

Band Intruders

During discussions of the teletype print-out from certain F1 intruders in the amateur bands, there has been mention of reasons for not being able to print the copy.

Sometimes this is due to the shift between mark and space, and other times to the speed which can be 60, 67, 75 or 100-speed, and faster in many cases, especially multiplex and error-correcting codes.

Also, there are numerous systems used, of which only some appear on the air.

When the word "scramble" is used, it may apply in different ways. By putting the mark side of the signal on an unidirectional syphon-pen recorder, on inked paper tape, it is often easy to see why

they do not print. Some of the reasons are:

- a. The bauds are scrambled, which may cause the machine to "run open", inasmuch as there is no regular stop pulse.
- b. The characters may be scatter-scrambled, causing the printer to drop letters here and there on the page, with overlines and end-of-line pileup because the CR and LF characters do not come at the right places, nor in the right order. In this type, the machine will hold sync.
- c. Normal transmission of neat 5-letter or 5-digit traffic, with spaces and proper carriage-returns and line-feeds.

If anyone has done "signal analysis" on these or other intruders, please send details to K6KA, Box 1, La Canada, Calif. 91011.

RTTY December 1974

JOURNAL

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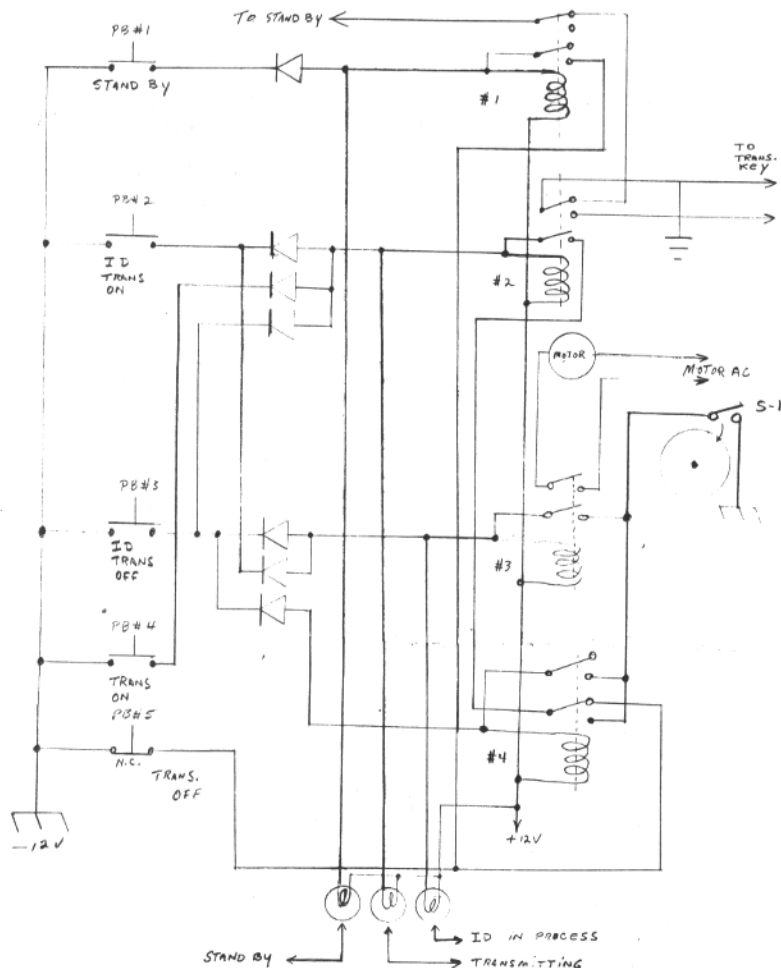
Push Button CW IDer.

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4843 N. 90th St.
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An article by VE5TO from the RTTY Journal of Nov. 1972 sparked my interest in adding an auto station control to the CW ID wheel which I have had for some time. Being somewhat short

of relays at the time I read the article I decided to put the project off. However many times I have said to myself: now if only the wheel would turn the transmitter on and off it would eliminate throwing several switches every time.

Not having 6 V.A.C. relays I decided to use 12 V.D.C. ones which I had. The entire project was put together and completed with only one hitch. The system used for stopping and starting the



wheel was erratic. A friend I work with suggested adding diode switching to the input and in the process eliminating a lot of wires. The schematic presented here works perfectly. One additional relay was added after the original unit was built for the standby circuit. It is shown wired so that the standby line is shorted to ground during standby and during transmit and open during receive. This is correct for the TTL/2 which I own. However some terminal units may be different. The mechanical wheel was built from a 10 RPM motor purchased from Olson Radio. One micro switch (S-1) stops the wheel after one turn. This switch is open in the stop position. The second switch not shown on the schematic is a micro switch with a roller which gives out the CW ID as the wheel turns. The wheel is one side of a 7' aluminum tape reel appropriately notched. If you mess one up you have a spare.

Here are the functions:

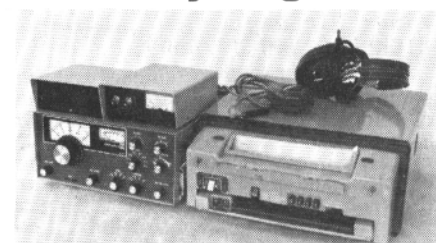
Push button #1 closes relay #1 which puts the terminal unit in standby for making tape copies, etc. To remove the unit from standby push #5 which opens relay #1.

Push buttons #2 and #3 are the most often used buttons. Pushing button #2 closes relay #2 and #3. Relay #2 puts the transmitter on the air while relay #3 closes the AC circuit to the wheel motor. After the turn of the wheel switch S-1 drops out relay #3 while relay #2 remains on. If your side of the QSO runs more than ten minutes like with pictures another push on button #2 will give out the ID again. When you are ready to go off the air push button #3 which closes relays #3 and #4. When the turn of the wheel is completed switch S-1 drops out relays #2-#3 and #4. Button #4 would be used to put the transmitter on the air without ID. Button #5 is used to take the transmitter off the air without ID or to remove the T.U. from standby. The lights are somewhat self explanatory. The ID light lights during the turn of the wheel. The transmitter light lights during "on the air". The standby lights only if you use the standby button (#1). It doesn't light during transmit even though the T.U. is in standby. The diodes used were removed from an old computer board. Most any type will work.

The one additional thing I did not show on the schematic was to add a Dual tape recorder foot switch from an old Norelco (normally open). One parallels push button #2 and the other parallels push button #3. Now all I do to go on the air is kick

a foot switch and wait for the completion of the ID and type away. When I am thru typing I kick the other. This no hands system is great.

Ready to go ---



Larry Phiby, K1LPS, who many worked from Guam a few years back, states that he is grounded now in Italy as it is impossible to get a license. Larry has spent his time building a portable RTTY outfit with hopes that he can activate some SC spots when he leaves Italy. The unit consists of a Halli-crafter FPM300, St-5 and a Mite printer (shown with the keyboard retracted). Everything fits in an attache case.

Larry also offers to help anyone getting started or having particular problems. Write him at - Larry Philby, USNAF-Box 80-FPO, New York, 09520. As with all inquiries a SASE is courtesy that should be observed.

The Teletype

Here's to you, you cute little thing
With all your thousands gageets, a million
springs

Oh! you've given me lots of pains
With all your function levers and all six
vanes

You've started, stopped, and sometimes
stalled

All because of an escaped pawl.
You've made me pull my hair, pray, and
curse

Just to get your ribbon to reverse
You've made me feel like an awful ham
Trying to adjust your selectoe cam

You're the cause of all my pet peeves
Oh! You and your spacing stop sleeves
And if this course I should fail

It'll be because of your printing bail
Now these instructions say it's a cinch
To get you gauged to the thousandth of an
inch

But when I'm through will I deplore
I'd like to slam you on the floor
Now I'd like to heave you over the brink
And for me to watch you slowly sink.

(Via Minn. Mars)

DECEMBER 197 3

Equipping the Model 28 Stunt Box

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MICKLETON, N.J. 08056

Perhaps the most unique and important feature of the Model 28 series of teletype equipment is the stunt box. This is the device that permits the machine to perform or respond to mechanical and electrical signals and further control external equipment. Several references that pertain to the stunt box are as follows:

a. TTY Corp Bulletin, Section Nr. 573-115-103, Description and Operating Principles, 28 Stunt Box.

b. TTY Corp Bulletin, Section Nr. 573-115-200, Installation of Function Parts on a 28 Stunt Box.

c. The 28 Stunt Box, A Bell System color brochure that, unfortunately, is out of print, but nevertheless a good reference, if you can find one!

d. Mouse Machine Modifications, by Irv Hoff, 8 parts, printed in RTTY Journal 1970-71.

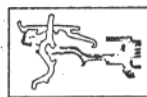
e. TTY Corporation Bulletins 216B (Desc), 217B (Tech & Adj), 1149B (Parts) Model 28 KSR (Additional Bulletins for ASR as required). (While not everyone will have ready access to the above references, they are listed in the interest of providing as complete a list as possible. The TTY Corp. Bulletins may be purchased from that company.)

Behind the front plate of the printer unit there are eight code bars that can shift left (marking) or right (spacing) when the appropriate signal is received. The second through sixth code bars are directly associated with the five elements of the received teletype signal, while the top (first), seventh, and eighth code bars are positioned independent of, or indirectly from the received code. Of these latter code bars, most amateurs will be interested primarily in the bottom two; the seventh usually being the "zero" code bar used by amateurs for auto CR-LF, and the eighth being the letters-figures shift bar. The top bar is infrequently used for such things as call sign recognition activation/inhibit, mechanical SEL-CAL operation, or excessive line feed protection in which case it will be moved between the print or non-print positions upon receipt of the proper code, but is generally locked into the print condition by a small clip on the outside left of the printer, at the end of

the code bar assembly. These three bars are moved left or right by means of a shirt fork mounted on top of the stunt box that engages a post over the code bar assembly. The stunt box itself is an assembly that mounts behind the code bars and contains various function bars to interact with the eight code bars. When you look from the back of the machine (with paper roll/spindle removed) you see the top and back of the stunt box, with unshift-on-space screw on the top left, then the figs/ltrs shift slide, and perhaps some electrical switches. Protruding and visible from the rear of the stunt box are pawls, levers, spring plates, and the rear tip of the function bars. A large flat vertical blade (stripper blade) goes across the rear of the stunt box, and is an integral part of the box on Mark III printers (on Mark I this blade sticks through a slot on each end of the printer and is externally operated). This stripper blade releases latched levers on its downward motion, and releases operated function bars on its upward travel. On every complete rotation of the main printer shaft, each function bar is allowed to move forward under spring action against the code bars in front of it. If the code received (and code bar alignment) is such that it coincides with the times on any individual function bar, that bar then moves fully forward so as to engage the pawl in its slot. All function bars then are then moved rearward and those pawls that have been engaged are carried rearward sufficiently so the pawl rotates its associated function lever backward. This lever is the piece that actually accomplishes the desired operation, such as opening or closing a switch, space suppression, line feed, letters shift, sequential operations, etc.

Essentially, each of the 42 slots in the stunt box may be made to perform a function by installing the appropriate function bar, lever, pawl, and spring plate in that slot. The function bar is "coded" by tines on the end adjacent to the code bars which are set either right or left of center to correspond to "mark" or "space" position of the code bars which move in accordance with the received signal. Figure 1 is a chart depicting various function bar coding. Functions performed by the stunt box can be classified as required and optional. Required functions are those of carriage return, line feed, letters and figures shift, all of which are usually assigned to specific slots. Normally,

FUNCTION BARS . . . how they are coded



Function bars are literally the "passkeys" to the performance of functions. In their forward motion into the "lock-like" code bars - they search for an opening.

Like keys . . . function bar projections vary . . . and they vary in several ways. The number of tines and the way they are angled . . . left, for marking and right, for spacing usually varies from one function bar to the next.

Shown below in front views are function bars with tine arrangements corresponding to the 5-level signal characters that will allow these function bars to move completely forward.

Coding Function Bars

As indicated in this diagram . . . by snapping off tines, "universal" function bars can be coded for any one of the code characters.

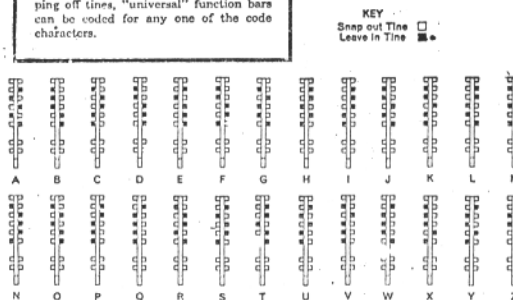
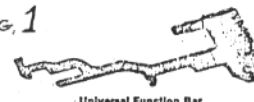


FIG. 1

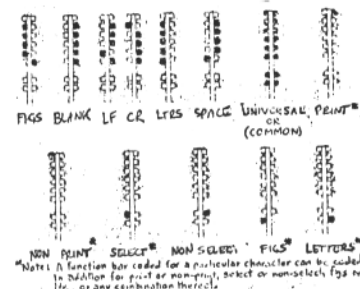


Universal Function Bar

FRONT VIEW

SUPPRESSION
SH. PULSE
LF. PULSE
CR. PULSE
LS. PULSE
DE. PULSE
ZERO
FIGS.-LTRS.

Illustrated above is a side view of the fully loaded bar called the "universal" function bar. At left is the front view of this bar with lines identified as to the level of typing unit code bars they contact.

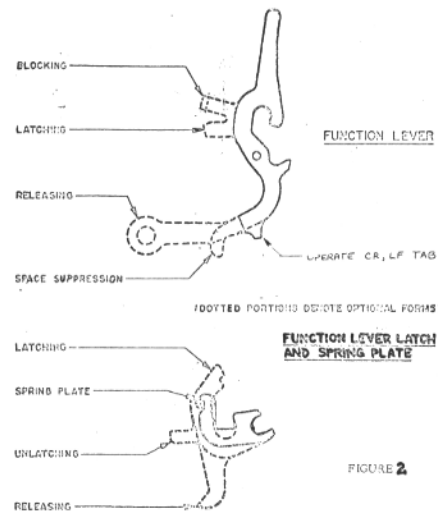


space suppression is also provided with certain of these functions. Optional functions are any desired by the individual to respond for bell, WRU, reper control, and may be assigned to any of the slots not used by required functions. The required functions require certain slots to be used for specific operations; on all but a very few old printers, slots are originally equipped with the following minimum functions furnished:

- Slot 1 - Space (unshift-on-space usually equipped by disabled)
- Slot 2 - Figures
- Slot 3 - Letters
- Slot 5 - Carriage Return
- Slot 40 - Line Feed
- Any Slots - Space Suppression for CR, Blank, LF

As Irv Hoff carefully explained in his Mouse Machine articles, this original setup should be modified for amateur use so that a printer will have the "standard three" features commonly desired for RTTY use. (Non-overline, Auto CR-LF, Unshift on Space). This amateur modified setup then uses these slots with functions bars coded as indicated:

- SLOT CODE**
- Slot 1 - Space (with top mounted screw backed out for unshift on space enable)
- Slot 2 - Figures
- Slot 3 - Letters
- Slot 4 - Auto CR-LF (for Auto CR)



FUNCTION LEVER

FUNCTION LEVER LATCH AND SPRING PLATE

FIGURE 2

- Slot 5 - Line Feed to provide CR on receipt of LF
- Slot 39 - Auto CR-LF (for Auto CR)
- Slot 40 - Line Feed (normal LF) (space suppression may be on either LF Function bar)
- Any Other Slot - Special; Space suppression for CR and Blank (by using a specially coded function bar to respond to both CR

or Blank, thereby saving one slot. This special coding is accomplished by breaking off the top tine of either a CR or a Blank bar, allowing it to respond to both functions.)

With this lineup you will have a printer that does all the things you will really need for practical RTTY operation; the only initially strange characteristic of this configuration is that nothing will happen locally when you type a CR, and both CR and LF will occur whenever a LF is typed. And, you have 34 empty slots to code for any options you may desire!

Now, here is the interesting part of the entire stunt box study - just how do you use these 34 slots? Customary, of course, is equipping one slot with a function bar coded for upper case S, or bell. Many machines also have this installed at the factory. If you don't like a raucous bell in the shack, you can instead hook up a chime as has been done by several enthusiasts.

Perhaps here is the place to briefly cover the variable features of the levers and plates used to equip slots to respond to sequential characters. The function bar is obviously coded for the desired action. Function levers (there are more than two dozen kinds!) can be obtained that:

- Operate electrical switches
- Suppress spacing
- Latch for one character
- Latch until released upon specific code
- Operate sequentially
- Operate top slides (Figs/Ltrs)
- Move bottom T-bars (blank-blank, CR, LF)
- Perform practically any combination of the above!

There are three different spring plates; plain, latching (one character), and latching (bail release). Figure 2 is a pictorial explanation of Lever and Plate variations. Sequential operation is used for the many station control features that are being used by many amateurs throughout the world with Model 28 machines. From figure 2 it can be seen that blocking and latching arms are available together or separately on a function lever. Assume you want to have the sequence "Figs - Blank - H" operate an electrical switch (commonly used for transmitter turn-off (N.C.) or as part of a longer sequence for WRU *turn-on (N.O.)). You would use a latching sequential lever in the "Figs" and "Blank" slots, and a plain lever** in the "H" slot. Of course, each slot that has a latching lever would have a latch spring

plate and a normal pawl. Over the "H" slot you would mount an appropriate switch. Now when the character "Figs" is received, not only does the Figs bar in slot 2 operate, but so will the one you have added for this sequence. This additional "Figs" bar and pawl moves rearward and will rotate and latch its associated lever, and the lever's blocking arm which curves around behind the next higher slot will move out of the way allowing it to operate on the next cycle. Similarly, if the very next character is a "Blank", the lever in that slot will unblock the next higher slot, where you have an "H" bar. If the next received character is an "H", the function lever in that slot will rotate and operate the switch mounted on top of the stunt box. Note that if any other character or garble is received in the midst of the sequence, the switch will not operate, as the stripper blade will unlatch all latched function levers on the next received character. As long as the blocking arm of the lever is not latched out of the way, the function bar of the next higher slot can not be "selected" or move forward into the code bars.

Sequential operations are the heart of all station control schemes; they always consist of two or more slots coded so as to respond to the desired sequence of characters. The longer sequences are used where more protection is required, such as WRU or reperf turn on; the shorter sequences are adequate for such things as CW ID activation, etc. (Note that codes are usually designed using character sequences that do not commonly occur in normal conversation.)

Here is where your work comes in - deciding what features you want in your station. A worksheet has been prepared to assist in planning your particular stunt box configuration. When considering optional function, it is essential that an electrical diagram for your station control scheme be made at the same time. A sample of a filled-in worksheet together with its associated station control is attached as Figures 3 and 4. This station control scheme is essentially that published by Irv. Hoff, W6FFC, in the May 71 RTTY Journal, and modified for reperf control, 4 N's deactivation, and CW ID changes. Figure three has been laid out with the author's call sign and for use with a Model 28 ASR, and in addition to the "standard three" features, has as options the following:

- WRU
- Reperf remote on/off
- Fig-BI-H shut down
- CW ID
- Bell on Bell; BK, and call sign

f. Station control arm/disable

It should be emphasized here that each individual should analyze his own requirements and equipment before he decides on what kind of station control he needs or wants. This sample is just one approach to the problem, and is not in any way the only or necessarily best way of accomplishing the task. (Several other approaches to station control are possible, from more mechanical use of the stunt box to a "pure" electronic logic approach.)

Figure four is the associated circuit diagram that was made to complement the stunt box layout. It would be helpful if the reader would place these two figures side by side as he proceeds through the following explanation.

One factor that becomes apparent

when a stunt box is removed from the printer is that there are only certain specific places that shift forks and switches may be mounted on top of the box, due to the location of the drilled and tapped holes. Since our example does not use any shift forks other than the normal space-figs-ltrs fork on the left end of the box, it will suffice to say that additional shift forks can only be mounted where the two large tapped holes are found across the top of the stunt box. Electrical switches can be placed more frequently; however, to get maximum utilization out of the switch assemblies, they too should be planned (also for neatness and economy). Switch blocks come in double or quadruple units, and are attached so that they will work over one to four slots, beginning with an odd

| KL7HKB M28 STUNT BOX CONFIGURATION | | | | | WRU REPERF ON/OFF AUTO TURNOFF BELL ON BK |
|---------------------------------------|--------------|---------|--------|---------|--|
| S L O T | FUNCTION BAR | | LEVER* | PLATE** | OTHER EQUIP & REMARKS |
| | DESC | P/N | P/N | TYPE | |
| 1 | SPACE | 155129 | 152642 | SPRING | ENABLE UNSHIFT ON SPACE |
| 2 | FIGS | 152666 | 152641 | SPRING | FIG-LTRS SHIFT SLIDE |
| 3 | LTRS | 152665 | 152641 | SPRING | |
| 4 | SC CR LF | 152671 | 152642 | SPRING | AUTO CR-LF |
| 5 | LF (P) | 153435 | 152641 | SPRING | LF 152668 PERMISSIBLE |
| 6 | N | 152689 | 152121 | LATCH | |
| 7 | N | 152689 | 152121 | LATCH | |
| 8 | N | 152689 | 152121 | LATCH | |
| 9 | N | 152689 | 152642 | SPRING | N.C. SWITCH - DISARM CONTROL |
| 10 | FIGS | 152666 | 152121 | LATCH | |
| 11 | BL | 152669 | 152121 | LATCH | |
| 12 | H | 152683 | 152642 | SPRING | N.C. SWITCH - TURN OFF TX |
| 13 | LTRS | 152665 | 152121 | LATCH | |
| 14 | H | 152683 | 152121 | LATCH | |
| 15 | K | 152686 | 152121 | LATCH | |
| 16 | B | 152677 | 152121 | LATCH | N.O. SWITCH - RING BELL ON CH |
| 17 | FIGS | 152666 | 152121 | LATCH | N.O. SWITCH - ARM CONTROL |
| 18 | UC BL | 152693 | 152121 | LATCH | |
| 19 | UC H | 152673 | 152642 | SPRING | N.O. SWITCH - TURN ON WRU |
| 20 | UC S | 152672 | 152298 | LATCH | N.O. SWITCH - RING BELL |
| 21 | UC BL | 152693 | 152121 | LATCH | |
| 22 | UC Z | 153161 | 152642 | SPRING | N.O. SWITCH - TURN ON REPERF |
| 23 | UC BL | 152693 | 152121 | LATCH | |
| 24 | UC D | 153521 | 152642 | SPRING | N.C. SWITCH - TURN OFF REPERF |
| 25 | B | 152677 | 152121 | LATCH | |
| 26 | K | 152686 | 152642 | SPRING | N.O. SWITCH - RING BELL ON BK |
| 27 | | | | | |
| 28 | | | | | |
| 29 | | | | | |
| 30 | CR/BL | SPECIAL | 152641 | SPRING | REMOVE TOP TINE OF BAR - SUPP SPA |
| 31 | | | | | |
| 32 | | | | | |
| 33 | | | | | |
| 34 | | | | | |
| 35 | | | | | |
| 36 | | | | | |
| 37 | | | | | |
| 38 | | | | | |
| 39 | SC CR LF | 152671 | 152642 | SPRING | AUTO CR-LF |
| 40 | LF | 152668 | 152642 | SPRING | NORMAL LINE FEED |
| 41 | FIG | 152666 | 152659 | LATCH | |
| 42 | LF | 152668 | 152641 | SPRING | N.O. SWITCH - TURN ON CW ID |

* 152641 - SPACE SWAP 152659 - SPACE SWAP (SEQ, LATCH) ** 152660 - SPRING
 152642 - PLAIN 161649 - LATCH (SEQ) 154613 - LATCH
 162059 - LATCH, SPACE SWAP 152298 - LATCH, PLAIN
 152121 - PLAIN (SEQ, LATCH) 153670 - UNLATCH BAIL 152089 - BAIL BEL LATCH PL

FIG 3

numbered slot (5).

Beginning in slot 6 is the station control disable sequence of 4 N's. This is shown on figure 4 as SB9 and will open the flow of current to relay K4, a double pole double throw unit. With K4 open, relay K5 cannot operate, thereby preventing unintentional reperf operation.

Slots 10 through 12 are the transmitter turn-off sequence, and shown on figure 4 as SB 12. This switch opens the holding circuit for relay K1, a four-pole double throw unit that is the heart of the station control setup.

Slots 13 through 19 constitute the WRU turn-on, shown as SB 19 on figure 4. Since the last three characters of this sequence are the same as slots 10 through 12, the relay R-C network in figure 4 insures that there is a different effect of the two switches SB12 and SB19. SB19 turns on relay K2, a double pole double throw unit, relay K1, and initiates relay K3, a time-out relay of approximately 30 seconds or so. A word of caution: NEVER operate a WRU without some sort of time out protection; if you wish to become famous overnight, leave it out, get a stuck TD, and thereby leave a carrier on an autostart frequency for several hours! Such operation is not only highly illegal, it also tends to make it hard for your signal to be "heard" for quite some time thereafter!!

Slot 17 has another switch shown as

SB17 on Figure 4; this turns on K4 with a fair amount of protection. Subsequent receipt of the sequence B1-Z in slots 21 and 22 will then close SB22 on figure 4, operating K5 which activates the reperf in the ASR by "unblinding" a solid state selector magnet driver (SMD) (TTY part number 177010). This SMD has the ability to follow the DC signal loop, reconstructing the signal to the reperf; by connecting two points together in the SMD (with a 47 ohm resistor) it is put in a "blind" or mark hold condition, without affecting the main loop.

Slots 23 and 24 then open SB24 which opens up the circuit to K5, turning off the reperf by "blinding" the SMD.

Slots 41 and 42 close SB42 which activates an automatic CW Ider (this one designed by WA1DLZ which in turn interrupts the TD until ID is completed at which time the TD is allowed to continue.)

A bell is energized for a short period (less than one revolution of the printer shaft or approximately 160 ms) upon receipt of: an upper case S, slot 20; letters B-K, slot 26; and SB16 respectively, which are connected in parallel to ring a bell or chime as desired.

The other switches on figure 4 are manual for non-automatic control of the transmitter, TD, CW Ider, or reperf. They may be mounted on the keyboard, on

CONTINUED ON PAGE 13

STATION CONTROL

- NOTE 1 CONTACTS K3a IN SERIES WITH K1a
 NOTE 2 MANUAL SWITCHES USED AS FOLLOWS:
 S1 TRANSMITTER ENABLE/DISABLE
 S2 MAIN TD ENABLE/DISABLE
 S3 RECEIVE (TRANSMIT OFF)
 S4 TRANSMITTER ON
 S5 TD INTERRUPT (PART OF CW IDER)
 S6 CW ID START
 S7 SELECTOR MAGNET DRIVER (SMD) UNBLIND
 NOTE 3 "SB" DENOTES STUNT BOX CONTACTS

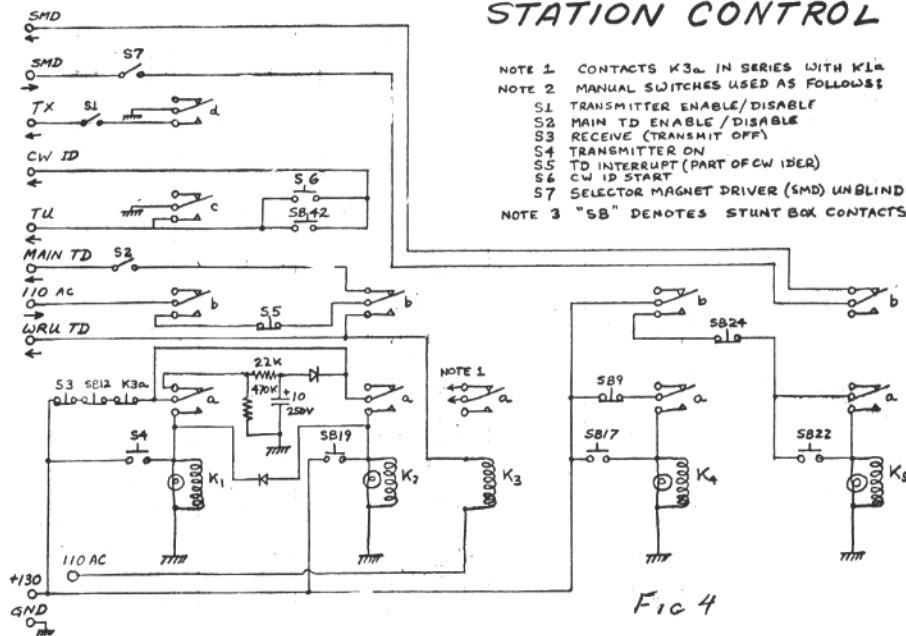
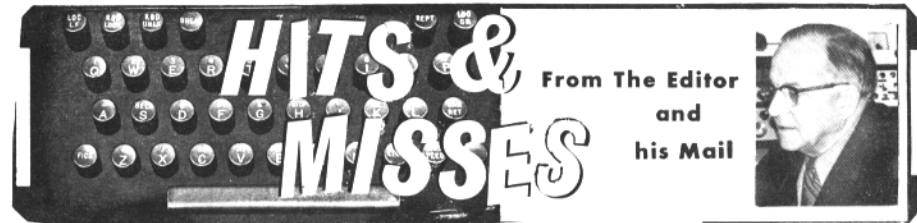


FIG 4

KL7HK8



A great many subscriptions expire with this December issue. This is the one time we would appreciate an early renewal due to the flood of work in December. It also helps if you mark renewal on your check. You would be surprised how many letters we get saying "send me the Journal for a year" when it is a renewal. We have learned now and always check first, in fact we have been able to decipher most of the problems that used to drive us nuts all except one thing - why does a magazine that has been sent from the same stencil for months suddenly come back marked - Unknown - Undeliverable. We get several of these every month.

When we first started publishing the Journal eight years ago we requested a limit of one year on subscriptions. We still prefer it that way. This is heresy in the publishing business to turn down multiple year subscriptions and does mean a little more work for us but with a one man operation and not getting any younger, we will feel more comfortable without long range obligations. Thanks.

The RTTY Art Contest is over and the judges are making their final decisions. We hope to announce the winners and maybe the winning picture in the next issue. The contest was international as 2 entries from Germany and 1 from Canada were among the entries.

NOTICE ON DAYTON ROOM RESERVATIONS

Due to confusion and shortage of rooms during the Dayton Hamvention the committee has received an allotment of rooms from all of the motels in the area. For a room reservation write to -- Reservations, Dayton Hamfest, P.O. Box 44, Dayton, Ohio, 45401 . . . State the number in the room, the arrival date and departure time. Acknowledgements will be mailed direct to you but allow for some time as the committee has just started to work. If you want to be with the RTTY group at the Imperial North Motel mention that on your request. As far as possible requested preference will be given. Rooms will be at a premium and if you

write direct now your answer will be - all sold out ----. Send your request to the Hamvention address.

BACK ISSUES --

New subscriptions and classified ads are cash in advance as we have no method for billing. New subscriptions 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

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 1972- April-May-July-Sept.-Oct.
 Nov.- Dec.- [7]
 1973- Complete. [10]
 1974- Complete- [10].

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Editor & Publisher 'Dusty' Dunn, W8CQ

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VHF RTTY NEWS

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



We are happy to say that we have received some VHF RTTY operating information. Certainly, there is not as much as we would like to see, but what we do have, helps.

Joe Stevens, WA4JZX, in Elizabeth City, NC (about 60 km south of Norfolk, VA) writes: "We have a little interest in the area in VHF FM RTTY using 2125/2295 on our repeater 146.46/147.06 WR4ADN. Stations on are KL7HIX/W4 and K4VHV. We have several assets to work with here: 300' (90m) tower at my shack, 28ASR, 28KSR, 33ASR, minicomputer, access to TWX (first RTTY autopatch?). We are running 60 WPM with no plans for any other speed. I don't know what direction we are running off into though - I am building the Radio-Electronics TV-Typewriter. I would be interested in getting any software for the Intel 8008 CPU that would be useful for amateur RTTY."

Duane Fruechte, W9HWQ, of Trempealeau, WI, had the following news: "Just a note to let you and the other VHF RTTYers know about the activity in the western Wisconsin area. At present in the La Cross, WI, area we are using a frequency of 145.6 MHz wide shift on AM. There are three stations on 24 hours a day autostart: W9HWQ, WA9HCZ, and WB9BJQ with several others on at various times. This group has been on for the past two years. This is a very informal group and all are welcome at any time."

Tom Talley, W8HQQ, sent the following information on the MARA (Midwest Amateur RTTY Association) repeater in Cincinnati, OH: "The MARA 2 meter voice/RTTY repeater is now on the air (a little late by about 2 months but nevertheless "on the air"). We still have several things to do, but it is working fine. The power output at this time is 200 watts, but will be increased to 374 in about a month. It is currently locked into the voice C.O.R. (carrier operated relay/repeat) mode, but the presence of a mark of space signal (RTTY) will switch it into the RTTY

mode. In other words, it will follow you. The MARA Net probably will resume sometime around the first week or so in November, on Monday evenings at 7:30 local time.

"Stations are getting into it from Columbus. This new 2 meter MARA repeater is on the standard 147 MHz pair of 147.69 in/147.09 out." We had a summary of the MARA 6 meter repeater in this "column" in 1972 NOV. For an idea of the complexity/cleverness of the repeater see that "column". For additional information, you can write to Tom Talley, W8HQQ, 940 North Hill Lane, Cincinnati, OH, 45224. Thanks, Tom. Thanks also to Joe and Duane.

We also have a bit of VHF RTTY news from here. After a long delay, W8AYS, Clarence Kersker finally got going on the "standard" 30F2 146.700 MHz with his 2125 es 2975 "tweedles", vertically polarized, of course. He has been putting in a potent signal here in Ada - all the way from Lima (OH). We have also been hearing Bob Jeffrey, WB8DUO, from Fostoria, OH. Seems he has lots of RF, but something has been happening to the tones or the keying. There are a lot of potential VHF RTTY operators around here (as is probably the case everywhere). Why don't they get on?

The following item was accidentally omitted about 14 months ago. Although not necessarily current news, it is certainly worth printing here.

Vladimir Holena, OK1ALV, has the following information on the OK7ULZ VHF Group repeater: "At the end of last year (1972) we finished the design and construction of the linear 2 meter repeater, the first in Czechoslovakia. It is presently (mid 1973) under test here in Praha and at the beginning of the summer it will be installed on the highest mountain in Northern Bohemia - Snezka (Snow Hill) - altitude 1602 m. Until now, more than 100 contacts were made thru the repeater - both local and abroad. Listed below are the basic characteristics.

(1) Call sign - OKQA. 2) Input frequency centered at 145.1 MHz. 3) Output frequency centered at 145.7 MHz

(IARU Channel R4). 4) Tone access is 1750 Hz and the PA is automatically shut down 2.5 minutes after the end of the last QSO.

"All modes including RTTY can be used. Maximum output, 10 W PEP. Antennas - crossed dipoles. Bandwidth - 15 kHz. The call sign is transmitted once a minute on the output channel (OKQA, 145.7 MHz). All stages including the identifier are fully solid state except for the final amplifier. (We had no experience with protection against static and tubes are much cheaper.) The chief designer and constructor of the repeater is Stan Blazka, OK1MBS."

Vladimir would like information about activity (RTTY) elsewhere, including any club bulletins. "If there is any club issuing its own RTTY magazine, I will be glad to know about it. All free samples and/or back issues will be welcomed." Send them to Vladimir Holena OK1ALV, Pobrezni 54, 186 000 Praha 8, Czechoslovakia.

Vladimir is the RTTY Editor for their club bulletin: "Radioamatersky Zpravodaj." Because of currency exchange problems they cannot send currency from Czechoslovakia; therefore, any free literature is greatly appreciated.

We have one very interesting technical item sent to us by Eskil Hedetun, SM7DMG; it describes the Siemens Fernschreiber 106. It looks very much like the Teletype Corp. M15 with two exceptions: 1) The keyboard has 4 rows of keys, and 2) The type pallets contain 4 characters each. Which of the four characters is to be printed is determined by shifting both the type basket and the platen! The code used is quite similar to the 6-unit Teletypesetter code.

Well, that's it for this month. Please keep sending VHF RTTY operating information to us. 73, ES CUL, RG

1974 BARTG Contest Results

| No | Call sign | Points | | | | | | |
|----|-----------|--------|----|--------|-------|------------------------------------|-----------------|--------|
| 1 | SM4CMG | 215080 | 37 | ON4BX | 46592 | 74 | VE7YB | 14564 |
| 2 | I6NO | 210600 | 38 | W7IU | 46438 | 75 | LA5HE | 14520 |
| 3 | I5WT | 169722 | 39 | DL8VX | 44288 | 76 | WA6TLA | 13536 |
| 4 | XZ5BH | 150552 | 40 | VK3KF | 40620 | 77 | W6AEE | 13088 |
| 5 | KH6AG | 134620 | 41 | SMOY | 40300 | 78 | V56EK | 12870 |
| 6 | I1YTL | 131600 | 42 | DJ1QT | 39676 | 79 | K1YGF | 11368 |
| 7 | K4GMH | 112896 | 43 | SM6AEN | 39232 | 80 | SL5AR | 10560 |
| 8 | HK3PB | 110970 | 44 | SM6CDG | 38232 | 81 | W3CRG | 9500 |
| 9 | XE1LL | 109058 | 45 | VK5IF | 39016 | 82 | OK2BJT | 8184 |
| 10 | G3MWI | 108600 | 46 | VP2MKH | 37000 | 83 | WB9JTK | 7502 |
| 11 | ON5WG | 107712 | 47 | ON4CK | 36624 | 84 | JA1EUL | 7140 |
| 12 | W4CQI | 107424 | 48 | WA6WGL | 36512 | 85 | IT9APZ | 6710 |
| 13 | I1PXC | 107100 | 49 | CE3EX | 34408 | 86 | SM0KV | 6606 |
| 14 | KX6LA | 106568 | 50 | W0MT | 34268 | 87 | OZ4EDR | 6500 |
| 15 | JH1TFF | 96600 | 51 | W7BCT | 33800 | 88 | G3OUR | 5900 |
| 16 | HB9AVK | 89884 | 52 | W9KDX | 32550 | 89 | W8TCO | 5616 |
| 17 | PY2CYK | 86602 | 53 | HB9HK | 30900 | 90 | VE4SC | 5054 |
| 18 | W0CJZ | 79294 | 54 | LX1JW | 27750 | 91 | SM6EDH | 4662 |
| 19 | I1COB | 78936 | 55 | VE5LG | 26372 | 92 | OZ4XR | 3564 |
| 20 | DJ8BT | 72324 | 56 | G3RDG | 36760 | 93 | OK1AMS | 2260 |
| 21 | I0ZAN | 71972 | 57 | E18BZ | 22932 | SHORT WAVE LISTENER SECTION | | |
| 22 | 9Y4VU | 71484 | 58 | W1GKJ | 22360 | 1 | K1LPS/I8 | 197424 |
| 23 | OZ4FF | 69044 | 59 | I0TTC | 21960 | | Larry Filby | |
| 24 | DL1VR | 66744 | 60 | W1MX | 21560 | 2 | H. Ballenberger | 107800 |
| 25 | K6WZ | 64862 | 61 | G8LT | 20580 | | DL-SWL | |
| 26 | 9Y4RB | 63060 | 62 | VE2JR | 20328 | 3 | R. Giarnello | 104244 |
| 27 | DK2XV | 61050 | 63 | WA4JJY | 20292 | | 13 130138 | |
| 28 | G3YDR | 60636 | 64 | HA5KFZ | 20286 | 4 | P. Winchester | 104144 |
| 29 | W3EKT | 59976 | 65 | UA9PP | 19210 | | BRS 25676 | |
| 30 | G6JF | 59004 | 66 | FO8BO | 17800 | 5 | A. Marchesini | 86490 |
| 31 | W5EUN | 56376 | 68 | WB4ZDA | 17460 | | I4 14707 | |
| 32 | W8JIN | 52990 | 69 | I2SVA | 16800 | 6 | D. R. Hare | 75760 |
| 33 | W3KV | 50688 | 70 | G3IIR | 16520 | | BRS 27239 | |
| 34 | PA0WDR | 48642 | 71 | WB6QFE | 16072 | 7 | P. Menadier | 70392 |
| 35 | OK1MP | 47038 | 72 | DF1FA | 15680 | | U.S.A. | |
| 36 | VE7UBC | 46950 | 73 | WA0TAS | 15232 | *** | | |

RTTY-DX

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



HELLO THERE

Funny thing about a Contest; when it ends the silence seems to be louder than the noise that preceded. Anyway, the CARTG "Winnipeg Centennial" is in the record books and while there may not have been records broken there sure was a lot of activity. Conditions can best be described as very good. Had the test been scheduled for one week later it could have well been a disaster as the bands were closed down due to solar activity. There certainly were some king sized pile-ups when such rare DX as XW8HJ, HZ1SH, 3A2GX, SV1EC, CR6GA, and 4U1TU showed up for brief periods on one or more bands. There are sure to be several very high scores judging from the numbers being given out toward the end of the contest. Band/Country multipliers will be up around the 90 mark in several logs and WAC was not difficult with Africa and Asia quite active. I am sure that in the latter category was Henri, LU2ESB, this being his final contest effort from the LU QTH. Henri will soon show up with a PY call and we have no doubt that whatever the call is, it will be heard in the future RTTY Contests.

Activity by Tony, XW8HJ, was certainly a surprise in the Contest and his activity carried over for a few days after with strong signals to the East Coast USA. The shift was 850 hz and speed at 50 baud but this may well have been changed to the narrow shift and 60 speed by now. Tony will be active from Laos for a few years so there should be no problem to contact him eventually. He may also operate from other countries in that area if permission is granted. His QSL manager was misprinted in the last issue, so to set the record straight, cards for XW8HJ go to --

Glenn Kurzenknabe, K3SWZ
403 Centerview Av.
New Cumberland, Pa. 17070

The contest mayhem must have stripped the gears in Feisal's machine as he has not been reported on since that time. For the lucky few that have made contact thus far QSL's for HZ1SH can go to --

12 DECEMBER 1974

P.O. Box 2108
Jeddah, Saudi Arabia

While everyone cannot win a contest, it is always nice to see how you made out in the overall results and perhaps gather data so that you can do better in the next one. Our observation has been that the Contest Managers do an outstanding job of itemizing the results showing QSO and multiplier breakdown for each entry along with general comments submitted by the participants. However, what you see published is usually only the first ten or so scores, particularly in a publication such as this, with limited space for many diverse activities in RTTY that all have to fit into a magazine with a postal weight limitation. We hasten to add, however, that complete results of contests are published in some of the publications but not everyone subscribes to all of them. Ted Double, Contest Manager of the BARTG, informs us that complete returns of their contest will be sent upon request at the time you send in your score. For European stations enclose 1 IRC and all others 3 IRC and results will be forwarded by Air. I am quite sure that the same would apply to other contest sponsors and the reciprocal in IRC's for the CARTG contest based in North America.

In addition to his RTTY activities, Bud, W2LFL, has been working via the Oscar 6 satellite since last August and has found many of the RTTY gang engaged in similar activity. While this has been on either CW or SSB, RTTY will not be long in coming. In fact the Oscar 7 package will be sending out telemetry information on 144 and 432 mhz in 850 shift at 60 speed. Imagine, international RTTY DX on VHF and UHF!! You will certainly recognize some of the following calls that are presently active via Oscar, 15CTE, I1KFB, I1BAY, F8XT, EI5BH, DK3NG, DJ1QT, TF3IRA, OE9ERI, ZL1WB, VP2KH, W6CG, CN8BO, and no doubt many more. At this writing the impending launch of Oscar 7 has been delayed at least three weeks due to launch vehicle problems.

In the meantime, look for Bud on 29490 khz.

No activity from the Philippines for quite a while but via Gin we hear that DU1POL is now QRV.

We understand that OE9ERI has had contact with XT2AE but further info not available at the moment.

VK9XW has filtered through to the East Coast USA during the early morning hours recently, so keep listening.

QSL's are being mailed for the VP2 MRW operation so a SASE will get a card from Knobby. QTH listed last month.

Ariel, 4X4MR, is out of QSL's for the moment, but it has been suggested that a "homemade" card with all the QSO information does get results.

IC8SMY, while counting as Italy is a good catch for the prefix hunters. He has been quite active and is located at P.O. Box 39, Ischia Porto, 80077, Italy.

Larry, K1LPS/I8, and formerly KG 6NAA, recently traveled through northern Europe and had the opportunity to meet the boys at OZ4EDR and club president of the SARTG, OZ4FF. Larry is on the down side of his duty tour and expects to be "green keying" from Vermont again sometime next year. So you fellows needing Vermont to complete WAS be patient just a while longer.

Mike, OY1M, had some machine troubles causing a short QRT but seems to be back in business again. In addition to the home QTH previously published, he does have a QSL Manager and this route may be more convenient, it is -- R.F. Huntington, W6TCQ

5014 Mindura Drive Torrance, Ca. 90505
Congratulations go to the following stations for --

| | |
|------------|--|
| WAC | Nr. 232 James Sims W5RYA |
| WAC 14mhz. | Nr. 2 Howard Markwell WØMT Nr. 3 James Sims W5RYA Nr. 4 Hans Shalk DJ8BT Nr. 5 Kungl. Soderman- lands Regemente SL5AR Nr. 6 Heinz Lammel DK4ZF |
| WAC 21mhz. | Nr. 1 Howard Markwell WØMT Nr. 2 Hans Schalk DJ8BT |

Well, now that everyone has had a good long rest, it is time to get set for the Volta Contest which should take place in about a week or so. OX3JW should be active in this one.

The recent articles published using the UART and FIFO chips has caused a tremendous interest in their use for RTTY terminals. Pete, W6KS, has been making them available at about cost and postpaid stateside and now passes word that he can make them available to DX stations also. Units can be sent at the airmail letter rate and he has had success in doing this to several countries. See Pete's offer in the "Classified Ads" to obtain these hard to get items.

In the next issue we will run the RTTY -DX HONOR ROLL. To up-date your listing, please have the totals to me by 1 December. Those wishing to participate for the first time just send me two numbers, DX worked/DX confirmed, no list or QSL's needed until 100 confirmed is reached.

Since this is the December issue it indicates that another year has passed. In our age bracket there is a tendency to ignore the fact that "time marches on", but regardless, 1975 is just around the corner. Anyway, we wish all of you and your families a very Happy Holiday Season along with sincere thanks for your support of this column by your timely and informative contributions throughout the year.

73 de John

CONTINUED FROM PAGE 8

the ASR front panel over the TD, of just about any convenient spot to the operator. Indicator lamps should be near the switches. The relays themselves can be mounted on the LESU or in the basement of the machine; the only caution is to insure isolation of the CW IDER from noise impulses to prevent false operation.

The foregoing was intended as a quick guide to understanding the M28 Stunt Box. Hopefully, it will give the reader the proper orientation to dig into his machine and learn first hand just what operations occur in the stunt box, and what can be done for his particular desired options. The author wishes to thank all who provided ideas and encouragement for this article, especially Fred WA1DLZ whose assistance was most helpful.

*WRU - Literally "Who are you", but used here to define an automatic short answer back that acknowledges a call.

** A plain lever will permit momentary operation of the electrical switch. If it is important to have the switch operated for an entire character interval (163 ms), a latching lever may be substituted.

DECEMBER 1974 13

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

Cash with copy, Deadline 1st of month.

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TELETYPE MANUALS, 250B, Adjustments and Lubrications, Model 28 Perforator Transmitter LAK, LPE, LTPE, LAAC, new \$3.50 postpaid in U.S., Bob Graham, 2105 N.W. 30th, Okla. City, OK 73112

WANTED: MODEL 33 & 35 EQUIPMENT. Complete or partial units, any quantity. Will pay shipping. Terminal Systems, Inc., 11300 Hartland St., North Hollywood, CA 91605 (213) 769-6772.

RTTY VIDEO DISPLAY UNIT: 1000 characters, plugs into loop or logic circuits. ASCII or BAUDOT available. Works with any TV set. Leland Associates, 18704 Glastonbury Rd., Detroit, MI 48219

TELETYPE RIBBONS, Black nylon, fresh stock \$3.95/DOZEN, 50¢ each, plus postage (2 pounds per dozen). CV-89 SCHEMATIC and 14 important pages copied from NAVSHIPS manual. \$2.95 postpaid. 11/16 PERFORATOR TAPE, \$2.95 for ten rolls, \$8/case of 40 rolls plus shipping (49 pounds per case). JIM COOPER W2BVE, Communications Equipment, Supplies and Information, P. O. Box 73-T, Paramus, NJ 07652.

TECH MANUALS---\$6.50 each: TT-63A/FGC, CV-591A/URR, R-390/URR; following manuals \$8.50 each: TT-47/48, R-388/URR, USM-50, 51J4, FR114/U; following manuals \$10.00 each: R390A/URR, SRR-11, 12, 13, USM-32, URR-35C. Special manuals (limited quantity): TM-03315-15 TGC-14/14A \$10, Navships 95898 TT-298A/B, TT-299A/B \$12.50, Navships 0967-170-8010 UGC-38, 40, 41 \$12.50 14 TD manuals \$2.50 each. Thousands more in stock. Send 50¢ (coin) for large list. W3IHD, 7218 Roanne Drive, Washington, DC 20021.

HAL COMMUNICATIONS CORP. announces the DKB-2010 Dual Mode Keyboard. Provides flawless transmission of RTTY and Morse Code with standard 3 character buffer and optional 64 or 128 key buffer. Call letter identifier and "Quick Brown Fox" sequence standard. Write for detailed spec sheet. HAL Communications Corp., Box 365RJ, Urbana, ILL. 61801. Phone 217-359-7373.

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MODEL 28 - RIBBON REINKERS - MODEL 28 We have cleverly (well, we think so!) remanufactured the Model 14 reinker mounting brackets, so that they install on the Model 28 typing units in just minutes. No cutting, or drilling required. Comes with installation instructions, spare inkwell, replacement felts, etc. Send check or money order for \$3.50 (includes postage in U.S. - overseas customers include an additional \$5.00) to: W.H. Craig, P.O. Box 947 Grayson, Kentucky, 41143. For an additional \$.85 we'll include a nice fresh tube of NCR's K-575 black ink. Return for full refund if not satisfied. Limited quantities.

WANTED: WESTERN UNION MODEL 105 parts source. Especially looking for maintenance manual and main driveshaft fibre gear. Richard Garcia, WA5VMW, 4826 Rollingfield Drive, San Antonio, TX. 78228

CIRCUIT BOARDS: CW-ID, Oct. 1974 Journal \$8; Frequency Standard 1974 Ham Radio, \$8; Digital Autostart June 1973 Ham Radio, many built, a few left at \$10 set, including automatic CR/LF board; SSTV Test Generator July 1973 Ham Radio \$5. All boards epoxy, plated, undrilled, sent First Class mail, US or Canada only. Bert Kelley, 2307 S. Clark Ave., Tampa, Fla. 33609

SALE: MODEL 28 TYPING REPERF, type 315/UG code LPR-35, or TT 317/UG code LPR-37, tape data 11/16" wide, Chadless or fully perforated; Good \$25.00 each. Model 28 Transmitter-Distributor type TT 334/UG code LXB-9, Good \$25.00 each. Tuning forks 96.19 VPS, or 120 VPS. Unused \$2.00 each. Mite PD/82U 115VAC, 60 cy. Synchronous motor with connector Unused \$18.00 each. Reader, High Speed Ferranti model Mark II or III Good \$15.00. TT Socket wrench 5/16" with 12" long handle. 75¢. 60 WPM set gears for Model 14 TD 1800 RPM Unused \$4.75. . . Model 14, 15, and 19 Machines available. Also LORENZ LO-15 ASR and KSR (IT'S A REAL BEAUTY). Send us a list of your needs. ATLANTIC SURPLUS SALES CO. 1902 Mermaid Ave. Brooklyn New York 11224 Tel. (212) 266-2629.

CLASSIFIED ADS-

HELP! HELP! ANYONE know where I can buy, beg, borrow or copy Schematic and/or manual for Erie 400 countertimer? WA0IVN 3875 Newland, Wheat Ridge, Colorado 80033

33ASR, \$595.00 Control data model 607800 tape punch useable on 5-6-7 or 8 level, \$55.00. Control Data model 600700 photo electric tape reader cds cells 5-6-7 or 8 level, \$35.00. Special reader and punch \$75.00 schematic furnished. Frieden 2312 tape reader \$50.00. (8 level). Frieden ATR tape reader \$35.00 (8 level). One CV89 left at \$95.00 with manual. Lou Carbaugh, P.O. Box 398, New Cumberland, PA. 17070.

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

COLLINS FILTER, Crystal Bandpass with 455KC Center Frequency and Minimum 6DB Bandwidth of 300 CPS. Type No. X455KF300, P/N 526 7073 010 Collins spec. sheet included.

Use for Narrow Shift RTTY with 75S Line (no receiver modification necessary) or 75A4 (installation instruction included on request).

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

FIFO's/UART's. Fairchild 33512 plastic 9x40 FIFO for down-converter transmitting buffers, etc., \$13.00 each, 2/\$25 postpaid with summary data sheet. TMS-6011NC UART's \$11.00 postpaid. See prior Journal ads. Courtesy airmail to overseas RTTY'ers. Peter Bertelli, W6KS, 5262 Yost Place, San Diego, CA 92109. 714-274-7060.

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

CW IDENTIFIER PARTS PACKAGE: 64 character memory, (twice the memory of the K20AW ider). Package includes plated, drilled board, ICs, diodes, resistors, capacitors and (optional) IC sockets. \$39.95 or \$42.95 with sockets. Roger Kissel, WB8GIW, 1446 Sunset, Fairborn, OH. 45324

WANTED: CASH DEAL 100-300 watt transmitter. VFO with FSK modification. Any make, model or kind considered. Must be in good shape, stable and ready to use on RTTY, as I am too old to build here. Being deaf, other modes not required, but not excluded. FSK adaptor must be reliable, adjustable shift for all bands. Especially 20-40. Should be capable of loading all band antenna without tuner. To be used with Hal Keyboard. Any suggestions or offers promptly acknowledged. New or used. Claude Sweger, W5SHC, Box 1842, Ft. Stockton, TX 79735

EQUIPMENT FOR SALE: Model 28 KSR teletypewriter complete, geared for 65 WMP, internal loop, \$350.00. 1-RO 28 Teletypewriter complete, geared for 67 wpm. Internal loop, \$250.00. 1-FCS 250 Converter, 2975 and 2125 coils complete with autostart, \$150.00. 1-Homebrew converter, 2125 & 2295 coils, w/ 24 hour clock start, \$35.00. 2-Regenerative repeaters, w/ mercury wetted relays, as is, each \$15.00. 1-11-0 to 110v voltage regulator transformer, \$10.00. 1-6" Bud relay rack, \$10.00. 1-RCA fixed freq. (crystal) receiver, 7 to 12 KC with squelch. \$25.00. 1- Rack mount and cabinet for 28 Teletype table mount, \$30.00. Contact Bill Haley, W0EGA, 2310 Jones St. Sioux City, IA, 51104, 255-8332.

RTTY PICTURE PERF TAPES. "Danae" by Rembrandt van Rijn, originated for RTTY by WA6PIR and just released! "U.S.S. Enterprise", "The Last Supper", "The Blue Boy" (Gainsborough), "Pinky" (Lawrence), "The Three Jokers" (Laurel, Hardy, W.C. Fields) by Neil Petlock, K9WRL, and over 300 others including portraits, religious themes, Christmas and Holiday themes, art reproductions, Playgirls and pin-ups, cartoons, animals, nature and travel scenes, symbols and logos, etc. Completely error-free 5 level 11/16" chad perf tape (fully punched, no lids). Send 16¢ in stamps (no SASE, please) for complete catalog and details, plus list of free RTTY humor and articles. This is NOT an illustrated catalog. Joe Dickens, WA9UGE, 601 S. Dodson, Urbana, IL 61801.

HAL COMMUNICATIONS CORP. can provide you with the proven video display system, the RVD-1002. When coupled with the RKB-1 keyboard, you will have the ultimate in noiseless, reliable reception and transmission of Baudot coded RTTY. The RVD-1002 receives TTY pulses from the HAL ST-6 or any other demodulator, and generates a 1000 character display. Copies at all four standard speeds with selectable unshift on space. The RKB-1 features a high quality commercial keyboard, reliable solid state circuitry, and a rugged, attractive cabinet. BankAmericard and Master Charge now accepted. HAL Communications Corp., Box 365RJ, Urbana, Ill. 61801. Phone 217-359-7373.

FOR SALE: MODEL 28 EQUIPMENT. Several excellent KSR's and ASR's to choose from. Assemblies and parts. Stunt boxes coded. Model 15's \$30.00; 14 typing reperfs \$25.00; 14 R-T set, \$25.00. K8JOF, 2448 N. Wilson, Royal Oak, MI 48073

FOR SALE: GALAXY MARK 3, Transceiver with both power supplies. \$250.00. Crating and shipping extra. W9WKC, Ed. Trego, 517 Market St. Hoopeston, IL. 60942.

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