

MORE ABOUT THE ELECTRONIC TP CODE GENERATOR

WILFRED van HEDDEGEM, ON4HW
Kortrijkstraat 40, Oudenaarde, Belgium

Since it was treated in the March issue of this magazine, the circuit of the "Electronic Teleprinter Code Generator" has undergone some modifications. These are rather simple, and although the original circuit is entirely satisfactory for normal typing, they add to the flexibility of the system and therefore can be recommended to the one who considers to duplicate it.

One of these modifications consists of substituting $2\ \mu\text{f}$ (e.g. 20 volts electrolytic) capacitors for the $0.22\ \mu\text{f}$ capacitors connected to the keys, and using a diode in the matrix even for characters which make only one of the memory BMV's change its level. This allows to press a key as soon as say 23 milliseconds after the previous one while holding down both keys until the signal corresponding to the second key starts to be generated, or longer. The latter will take place in the right way.

With the original capacitor value this somewhat unusual typing procedure gave rise to a faulty composition of the second signal. In fact we got a combination of the first and second one; e.g. Y became "all spacing" if the first character was R, CR or LF and M became T if the first character was W, L or Z. This was due to the finite reverse resistance of the matrix diodes, through which the capacitor at the first key communicated its charge to that of the second key, in such a manner that, at the moment the second character had to come in for its turn, the capacitors had approximately equal charge, so that both could make flip their respective sets of memory BMV's at the same time.

The $2\ \mu\text{f}$ value is amply sufficient to make the charge communication slow enough for transmitting speeds of 45 bauds or more, and the normal charging-up time constant remains small enough compared to the available time of 22 milliseconds.

This modification being executed, the only case in which an error will still be possible is when a key is pressed during the start element of a signal that is being generated. Indeed, the latter will be faulty then.

Instead of changing the capacitor value one can also substitute silicon diodes for the germanium units in the matrix. This should have equal result, but it would be less economical.

Modification number two simplifies the addition of a (home brew) tape reader. The latter can consist of not much more than an

electromechanical tape feed system and five contact springs touching a common bar through the holes of the tape.

Here is what has to be changed in the code generator:

1. Take the "b" outputs of the memory BMV's at the collector of the other transistor.

2. Make the levels of the memory BMV's change for the "mark" elements instead of the "space" elements as was originally done. This involves changing the connections of the keys to the vertical matrix lines in such a way that V, X, M, Figs, R, etc. become resp. E, LF, A, Space, Y, etc. and vice versa, and adding a 31st vertical matrix line consisting of 5 diodes to which the Ltrs key is connected. The key connected to G11 can be omitted if desired; if one is used it will provide the "all spacing" signal.

3. Bring out connections to the horizontal matrix lines (A1 to A5), the "keyboard common" (B), G11 (C) and the collector of Q33 (D).

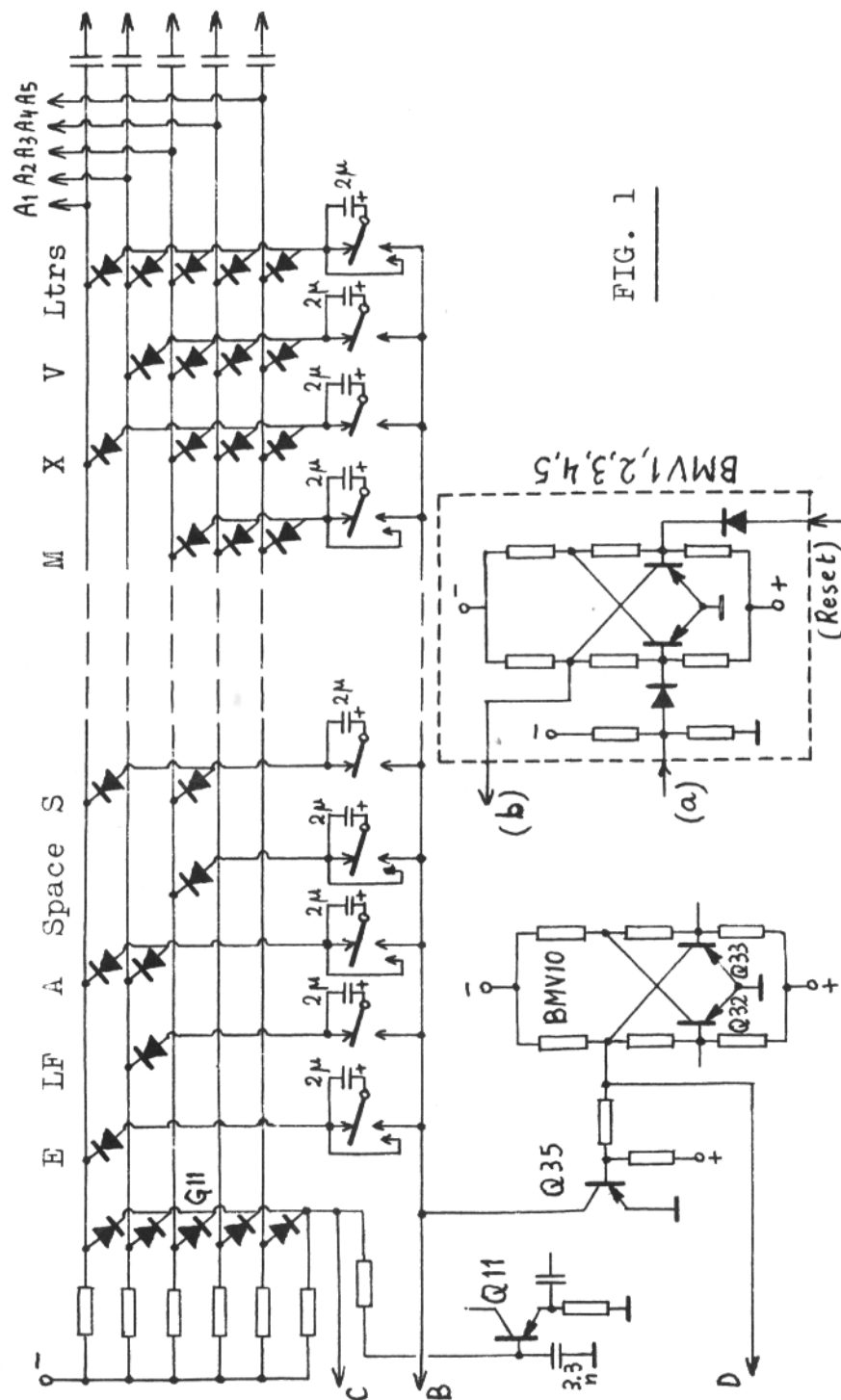
Fig. 1 illustrates the described modifications.

The circuitry of the tape reader can look as in fig. 2.

In position 1 of the switch (S) the tape reader is disconnected. The diodes in the leads A1 to A5 are necessary to prevent cross-talk between the matrix lines when the keyboard is operated, and when more than one of the five tape reader contacts are closed.

In position 2 the common lead of the tape reader contacts are connected to the "keyboard common." If at the moment of switching from position 1 to position 2 the reader contacts "feel" anything else than an "all spacing" perforation, a positive going voltage step will occur on one or more of the lines A1 to A5. G11 will then have an output pulse which causes the TP code generator to start. The positive going voltage step appearing at the collector of Q33 (line D) at the end of the start element triggers the MMV. The latter produces a pulse which is amplified to energise the tape feed electromagnet. As a result the tape is moved to the next row. The code signal corresponding to this row will then be generated as soon as the previous one is completed.

If an "all spacing" perforation is encountered none of the lines A1 to A5 will exhibit a voltage step. Hence there will be no output



from G11 and the code generator will stop. This automatic stop can be useful for some applications. To start again after an automatic stop it is sufficient to press a key on the keyboard, preferably the letters shift key or the "all spacing" key if one is provided. Another possibility is to put S on position 3 for a moment and then back to position 2. To type a text on the keyboard after an automatic stop, S should be turned to position 1. No doubt there can be devised more sophisticated circuits which enable operating the keyboard after an automatic stop without having to turn S to position 1.

In position 3, G11 is bypassed and, as a result, the tape reader will run free, ignoring "all spacings."

The system using contact springs as reading devices has been treated here to explain the basic operation of the tape reader. Although such a system has proved to be workable, it is better to replace the contacts by semiconductor switches driven by photosensitive elements.

The complete circuit of the tape reader used by the writer will be described in a future issue of this magazine, together with some mechanical considerations.

73 from Wilf, ON4HW

A Proposed Autocall System (Continued) . . .

the text. The recommended sequence for automatic sending is as follows:

1. Callword or Callwords
2. 5 LTRS
3. CRR, CRR, LF, LTRS.
4. Text

This sequence will prevent printing of extraneous characters and will begin the text at the left margin.

A similar philosophy shall apply to the shutdown routine. The upper case H will be selected as a shutdown command. This function can be permanently wired into the Autocall Receiver since it is not likely to require modification. An alternate shutdown command will be initiated thirty seconds after receipt of the last space pulse from the terminal unit. Thus, the receiving teleprinter will not be left running if the transmitting operator forgets the shutdown command.

The Autocall Receiver shall, upon receipt of either shutdown command, initiate the following sequence:

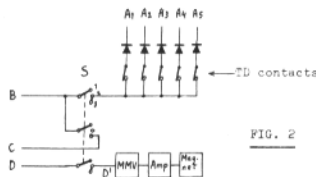
1. Inhibit loop-keying immediately;
2. Open the motor control relay;
3. After a suitable delay, open the loop power control relay.

This sequence will permit a "clean" stop for the called printer.

The automatic traffic distribution capabilities of such a system are immediately visible. A single tape containing the proper callwords, texts, and shutdown commands could be transmitted, and each station or group of stations would print only the messages directed to it. Unanimous callups for emergency traffic

OFFICIAL BULLETIN NR 57 FROM ARRL HEADQUARTERS NEWINGTON, CONN., APRIL 28, 1966 TO ALL RADIO AMATEURS

By order dated April 25, 1966, the Federal Communications Commission has relaxed its requirements for filing a change of name or of mailing address only. Effective May 20, 1966 if only the name or the mailing address has changed, the amateur may send a letter to the FCC, Gettysburg, Pennsylvania 17325, setting forth the changes and keeping a copy of the letter with his license until the next renewal. Where the transmitter location is changed, or the trustee of a club station is replaced, formal modification on Form 610 with fee of two dollars is still required. Full details will appear in June QST. AR



or for bulletins would be initiated by use of the allcall word.

Pitfalls of the system are few. The only problem that may arise lies in the choice of the callwords. There are a number of words in the language that have within them four consecutive letters that could coincidentally be a chosen callword. Not many such instances will occur in practice, however, and a little forethought will eliminate this risk. Even so, the occasional "wrong number" would not cause serious inconvenience.

The construction of the programmable receiver would be a highly complicated undertaking for even the most experienced builder if conventional components were used. For this reason, the system has been designed with all logical functions performed by integrated circuits. This, of course, eliminates the possibility of the device being built from junkbox parts. The costs of parts for the Autocall Receiver is just over \$100. If several builders make a joint purchase, they can capitalize on the price breaks offered by the distributors of the integrated circuits. The original receiver was built with Fairchild industrial RTL circuits. The present revolution in integrated circuits makes several other families attractive for this project.

The author invites comments from the readers of this article. Any suggestions or criticisms will be appreciated. If sufficient interest is shown by this response, the complete plans for construction will be published in a later issue of this publication. Please direct your comments to:

P. J. Prossen, WA6ZUH
P. O. Box 537
Westminster, California 92683

A PROPOSED AUTOCALL SYSTEM FOR RADIOTELETYPE NETS

There has been considerable interest shown in Radioteletype Autocall systems in the past two years. Several worthwhile schemes have been published, and some of these are actually in service at this time. It is the purpose of this paper to present a new autocall scheme for comment by any readers who have opinions on the subject.

The mechanism of the autocall system shall be a programmable receiver which recognizes a specific word. The word shall be four characters in length and shall be composed of the various combinations of any two alphabetical characters. One of the characters will be defined as the "1" character, and the other will be defined as the "0" character. The word will actually be a binary number with the chosen letters substituted for the binary digits. For example, suppose we choose the letter "K" for the "1" digit and the letter "R" for the "0" digit. The following set of words is then possible:

RRRR	KRRR
RRRK	KRRK
RRKR	KRRK
RRKK	KRRK
KRRR	KKRR
RKRK	KKRK
RKKR	KKRK
RKKK	KKRK

These words are written in order of increasing magnitude as binary numbers. If we now choose "P" for the "1" digit and "K" for the "0" digit, we will obtain a set of words which is the same set as above, except in the reverse order:

KKKK	RKKK
KKKR	RKKR
KKRK	RKKR
KKRR	RKKR
KRKK	RRKK
KRRK	RRKR
KRRK	RRKR
KRRR	RRKR
RRRR	RRRR

In the first case, we must reject the word RRRR. In the second case, we must reject the word KKKK. These non-permissible words are the "0000" words which are reserved as the "empty" condition of the decision register. Thus, for any pair of characters, we may realize two sets of 15 useable words. Fourteen words are common to both sets. This leaves one unique word per set in addition to the 14 duplicate words. Thus, the maximum number of usable words for each pair of alphabetical characters, regardless of order, is 16.

With a 26-character alphabet, we may choose our first character in any one of 26 ways. Remembering that the two characters must be different, we may choose the second

character in any one of 25 ways. We thus have 650 possible pairs of characters. Half this number must be disregarded since, in this instance, no differentiation is given to order. That is, we refer to BA and AB as the same pair. We can, therefore, choose 325 pairs, and each pair can form 16 words. This implies that 5200 unique calling words can be programmed into the Autocall Receiver.

To some, this number may seem excessively large. Since it is unlikely, however, that there would ever be 100% coordination among all nets within radio range of one another, this large number affords some measure of "statistical" protection against accidental calling of a wrong station. Furthermore, for obvious reasons, a net may choose to modify its callwords periodically.

The obvious reasons mentioned above refer to the preponderance of childish pranks that usually appear whenever an autocall net becomes active. Protection from these nuisances is probably the best cure for them. An optional feature that could be incorporated into the Autocall Receiver is a Multiple Line Feed Detector. Such a device would inhibit loop-keying on receipt of a predetermined number of line-feed characters in a given length of time. As time progressed, additional line-feed characters would be permitted. However, at no time would the maximum predetermined number of line-feed characters per unit of time be permitted.

This option is an interesting one from an academic point of view. Its practical value is perhaps questionable, particularly if the calling words are held secure, but the operator who has at one time or another discovered much footage of paper wasted by thoughtless pranksters may feel otherwise.

The autocall receiver shall, upon receipt of the proper callword, initiate the following sequence:

1. Provide a relay closure for control of loop power, and inhibit the loop keyer momentarily;
2. Provide a delayed relay closure for teleprinter motor power; and
3. Remove the keying inhibit function on the leading edge of the first start pulse after receipt of a CRR character.

This sequence will permit a "clean" start for the called printer. The transmitting station should pause for a few seconds after transmitting the callword before beginning the text.

If the transmitting station uses automatic sending, several non-printing characters should be punched between the callword and

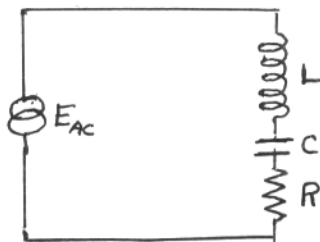
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FILTERS

One of the most misunderstood parts of an amateur RTTY TU is the wave filter as it used to be known. Many amateurs have avoided building filters, while others have "cut and try" designed and built filters. This latter approach works well at times, but does not lend itself to being copied by others readily.

The ARRL's "The Radio Amateurs Handbook" has carried the basic design information in it for many years (page 50, 1965 issue). Perhaps some of the problem arises from the plentiful supply of 88 mhy toroids. But if one looks into design considerations more carefully there is more to it than just some good inductances. As a starting point looking at an inductance and capacitance reactance vs. frequency chart, one will see the reactance in ohms changes by a factor of ten for a change in frequency of ten times. Now when a circuit contains both resistance and reactance the combined effect of the two is called impedance (Z). The resistance and

resistance. Keep in mind the resistance of an inductance is in effect a series resistor with the coil.



Parallel and series resonant circuits are quite alike in some respects. For example the two circuits shown will behave alike when an external voltage is applied if (1) the L and C are the same in both cases and (2) if the parallel resistance times the series resistance is equal to the square of the reactance (at resonance) of either L or C. If these conditions are met, the two circuits have the same "Q" (if Q is greater than 10). Another effect to be considered is that of loading. Of course if a filter is used to drive a tube's grid circuit or a high impedance transistor, this effect is not as serious. But if used to drive diode detector or similar load, the loading effect must be taken into consideration. For example the Q of a parallel resonant circuit loaded by a resistor impedance, the Q becomes:

$$Q = \frac{R}{X}$$

Where R is parallel resistance in ohms and X is the reactance of either the L or C in ohms. To quote from the handbook, "the 'effective'

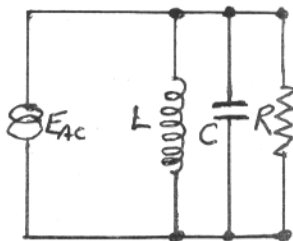
reactance may be connected in series or parallel with the following effects. The current in a resistor is in phase with the applied voltage, while in a reactance it is 90 degrees out of phase with the voltage, the phase relationship between the current and voltage in the circuit as a whole may be anything between zero and 90 degrees, depending on the relative amounts of resistance and reactance. For the case where the resistance and reactance are in SERIES, the impedance of the circuit is:

$$Z = \sqrt{R^2 + X^2}$$

The reactance may be either inductance or capacitance. For the case of parallel resistance and reactance the impedance is:

$$Z = \frac{RX}{\sqrt{R^2 + X^2}}$$

From these two equations one can see it is not a simple effect, adding series or parallel



Q of a circuit loaded by a parallel resistance becomes higher when the reactances are decreased. A circuit loaded with a relative low resistance (a few thousand ohms) must leave low reactance elements (large capacity and small inductances) to leave reasonable high Q". Additionally L-C circuits can be used to transform impedances (matching impedances).

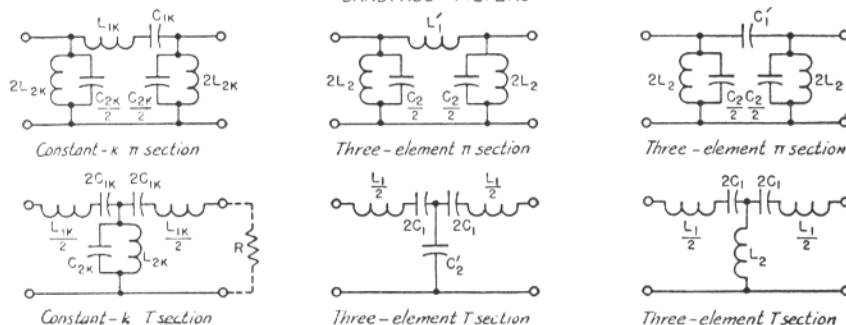
For those who are interested in this type of circuit, see page 46 of the 1965 ARRL Hand-

book. For most amateur RTTY'ers, the Band Pass Filters are of most interest. Like other circuits used by amateurs, there are many versions of Band Pass Filters. Among the basic types are the Constant-K type, "Pie" and "Tee" types.

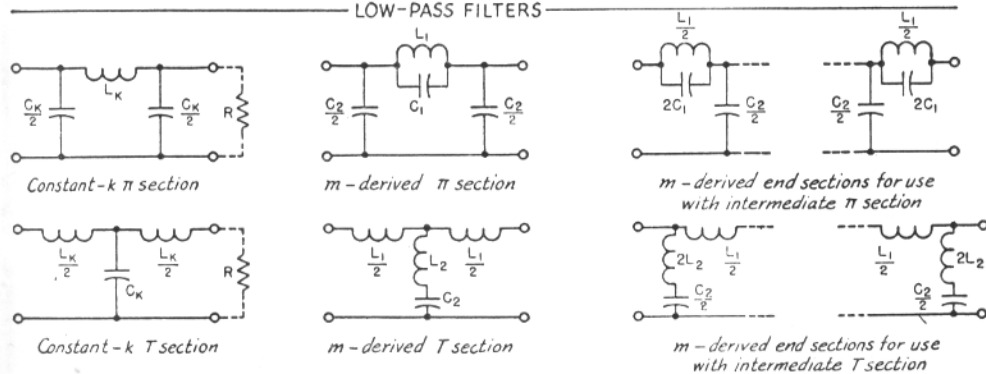
The parallel tuned circuit is one widely used which the frequency is determined by L and C with the R (resistance) effecting the width of the resonance curve (selectivity).

- To be continued

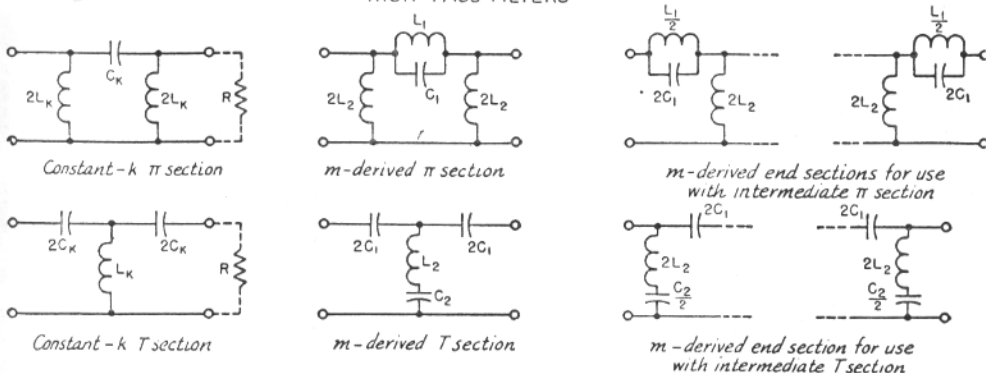
BANDPASS FILTERS



LOW-PASS FILTERS



HIGH-PASS FILTERS



ADDRESSES FOR RECIPIENTS OF MAIL FROM ANTARCTICA

- 094
MRS. JACK CARTER
212 Chestnut Ave.
Hawley, Pa. 18428
- 095
NANCY L. ANDERSON
2517 Northeast 47th
Portland, Oregon
- 096
ANN DOBO
30 Linmar Plan
Aliquippa, Penna.
- 097
MR. AND MRS. CLIFTON NORRIS
209 West Patton Ave.
Montgomery, Alabama
- 098
MISS GRETCHEN MERRILE
575 Broadway
Amityville, Long Island, New York 11701
- 099
MRS. N. B. DE'ARION
Route 2, Box 304
Gladewater, Texas
- 100
MRS. FRANCIS H. FOTH
2235 Morse Ave.
Sacramento, California
- 101
MISS WANDA DEAL
119 Avenue "F"
Thomaston, Georgia 30286
- 102
MISS DIANE LOVEJOY
P. O. Box 141
West Peru, Maine 04290
- 103
DAVID JEROME, PN2 USN
707 N. Dick St.
Spokane, Washington
- 104
MRS. MELROSE CARRINGTON
48 McLean Street
Dorchester, Mass.
- 105
MR. AND MRS. M. HENDRICKSON
2 Pond Street
Jamaica Plain, Mass. 02130
- 106
MISS PEARL RICE
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Virginia Beach, Virginia 23450
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Troy, New York 12180
- 109
MRS. MARY F. DUNN
2222 Hale Avenue
Louisville, Kentucky
- 110
MRS. NORM GLINTZ
1569 Laughlin Drive North West
Grand Rapids, Michigan
- 111
MRS. ISABELLA B. COCHRANE
c/o W. R. Robertson
53 Mossziel Crescent
Linlatnen
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Westfield, Mass. 01085
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MRS. EARL FUNKHOUSER
P. O. Box 129
Crossville, Illinois
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SP/5 DONALD O. SMITH
RA 1436 2194, 161st Avn. Co.
APO, San Francisco, Calif. 96238
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MISS CAROL CABRAL
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Chicago, Illinois
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MRS. SALLY L. RIVERA
1506 Cochiti Ave.
Farmington, New Mexico 87401
- 117
MRS. PATRICIA PRIEST
760% South Main Street
Franklin, Ohio 45005
- 118
MISS DOROTHY M. HILL
4936 South Prairie
Chicago, Illinois 60615
- 119
MR. AND MRS. THOMAS TROUTMAN
313 South Apple Street
Mt. Carmel, Pennsylvania 17851
- 120
MRS. H. BUNNELL
Number 64 Kaiser Alee
Karlsruhe, West Germany
- 121
ROBERT M'ARTIN, JR.
Bird Street
Sterling, Mass.
- 122
MRS. GLADYS SHELTON
Rural Route Number 7
Fairfield, Iowa

DX-RTTY

BUD SCHULTZ, W6CG
5226 N. Willmonte Avenue
Temple City, California 91780

Hi DX'ers:

Many thanks to Ed, K3GIF, for taking over the DX chore last month. Ed always comes through with a fine effort and it's a real pleasure to turn the DX column over to him. I'm sure everyone found his news a refreshing change from the usual "amateurish" cliches of the regular editor.

The big news this month has to be the second edition of the Alexander Volta Contest. Due to the complications of completely re-writing the rules and making a completely new format the information on this Contest was very late in being released. For awhile it appeared that activity might be quite small due to the lack of publicity but because of tremendous efforts on the part of the Italian group, the Contest was one of the outstanding events of the past year. Conditions were unusually good to all parts of the World and some of the DX signals were phenomenal. Here on the West Coast — during one period of the Test — all six Continents were coming thru at the same time which is indeed a rarity. Speaking from my personal observations it is very difficult to list the outstanding signals in this contest because there were so many pounding through. Some of the big ones heard here were IORS, DJ6ZBA, G3MWI, OK1-KUL, ON4BX, UA1KBW, UA3KBD, ON4-HW, YV1IK, XE1HHX, VK3KF, FG7XT — just to mention a few. All of those listed actually pushed the S meter to 9 which is proof of the good propagation conditions that existed for the entire contest week-end.

At this point the DX committee is taking a long hard look at the "Zone Chart" method of scoring used in the Volta Contest. It appears that such a scoring system has considerable merit in giving stations in every part of the World a chance to compete on a more equitable basis. The Zone Chart includes the feature of giving more points for the "long haul" DX while still giving a reasonable credit for the closer countries. The contest proved that there is now sufficient World-Wide DX activity to support a contest where every participant operates under the same rules with no penalties or bonuses for certain areas. The SSB and RTTY Club of Como is to be complimented on the tremendous amount of thought and effort that went into their "Zone Chart" scoring method. It's too early to give any scores but by next month we should be able to sneak a few from our spies. Bob, W6WGL turned up with 12,384; VK3KF had about the same as Bob. KL7BAJ reported a score of 7073 and this writer turned a modest 6838. Beautiful certificates will be awarded

to the two top winners in each country and in each U.S. Call District.

The second big news of the month was the debut on RTTY of HL9TM in Seoul, Korea. Joe and Howard turned up on 14 Mcs on the week-end of May 28 with a fine signal and really started a jam session. They appeared to be quite amazed at the amount of RTTY activity on the band and promised to try and give as many of the gang this new country as they can in the limited time they have to operate. I will act as their QSL manager to facilitate the handling of cards so if you make a QSO with HL9TM send your card along with an SASE to me and I will do my best to get it taken care of quickly. To those of you who have already mailed me cards for HL9TM I can only say that as of this moment I am still waiting for the stuff to arrive from Korea so please be patient.

MP4BEK is causing quite a stir these days and several of the boys report having lost quite a bit of sleep chasing him. So far he is just a legend out here on the West Coast. Terry, 5X5FS, is also active and is a good catch if one is able to sneak him out from under the pile up. HH9DL is still showing up at odd times on 14 mcs but is reported most active on weekends. This should be a new country for a lot of the gang. Ed reported his mailing address in last month's column, if you need it. Several stations have been logged calling FB8XX in the early morning hours but I still have no definite report that he is actually on RTTY at this time. KC4USV still active on 7127 around 0800. Eric, VK3KF, has had several cross band contacts with KA9AK (21090 to 29040) but says that conditions between Australia and Japan are dropping off now that winter is setting in down there in Melbourne. I still must urge all to continue monitoring 29040 for at least three known "active" RTTY stations in Japan. Their calls; KA2LD, KA2RJ and KA9AK. The ten meter band has been open to this part of the World during the past several weekends so give it a little of your listening time — might pay dividends.

The WAC-RTTY list received some new customers this month — Congratulations are in order for Sonia and Joe — PY2SO/PY2CQ for achieving their awards. This RTTY family has done an outstanding job in their short career on the green keys. Congratulations also to Dee, K7MNZ for making his WAC-RTTY. Dee's award is especially noteworthy because he accomplished it with only 100 watts. Lamberto, I1ROL, sent in for his

Continued . . .

RTTY-DX (Continued) . . .

WAC-RTTY certificate in the hope that his card from HL9TM would be here by now. Your award will be on its way as soon as the log or cards arrive from Korea, Lamberto.

Bruce, ZL1WB, is still very consistent on the bands and can usually be found around 0400 every day talking to his many friends in the States. Bruce is very active with the Oscar satellite operation and has had unusual success with this venture. Bill, VK2EG, was very busy during the Volta Test and had outstanding signals here on the Coast. Several European stations were heard calling VS6AZ during the past month. Wonder if anyone can furnish any info on this Hong Kong station?

Jim, VP9BY, is in great demand these days from all parts of the World. Serge, UA1KBW, has a fine signal here and is quite consistent. He is using 45.5 bauds and makes excellent copy.

The DX headquarters shack was honored this month by a personal visit from K5OLU (Ex-KR6MF) — one of the early DXers on RTTY. While K5OLU, W6AEE and myself were discussing the situation we were pleasantly surprised by a visit from W6NRM so a real rag chewing session developed in short order. After about two hours of debate we managed to iron out all the DX problems in fine shape (Oh yeah!!).

At least two of the Stateside DX'ers are making a tour of Europe this summer and

plan on visiting as many of the gang over there as they can get around to. Dick, W7LPM, says he and a friend are planning on quite an extensive trip across the Continent and hope to visit a lot of the stations they have worked in the past. W5APM and his XYL are also planning a trek thru Europe and have requested a list of the addresses of some of the stations along their itinerary. I am in the process of making up a list of likely stations in Europe that have indicated that they would be pleased to entertain overseas hams and I hope to have it available in a month or so.

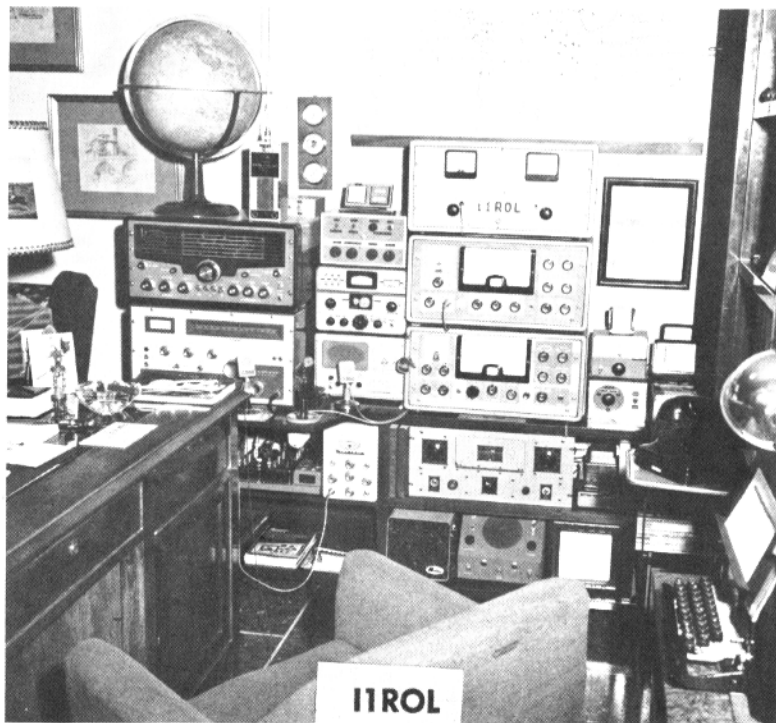
DX news is hard to come by during the summer months so please don't forget to drop a card or let us know by some means if you log any developments in the DX spectrum. Your help is needed and solicited. Thanks a lot, gang — see you next month.

73
Bud — W6CG

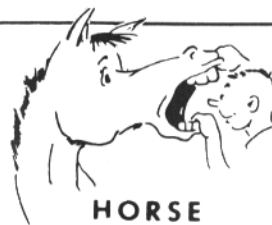
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For you guys with the Western Union 2-B printers, a good source of 5/16" ungummed paper can be found at the Link Paper Co., Englewood, N. J. at 20 cents per roll, minimum order 100 rolls. Also, you might be able to order from Western Union when they order their yearly supply in February with delivery in April. 60 rolls of yellow ungummed for \$9.00. Some offices will sell three or four rolls at a time, at 30 cents per roll (gummed).

73 and Tks, Dick, WØSIR



IIROL



HORSE TRADES

- FOR SALE:** Following items in like new condition. One KY 58-GRT keyer and manual. Disabling relay installed. Two General Radio Interpolation Oscillators Type 617-C. Keyer, \$150.00. Oscillators, \$50.00 each. K6EER, 1950 Oak Knoll Drive, Belmont, California 94002.
- FOR SALE:** Perf tape, standard 11/16" wide; 10 rolls/\$2.25. Gears for all standard machines, 60 wpm, \$3.50; other speeds, \$5.00 (pp.). Complete gear guide, \$1.75 (pp.). Manuals for Teletype equipment, write for list. 8 1/2" wide page paper; 12 rolls for \$8.00. W2BVE, 834 Palmer Avenue, North Maywood, N.J. 07607.
- FOR SALE:** Brand new Nylon Teletype ribbons, \$2.00 each postpaid. WA5DAJ, 4305 Windsor Drive, Garland, Texas 75040.
- FOR SALE:** One model 19 printer absolutely like new condition in perfect working order complete in every detail, has automatic line feed and carriage return installed by Teletype Corp. No reasonable offer refused. W8UUS, 2242 Stevens Ave., Kalamazoo, Michigan 49001. Phone: FI. 2-8838, area code 616.
- FOR SALE:** Home made TU's with and one without scope. Works OK. One FRA 400 kc IF TU, one CV-57 TU. One SGCIA converter. Northern Radio #107 dual diversity converter with manual. Also have many Printers and other RTTY equipments. Send SASE for list. W6-VPV, 1067 Mandana Blvd., Oakland, California 94610.
- WANTED:** Source of supply for paper printing tape for WU Model 2-B printer. W5-AQN, P.O. Box 1316, Rockport, Texas 78382.
- WANTED:** Army technical manual TM-11-2215 covering Teletype writers TT-5/FG and TT-6/FG, state price and condition. K2MOO, 21 St. Pauls Court, Brooklyn, N.Y. 11226
- FOR SALE:** Page printer paper, standard 8 1/2", 12 rolls per case, \$8.00. Fax Paper, \$1.00 per roll. Model 14 typing reperfs, \$45. Two headed Model 14 Tee Dee's, \$40. Model 26, \$40. SX-99 with speaker, \$60. DX-35, \$32. Teletype gear manual, \$2.25. REC-29 power supply, \$6. Want—TUBES, D 104 mike, Johnson Matchbox, Teletype part 92617, or 114535 cam sleeve for Model 26. Send your list for my list. W2DLT, 348R Essex, Stirling, N.J. 07980.
- NEEDED:** Tape Guide and gate for Model 14 TD. K7MNZ, P.O. Box 105, Aberdeen, Idaho 83210.
- WANTED:** Model 14 Typing Reperf manual and a Model 19 composite set manual. WA6-UXP, 14358 Hortense Street, Sherman Oaks, California 91403.



K7MNZ

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