.5" High Rack Mounting

Write or call for complete ST-8000 specifications.

HAL Communications Corp.
Government Products Division
Post Office Box 365
Urbana, Illinois 61801
(217) 367-7373 TWX 910-245-0784

C-64 + CP-100 + MBA/TOR + 28KSR = HARD COPY

by: Dale Sinner, W6IWO
9085 La Casita Ave.
Fountain Valley, Ca.
92708

I'm a die hard I guess, cause I still like to hear the noise of a TTY machine once in awhile. Probably been into RTTY to long. Whatever the reason, here's how I went about it using a C-64 computer and the AEA CP-100 interface. If you are interested, read on!

It really takes four components to make this all work but don't stop reading yet, they are all easy and don't take up much space. I'll describe them separately and then put them together for you.

First: You need a high voltage selector magnet supply. Lots of these still around from an old 28ASR or KSR. If you can't find one ,then build one. I'm not going to include a circuit for this H/V supply, since they are so easy to come by. Just a transformer, couple of diodes, capacitor, and a resistor to obtain the 60 ma. needed.

Second: Now that you have the H/V supply you will need a circuit to key this voltage to the selector magnets. I call this circuit "A". In this circuit you will use a GE-232 transistor to do the actual keying. This transistor is in turn keyed by the opto-couplers in the circuit. Nothing fancy here, just be sure to watch the polarities of the couplers. Without the proper polarity your circuit will not work, so be especially careful and get it right the first time.

Third: Now you need a 20 ma. loop, low voltage (12+), which will be keyed by the CP-100. To do this, you must have the loop current keying circuit in the CP-100. This is an option available from AEA. The current draw on this circuit is small and I used the 12 volts supplied to the CP-100 for this circuit. I picked it up at the ON-OFF sswitch. Circuit "B" shows the opto-couplers from circuit "A" and how they fit into the circuit. You can use more couplers in this circuit if you like. Just be sure that the current is limited to 20 ma. Adjust the current flow with R-1. The meter in the circuit is optional.

Fourth: Next you will need a circuit to turn the 28 machine motor on without having to do it manually each time. Circuit "C" is a simple autostart circuit for doing this job. Notice, I used a opto-coupler and an LED in the circuit to tell me if the timing circuit is working through the opto. I guess you could call this "bells and whistles" but I think it also serves a purpose. In this circuit the opto turns on the machine motor voltage. The 555 circuit is the timer for turning off the autostart and the time is adjustable at R-1 of this circuit. A little practice with this control and you will know where you want it to be for your station. The circuit sensitivity is set by R-2 and controls the turn-on time. On HF you may wish to have it come on immediately while on VHF you may want a delay so the machine will not come on each time someone ker-chunks your RTTY repeater.

Well, there you have it! Now you are probably going to ask, does it take up much space. The answer is, not really! If you find a H/V supply from an old 28 machine then circuit "A" can be built on the underdside of the chassis. Include a couple of quick disconnect plugs of some kind and that takes care of that end. Mount this supply in the machine and cable it to the circuit board. Circuits "B" and "C" can be built on the same board. Both will fit on a PC board about 2 X 3 inches. I even mounted the connector from the loop current circuit provided by AEA right on the board. The whole sha-bang now plugs into the back of the CP-100 to the loop current circuit. All the parts are easy to find and the circuit is easy to construct. So, that's it, a few parts, and a little time and you have C-64 + CP-100 + MBA/TOR + 28KSR = HARD COPY.

(WAC cont. from pg. 14)

26.	YB2BLI	30.	G4NJW
27.	N4FJL	31.	C. GIBBS
28.	KE6T	32.	LZ2KIM
29.	G4NYO		

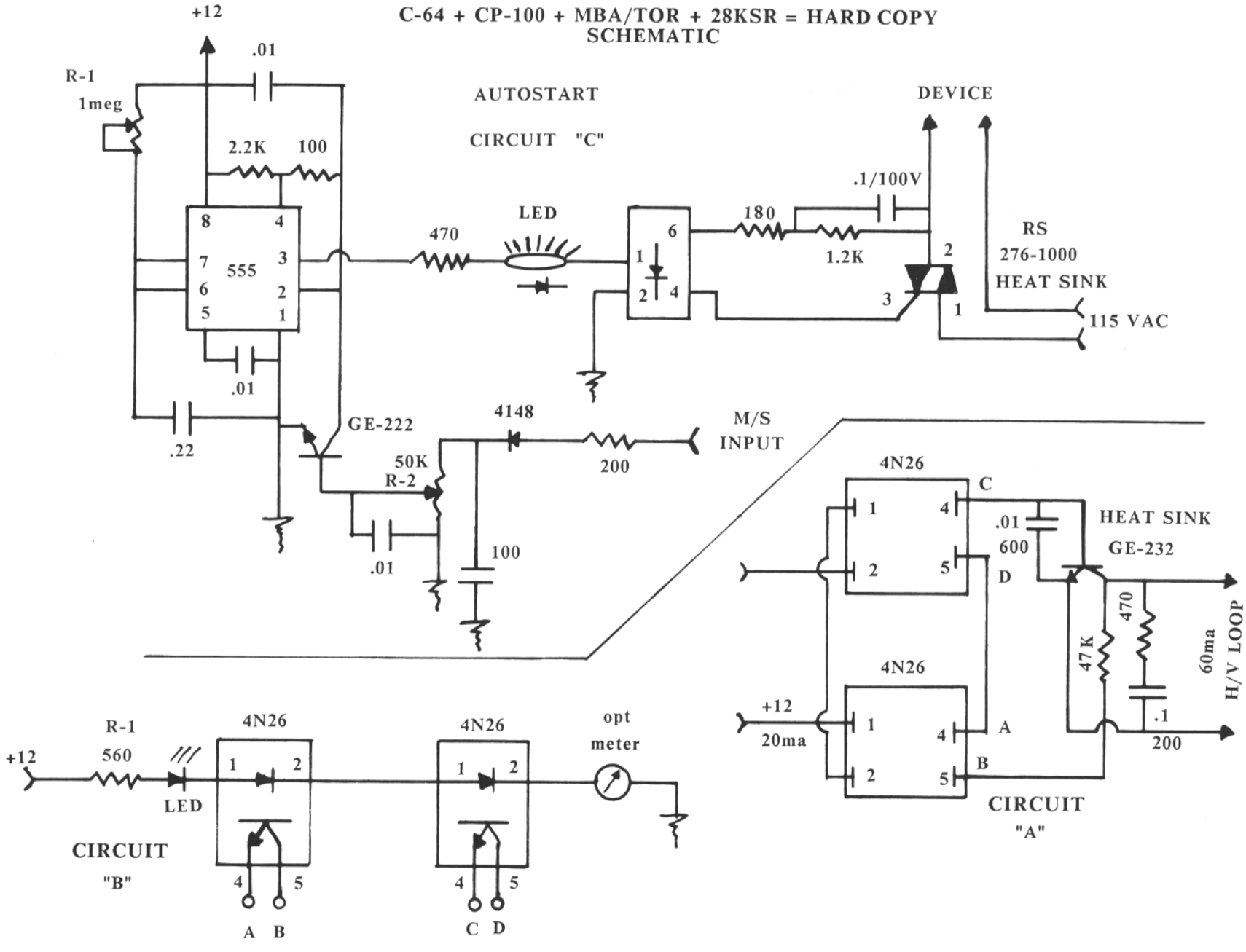
WAS

1.	K3SWZ	6.	WA8NGJ
2.	W2PLQ	7.	W9OEQ
3.	FG7XT	8.	I8AA
4.	W1GKJ	9.	W8JLN*
5.	W4CQI	10.	W6JOX

11.	WB6CYA*	800201
12.	W2IVC	800703
13.	K4YI	800610
14.	K3TOM	810201
15.	W7LLC	810312
16.	I0AOF	810415
17.	K4VDM	810915
18.	WB2VTD	820318
19.	JA1JDD	820320
20.	I8AA	820601

* all 20 meters

C-64 + CP-100 + MBA/TOR + 28KSR = HARD COPY
SCHEMATIC



Or This Inexpensive

It Really Shouldn't Be This Easy

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First, A Good Idea

The idea behind the Pakratt is very simple. One controller that does Morse, Baudot, ASCII, AMTOR, and Packet, and works both HF and VHF bands. Of course the decoding, protocol, and signal processing software must be included in the unit, and connection to the computer and transceiver have to be easy. The unit also has to be small and require only 12 volts, so it will work both in the shack and on the road.

Second, Computer Compatible

It doesn't matter what kind of computer you have, we have a Pakratt for you. The PK-64 works with the popular Commodore 64 or 128, and the PK-232 works with any other computer or terminal that has an RS-232 serial port. The PK-64 doesn't require any additional programs. Simply connect to the computer and transceiver and you're on the air. The PK-232 needs a terminal or modem program for your computer. The one you're using with your telephone modem will work just fine.

PAKRATT™ Model PK-64

PAKRATT™ Model PK-232

Third, Performance and Features

The real measure of any data controller is what kind of on-air performance it gives. While the PK-64 and PK-232 use different types of modems, both give excellent performance on VHF. The optional HF modem of the PK-64 uses independent four-pole Chebyshev filters for both Mark and Space tones, and A.M. detection. The HF option can be factory or field installed.

The PK-232 uses an eight-pole bandpass filter followed by a limiter discriminator with automatic threshold correction. The internal modem automatically selects the filter parameters, CW Fc = 800 Hz, BW = 200 Hz; HF Fc = 2210 Hz, BW = 450 Hz; VHF Fc = 1700 Hz, BW = 2600 Hz.

The PK-64 uses on screen indicators to show status, mode, and DCD (Data Carrier Detect) while the PK-232 uses front panel indicators. Both units use discriminator style tuning for HF operation. And that's just the tip of the iceberg. Features like multiple connects on packet, hardware HDLC, CW speed tracking, and other standard AEA software features are included in both the PK-64 and PK-232.

Fourth, AEA Quality and Price

Not many manufacturers like to discuss quality and price at the same time. AEA thinks you want high quality and low price in any product you buy, so that's what you get with the Pakratts. Ask any friend who owns AEA gear about our quality. The people who buy our products are our best salespeople. As for price, the PK-64 costs $219.95, or $319.95 with the HF option. The PK-64A, an enhanced software unit with a longer flexible computer cable, costs $269.95 or $369.95 with the HF option. The PK-232 costs $319.95 with the HF modem included. All prices are Amateur Net and available from your favorite amateur radio dealer. For more information contact your local dealer or AEA.

Prices and specifications subject to change without notice or obligation.

AEA Advanced Electronic Applications, Inc.
P.O. Box C-2160, Lynnwood, WA 98036-0918
206-775-7373 Telex 6972496 AEA INTL UW

RTTY JOURNAL AWARDS LIST

DXCC NR.	C.C.E.	DATE
1. ON4BX	200	7801
2. W3KV	210	7802
3. I5KG	120	7803
4. ON4CK	150	7804
5. W5QCH	130	7804
6. W8CQ	120	7804
7. WA3IKK	150	7804
8. DK3CU	100	7804
9. W5EUN	120	7804
10. G6JF	140	7804
11. W2LFL	200	7805
12. I5ROL	100	7805
13. W4YG	100	7805
14. W3DJZ	150	7805
15. JA1ACB	100	7805
16. K8YEK/W8US	100	7805
17. I5WT	226	7805
18. W1GKJ	150	7805
19. W4CQI	110	7805
20. DL8VX	100	7805
21. K6WZ	147	7806
22. W3EKT	100	7806
23. W8JIN	150	7806
24. W4EGY	100	7806
25. I8AA	225	7806
26. K3SWZ	100	7806
27. OK1MP	100	7806
28. W5VJP	100	7806
29. K4YZV	100	7806
30. K7BV	210	7809
31. F6ALL	100	7809
32. F5JA	160	7810
33. HB9AVK	100	7811
34. F8XT	100	790401
35. OH2HW	100	790410
36. W9RY	100	790416
37. DJ8BT	100	790524
38. DF2KU	100	790716
39. DL8KS	100	790829
40. JA8ADQ	100	790915
41. W3FV	150	790901
42. VE2QO	100	791114
43. W7MI	100	791201
44. DJ3OE	100	800210
45. I5FLN	220	800214
46. W6JOX	164	800724
47. JA1DSI	150	800923
48. VK2SG	100	801103
49. W2IUC	100	801103
50. K0BJ	120	801110
51. DJ1IJ	100	801215
52. JA1BK	100	801215
53. W2PSU	100	810221
54. SM6AEN	100	810225
55. I0AOF	100	810602
56. SM7CLZ	100	810602
57. DK5WJ	100	810602
58. ON4WG	105	810605
59. JA6GIJ	100	810921
60. JA1JDD	100	811012
61. WA6WGL	100	811102
62. GI4AHP	100	811110
63. SM7CLZ	100	811215
64. WB6CYA/KG6CM	100	811217
65. JA1MIN	100	811219
66. YB2BLI	100	810426
67. W0HAH	100	820506
68. K4VDM	100	820517
69. DK1BX	120	820702
70. K1NVY/7	100	820815
71. JA1ZF	100	820825
72. GM3ZXL	100	820925
73. W0LHS	100	821027
74. W8JMG	100	821122
75. JR2TZL	100	821122
76. JA3EOP	100	821221
77. KB9IS	100	830105
78. K4JAF	100	830401
79. WB3HAZ	100	830501
80. K1LPS	100	830520
81. JR6AG	130	830615
82. JA2VFW	100	830701
83. DK4KK	100	830910
84. N1BNK	100	830910
85. XE1M	100	830926
86. JA1DXV	100	830927
87. JH1BIH	100	830928
88. JR2CFD	100	831025
89. N4FJL	100	831102
90. SM5EIT	100	831104
91. KY4I	100	831106
92. TO 98.	NOT ISSUED	
99. VE7VP	100	840102
100. KA7BDB	100	840131
101. JH2PDS	100	840404
102. K4AGC	100	840520
103. WB2VTD	100	840601
104. HB9HK	100	840915
105. N6ELP	100	850211
106. WB4UBD	100	850501
107. JA5TX	100	850515
108. JA1BYL	100	850601

DXCC AWARDED TO SWL's

1.	G8CDW, Ted Double	821108
2.	Chris Gibbs	831106
3.	JA1-3477 Hajime	841231

(AWARDS cont. pg. 14)

WAC-20 METERS

1. K3SWZ
2. W5RYA
3. W0MT
4. DJ8BT
5. SL5AR
6. DK4ZF
7. JH1TFF
8. SWL 13-13-018
9. DJ1QT
10. W4LH
11. VP2MRW
12. K4YZV
13. F6ALL
14. W7JWI
15. SM6AEN
16. W1MX
17. W9OEQ
18. K6KW
19. G3ZWW
20. DL8VX
21. W3EKT
22. W0JCO
23. PY2CYK
24. WB9LUK
25. WA6WGL
26. WB4TPU
27. K4GJW
28. DL8QP
29. I8YRK
30. G3YDR
31. I1PYS
32. LA2IJ
33. JA7ML
34. G3HJC
35. W8JMG
36. K1LPS
37. WB4VUP
38. W1GKJ
39. VE2QO
40. K4ZS
41. OH1NI
42. WA0YDJ/4
43. K4VDM
44. G4ALE
45. GW3IGG
46. K4JAF/WA9AKT
47. W6JOX
48. JA4ONZ
49. G3IIR
50. SWL-BRS-18456
51. N3AI
52. I5HZZ
53. I5GZS
54. I2OLW
55. I5KPK
56. SM5EIT
57. WA8CZS
58. WA9BOW
59. B. NIENDORF
60. K4RN
61. IS0ESS
62. K5GH/W5KHP
63. HB9AVK
64. WB6CYA/KG6CM
65. I2WEG
66. WB2VTD
67. WA6CQW
68. K. WUSTNER
69. K0HSC
70. W8JLN
71. KA7CYK
72. VE2JR
73. LZ1KDP
74. DL8GO
75. DJ2YE
76. DK5WJ
77. K0PJ
78. JA1EN
79. E.PRAWALSCHKE
80. DJ3OE
81. WB7BFK
82. I5FLN
83. DL6ZB
84. W2LFL
85. VE7BTO
86. I5YTP
87. PJ5SO
88. JA1DSI
89. YO3AC
90. JR2TZL
91. K4UDM
92. K0BJ
93. YB2BLI
94. W4MWP
95. KD4OM
96. HB9BQL
97. WB3HAZ
98. ON7EV
99. KB2VO
100. N8AKF
101. FM7WO
102. I8JRA
103. OH5YW
104. GM4KHE
105. DF1UO
106. N4FJL
107. KA4BDB
108. KT1N
109. WA4JJY
110. WA6VZG
111. VK5RY
112. G3KQS
113. SP2UU
114. SP2FF
115. SP2UUU
116. KE6T
117. I5WT
118. HB9AVK
119. SM5EIT
120. SM7LSU 850615

WAC 80 METERS

1. W1MX 78
2. K6KW 790401

WAC 40 METERS

1. DL0TD
2. W1MX

WAC 15 METERS

1. I0LVA
2. G3UUP
3. I5NOD
4. WB6CYA/KG6CM
5. DJ5OE
6. JA1DSI
7. DK5WJ
8. K4VDM
9. G4EJA
10. EA8RU
11. 0N7EV
12. JR2TZL
13. I8JRA
14. K1LPS
15. N4FJL

WAC 10 METERS

1. FG7XT
2. WA6WGL
3. DJ8BT
4. W1GKL
5. W6JOX
6. HB9AVK
7. SM5EIT
8. K3SWZ
9. W2PLQ
10. K4YZV
11. W4QI
12. WA8NGJ
13. W9OEQ
14. I8AA
15. DJ3OE
16. JA1DSI
17. LZ2KRR
18. K4VDM
19. K1LPS

WAC MIXED

1. DF7FB
2. I5TIV
3. KB9DM
4. DK7UC
5. G4FLM
6. LZ2KRR
7. W2IUC
8. G3GGL
9. 9A1ONV
10. DJ0WQ
11. K4YI
12. YO3AC
13. N9BHH
14. OZ1CRL
15. EA4BLQ
16. W0LHS
17. 4X6GV
18. DH2BAB
19. DL5MBI
20. WB5HBR
21. SM5FUG
22. OK3CNJ
23. SM6AAY
24. GI4KQA
25. C21BD

(AWARDS cont. pg. 10)

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YB0AQT 13  SEP 1230 14.077 ARQ CBA
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