RTTY JOURNAL

MARCH – 1967

EXCLUSIVELY AMATEUR RADIO TELETYPE

Vol. 15 No. 3 — 30 Cents

Oh, Mine eyes have seen the glory of the teletype machine,
It is printing out the message typed upon the keys of green
In a far distant ham shack where in I have never been.
The tones are warbling on.
RY RY Hallelujah
RY RY Hallelujah
RY RY Hallelujah
The tones are warbling on..

I have printed on the low bands where the QRM encamps
And the crowding of the spectrum my reception sorely cramps
Where I have printed solid copy by the flickering neon lamps.
The tones are marching on.
RY RY Hallelujah
RY RY Hallelujah
RY RY Hallelujah
The tones are warbling on...

On my wall is pasted copy from Seattle to New York
And my friends they gather round me and they think I've popped my cork
When I'm gazing thru the shutters of the speed adjusting fork,
While the tones are warbling on.
RY RY Hallelujah
RY RY Hallelujah
RY RY Hallelujah
The tones are warbling on...

All hail thee oh printer, painted green, black or gray
With thy black shelled plug inserted in a jack marked "FSK"
Let us sit before the green keys and we'll throw our mikes away!
While the tones are warbling on.
RY RY Hallelujah
RY RY Hallelujah
RY RY Hallelujah
The tones are warbling on.....

COPIED FROM WA5NFA by KH6AX--

CLASSIFIED ADS. Rates $1.00 – 30 Words. Additional words 2 cents. Closing date 10th of month.

TYPEWRITER RIBBONN REINKER, Hand operated model now only $3.00. K575 or K764 Ink available at all National Cash Register Co. stores at 75¢ per tube. Walter Nettles W7ARS - 8355 Tanque Verde Rd. Tucson, Ariz, 85715.

RTTY GEAR for sale. List issued monthly. 88 or 44 mhy toroids 5 for $1.75. postpaid. Elliott Buchanan W6VPC, 1067 Mandana Blvd, Oakland Calif. 94610

FOR SALE: CV60/URA-8 TU, in good working condition, $110. Boehme 2E CW keying head and 4D 110 vt DC motor drive 3-120 WPM, needs cleaning and some paint but good mechanically $65. Commercial KW Xmtr good for lkw of RTTY, 4-125A's, 4-26 mcs, 2 14" rack panels, built in antenna tuner, good working condition, $125. TMC SBE-2 Gen Cover SSB exciter with Lamba power supply, like new, $275. Collins 708-Al Master Oscillator 2-4.5 mcs, calibrated in direct reading steps every 5 cycles, in good working condition, $125. TMC and Collins together $350. Frank Gentges, KOBRA/3, 7301 Garland Ave. Takoma Park, Md. 20012 (301) 585-1378.

FOR SALE: 88mhy, uncased, centertapped Toroids 5/$1.00 ppd. Facimile (Teledeltos) roll paper $1.00 roll. Page printer (2 carbon copy) paper $5.50/case. 11/16" Tape $3.00 box. 800ma Loop Supply $8.00. 14TD (sync) $35.00. 14 reperf RO $35.00 KB $55. Bubble Sextant $???. SX28A $65. HQ110AC $110. HQ140XA $125. New 250 watt matchbox /SWR 465. WANTED. Model 15 or 26, Super Pro. DM-35 Dynamotor. Stamp for list of more. W2DLT, 302R Passaic Ave. Stirling, N.J. 07980.

FOR SALE - Two-tone limiterless TU as described in August 1965 RTTY phone-llc PC board $3.50 postpaid, write Cashion Electronics, Box 7307, Phoenix, Ariz. 85011 for brochure.

SERVICE, RTTY - Cleaning and repair of Teletype machines. Have in stock every part for model 14, 15, 19, and many parts for 12, 26, 28, 32, 33, 35. Can obtain any others. Teletype machines all models, in any style, and all special features available. Will buy, trade or sell teletype parts and machines. Call or write, Martin Geisler, 8926 Kester Ave. Phone (213) 892-0685. Van Nuys, Calif. 91402.

TT63A REGENERATIVE REPEATER, helps receive biased, distorted signals, also serves as RTTY converter, complete with tubes, cable, and instructions for using the unit. Like new $25. FOB Brooklyn. RTTY Dual Frequency Shift Tone Converter: Northern Radio type 152, each tone converter is self contained w/ power supply, tubes, conversion details and schematic. Used-good-$32.00 each. Send us your RTTY requirements. Atlantic Surplus, 250 Columbia St. Brooklyn, N.Y. 11231.

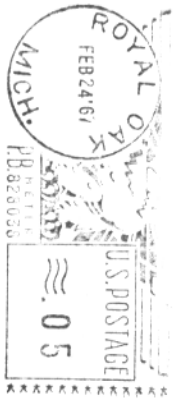
FOR SALE. Complete set of RTTY Inc. all issues 14 volumes. Sell to best offer. Sylvia Browdy, 1962 South Stearns Dr. Los Angeles, Cal. 90034.

FOR SALE, Two CV57 Navy Converters for 395-480 kc I.F. type receivers. Used but work fine $75. with manual. One W2JAV transistor TU on small chassis with power supply $20. E. Shafer W8MSG, 3479 Kersdale Rd. Cleveland, Ohio.

FOR SALE - 14 RO Typing Reperf (no Cover) $22. Multiple (3 gate) TD $35. FRXD $35. Few of each. Will not ship. RTTY Society of Mich - R. Leland, W8DLT, 118 Cambridge, Pleasant Ridge, Mich. 48069.

ELECTROCOM FSC - 250 terminal unit for sale to person with most reasonable offer. Original cost $400. Used very little during 6 months operation, WA6ZCQ 1312 Micheltorena St. Los Angeles, Cal. 90026.

Additional Ads on Page 15



1st CLASS MAIL

Return Requested

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

Commercial RTTY Stations

Our request for a list of commercial stations sending 60 WPM RTTY brought a number of helpful lists. In fact so many that instead of trying to condense them into one list, we are going to print several lists as we received them and let the listeners do the editing. On stations sending 65 wpm good copy can usually be obtained by adjusting the range scale on the printer to a lower number - don't forget to set it back later. These stations provide a fine way to test equipment but remember FCC rules require that all communications be secret. This means copy should be kept in the shack and used to tune gear only.

Frequencies may vary a few kcs from that stated. We are indebted to K3NIO, KH6AX, K8ERV, WORRS, WOWGN, WA5BFB, W4FUI and several others that did not include calls.

Weather information. WBR7O - Miami - Continuous on 3235--5973--8130--10950 --14395--16440. Use the information in January RTTY Journal to interpret these bulletins.

60-65 WPM - 400-850 shift.

Station	-	Freq.	-	Time. GMT.
VDL	-	5123	-	Various
Ft. Smith	-	5210	-	Continous
Russian	-	5797	-	Various
Notam	-	6771	-	0530
VDL	-	6783	-	Various
Ft. Smith	-	6910	-	Various
AP.	-	6937	-	Various
UPI	-	7760	-	Various
Reuters	-	9057	-	Various
Unipress	-	9201	-	Various
Press Wire	-	11643	-	1800GMT
AP Manila	-	11630	-	Mornings

Other 60 WPM Stations

WFL11 (UPI) - 10890 WFA36 - - - 6350
WER73 (RCA) - 13480 WFK24 - - - 11639
WFK24 - - - - - 14431 WFL (UPI) - 14700
WPL44 (UPI) - 14660 Press Daily- 14436
WDF34 (APO) - 14710 WFE54 - - - 14730

60 WPM Plain text -

Freq. - Station
4160 - Nam News Day.
4272 - A.S.C. Press news
4440 - Malta-
4778 - Nassau News. Daily
5060 - Non Sked News
5314 - NNN Armed Forces news
5372 - Internation news
5782 - Navy Personnel station
5883 - Evening news - test tapes.
6425 - NSS Armed services news
7742 - Jamaica - SSB and RTTY alt
7900 - AP News - evenings only
8142 - Weather and news
8192 - News in French
9178 - CQQW Times. News Bulletins
10465 - International Telegrams.
10965 - Hourly News daily.

14756 - *** Patrick Air force Base. Missile Tracking station. Print this one any time we have anything in space. The entire show is on RTTY and very interesting.

UP Spanish	-	14698	- 0200-2225
AP Spanish	-	14714	- 0300
RCA Ship	-	14770	- 1630

Middle East Wireless File (MEF) - English - 60 WPM
shift is 400 cycles in all cases.

MONDAY THRU	2200-0015 GMT 0030-0230	
FRIDAY	5434.0 KHZ	WWU-82, TANGIER
	5460.0	WWU-45, TANGIER
	10972.0	WWU-89, TANGIER
SUNDAY	2200-CLEAR	
AND HOLIDAYS	SAME	SAME

European Wireless File (EF) - English - 67 WPM

MONDAY THRU	1900-2000 2200-2400	
FRIDAY	6875.0	WWG-36, TANGIER
	7709.0	WWF-87/X5, TANGIEI
	7720.2	WWF-77/X27, TANGIE
	6894.5	WWF-56/X45, TANGIE
	10187.5	WWF-70, TANGIER
	11142.5	WER-91. NY
SUNDAY AND HOLIDAYS	2000-CLEAR SAME	SAME

American Republics Wireless File (ARF) - English (?) - 60 WPM

MONDAY THRU	1700-1900 2030-2300	
FRIDAY:	18560.5	WFL-38, NY
	14633.0	WFK-60
	10746.5	WFK-6(

Special European Wireless File (SEF) - English - 67 WPM

MONDAY THRU	2200-2400	
FRIDAY	5040.0	WWF-25, TANGIER
	7693.4	WWG-67/X9, TANGIER
	13607.5	WWH-93
	13470.0	WWH-53
	3355.0	WWF-33

Teleprinter Codes: 7 Unit Versus 7.42

F.W. SMITH

Republished from the October 1954 issue of the Western Union TECHNICAL REVIEW by courtesy of the Western Union Telegraph Co.

It is frequently necessary to operate a 65-word-per-minute teleprinter in the same circuit with a so-called 60-wpm teleprinter (actually 61.25 words per minute). The question is often raised as to how teleprinters of different speeds can send to and receive from each other with no loss in range or operating margin to either teleprinter. It is the purpose of this article to explain the compatibility of the two speeds. For the sake of completeness, the teleprinter signaling code is described and the principles of operation of a receiving teleprinter mechanism are outlined.

Start-Stop Teleprinter Code

The start-stop teleprinter signaling code is an electrical code consisting of seven current and no-current intervals, called pulses. A current interval, which energizes the selector magnets, is called a marking pulse; a no-current interval, which does not energize the selector magnets, is called a spacing pulse.

The first pulse in the signaling code is always a spacing pulse. This pulse releases the receiving shaft of the teleprinter and allows it to start rotating, for which reason it is called the "start" pulse. The next five pulses in the signaling code are intelligence pulses and any one of them may be either marking or spacing. There are 32 possible combinations of these intelligence pulses and the combination received by a teleprinter determines the character to be printed or the function to be performed. The seventh and final pulse in the signaling code is always a marking pulse, which stops the rotation of the selector shaft and causes it to remain at rest until receipt of the start pulse for the next character transmitted. For this reason the seventh pulse is called a "stop" or "rest" pulse.

The length of the start pulse is always the same as the length of an intelligence pulse. This seems to be a universal practice, used wherever the 5-unit Baudot code has been adapted for start-stop teleprinter signaling. There has been no such standardization, however, on the length of the rest pulse in relation to the length of the intelligence pulses. For example, Western Union uses a signaling code, commonly referred to as a "7-unit" code, in which the rest pulse is approximately the same length as the intelligence pulses. Other commercial telegraph users in this country employ a code in which the rest pulse is 1.42 times as long as the intelligence pulses, and which is called a "7.42-unit" code. In Europe, both the 7-unit and the 7.42-unit codes are used, as well as a 7.5-unit code with a rest pulse 1.5 times as long as the intelligence pulses.

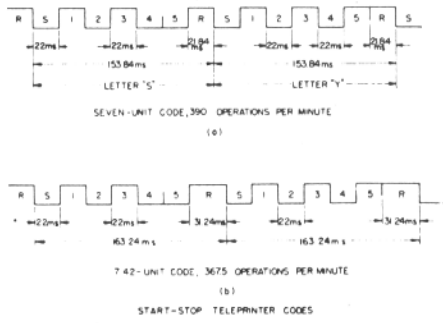


Figure 1

Figure 1(a) illustrates the 7-unit code commonly used by Western Union for transmission at 390 characters (65 words) per minute. The two signal trains shown represent the letters "S" and "Y". The start pulse and each intelligence pulse is 22 milliseconds long and the time required to transmit one character is 60/390 = 153.84 milliseconds. The rest pulse is 21.84 milliseconds long.

Figure 1(b) illustrates a 7.42-unit code, in which the start pulse and each intelligence pulse is 22 milliseconds long. The rest pulse is 31.24 milliseconds long and the time required to transmit one character is, therefore, 163.24 milliseconds.

All of these differences are, of course, insignificantly small.

Only a small portion of the total selector pulse length is required to set up a selection in a teleprinter. The remainder of the length of the pulse is used to provide an operating margin so that the teleprinter will be able to operate when the received signals are distorted or when the teleprinter itself has internal irregularities which cause variations in the times at which the selections are made. These variations may be caused by worn or defective parts or by maladjustment of the teleprinter. A device called a range scale is used to orient the selector mechanism to the received signals, by determining the point at which each pulse is sampled. The manner in which the range scale is utilized to obtain optimum operating margins will be explained in detail in the following paragraphs.

Teleprinter Selector Mechanism

Figure 2 is an exploded schematic drawing of the receiving selector mechanism on a teleprinter widely used in Western Union services. The selector cam sleeve assembly of this mechanism consists essentially of a stop arm and five selector cams assembled on the cam sleeve by means of a nut and soldered together so that the peaks of the selector cams are 55.5 degrees apart. This assembly is mounted on a main shaft which rotates continuously. The cam sleeve is free on the main shaft and is driven by a pair of friction clutches. When the selector cam is in the stopped position, it is prevented from rotating by the latching surface on the lower arm of the stop pawl, which engages the stop arm on the cam sleeve assembly. When a start pulse is received by the selector magnets, the armature is pulled away from the magnet by a spring (not shown in the figure). The trip-off screw on the armature extension then moves the trip plunger to the left and this, in turn, rotates the bell crank counterclockwise. The horizontal arm of the bell crank rotates the latch about its pivot, and the left end of the latch unlatches the upper arm of the stop pawl which is then free to rotate about its shoulder screw. The stop arm on the cam sleeve is thus unlatched and the cam sleeve is free to rotate.

During the early part of the revolution of the cam sleeve assembly, the No. 1 selector cam rotates the No. 1 selector lever about its pivot and causes the No. 1 sword to move towards the two vertical arms on the armature extension. If the armature is in the marking position at the time the selector lever rides to the peak of its cam, the right arm of the sword will strike the right arm of the armature extension and the sword will pivot in the selector lever so that the tip of the sword will move to the left. If the armature is in the spacing position at the time the selector lever is rotated about its pivot, the left arm of the sword will strike the left arm of the armature extension and the tip of the sword will be moved to the right. As the cam sleeve continues to rotate, the remaining four selector swords are positioned in the same manner. The positioning of the swords is transferred to associated mechanical members which determine the character to be printed or the function to be performed by the teleprinter. After all five selections have been made, a sixth cam (not shown) on the cam sleeve assembly

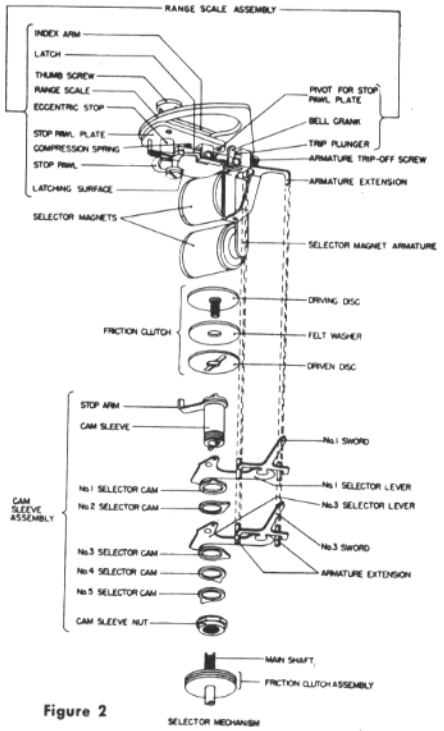


Figure 2

trips off another clutch to cause the printing or the function to be performed.

As the cam sleeve assembly completes its rotation, the stop arm again strikes the latching surface on the stop pawl. If the armature is in the marking position at this time, the cam sleeve will be prevented from rotating until the selector magnets are again deenergized.

The stop pawl and its latch are mounted on a plate which is pivoted directly above the center of the main shaft. An index arm on the top of the range scale is pivoted about the same point. The index arm and the stop pawl may be rotated together about their pivot through an angle of approximately 66.6 degrees and clamped in any position in this arc by means of the thumb screw. This changes the position of the stop pawl and therefore determines the position from which the cam sleeve assembly will begin its rotation. The top plate of the range scale assembly has an engraved scale which is marked off in percent of a pulse length, from 0 to 120. A pointer on the index arm indicates the point at which the stop pawl is set.

The nominal speed of the main shaft is 420 rpm and the peaks of the selector cams are spaced 55.5 degrees apart. The time between two consecutive selections is, therefore, $\frac{60}{420} \times \frac{55.5}{360} = 0.022$ seconds. As shown in Figure 1, this is the length of a code pulse in the 7-unit code at 390 opm and also in the 7.42-unit code at 367.5 opm. Since the shaft speed is 420 rpm, the shaft rotates once in $\frac{60}{420} = 0.14285$ seconds. Neglecting the release time of the selector magnet and the take-up time of the selector clutch, the cam sleeve will complete its revolution approximately eleven milliseconds after the beginning of the rest pulse. During the remainder of the rest pulse, the cam sleeve is held stationary as previously explained. Thus, a receiving teleprinter will operate satisfactorily when receiving signals from either a 367.5-opm, 7.42-unit-code keyboard or from a 390-opm, 7-unit keyboard. When receiving at the slower speed, the teleprinter receiving shaft will remain at rest for a longer period of time at the end of each revolution than it will when receiving at 390 opm. There will be no other difference in the operation of the receiving teleprinter at the two different speeds.

Effect of Range Scale Setting

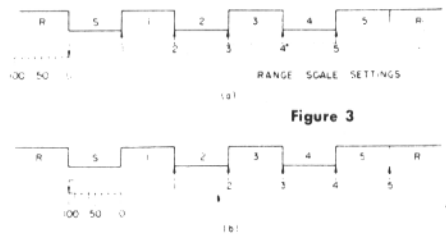


Figure 3

Figure 3(a) illustrates schematically the effect of setting the index arm on the range scale at zero. At this setting, the stop pawl is positioned so that the cam sleeve begins its rotation with the No. 1 selector cam approximately 45 degrees from the peak of the No. 1 selector lever. The first selection, and each succeeding selection, will be made at the beginning of the pulse. With the range scale index arm set at 100, as shown in Figure 3(b), the cam sleeve will begin its rotation with the No. 1 cam approximately 100 degrees from the peak of the No. 1 selector lever and the selections will be made at the ends of the pulses. If the range scale index arm were set above 100 or below 0, errors would result in the copy.

If it were possible to construct a perfect teleprinter, with no internal distortions and with zero time required to set up each selection, the range of the teleprinter, when receiving perfect signals, would be 100 points. Because a finite time is required to set up a selection, a range of 100 points is not possible, even when there are no internal distortions in the teleprinter.

In order to insure that the sampled portion of the pulse is located near the center, the index arm is moved towards the high end, while signals are being received, until errors begin to occur in the copy, then moved slowly back towards the low end until the errors cease. The low end of the range is then determined in a similar manner and the index arm is set midway between these two points.

Synchronism

If synchronism is to be maintained

Continued on page 14

End-Of-Line Indicator

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Laurium, Mich. 49913

The following is a description of a simple, yet effective end-of-line indicator used when cutting tape "blind" (cutting tape and printing "hard" copy on the machine.), for the TELETYPE Model 14 ROTR. Usually a ham starts out with a Model 15 or equivalent, and later obtains some tape gear to go along with it. In the past, various switching systems have been shown for allowing the operator to use his model 15 keyboard to cut the tape on another machine, and at the same time receive "hard" copy (off the air) on the Model 15. It was during this change in station operation that the need for such a "character-counter" was realized. This can be done through a simple switching system and alternate loop supply. There are advantages in using the Model 15 keyboard for cutting the tape. The operator is accustomed to the touch of his particular keyboard and a second keyboard is not needed for cutting the tape. This article is written especially for the Model 14 ROTR, but investigation of other tape gear may prove that it too can be modified for this type of operation. All that is needed for this set up are two gears (obtained from an old alarm clock) with a 6:1 gear ratio, a small contact assembly (made from a piece of spring steel), a filament transformer, a lamp and socket.

The feed-pawl shaft of the Model 14 ROTR makes 12 RPM and has a twelve tooth gear attached, another small gear (pinion) is soldered to this shaft, and drives the larger gear. The larger gear has a fixed contact attached to it, and rotates with the gear. A contact made of spring material is attached to a standoff insulator, so that it can make contact with the fixed contact, as the gear rotates. Since the shaft is turning at 12 RPM and the gear ratio is 6:1, the contact will make with the stationary contact 12 times 6 or 72 characters later. By adjusting the spring metal contact and allowing some wiping-action, it can be made to close for seven characters (i.e. the distance it would travel for end-of-line; standard communications length of 72) that is, contacts close at 66 and open at 73. By wiring a lamp and small power supply in series with this contact, a lamp will then come on after the 66th character and go out on the 73rd, thus starting the count over again, for the next line. Figure 1 shows the mechanical details of this counter, and Fig. 2, the electrical circuit.

Advantages of the system:

1. Simple, requiring a minumum of parts.
2. Once adjusted properly it will stay that way indefinitely.
3. Can be built in a minimum of time, (one hour or less).
4. No mechanical linkages to the Model 15 keyboard, and so does not affect the touch of the 15.
5. Obtains its power supply from the Model 14 itself, so no additional power is required.
6. A tried and proven system to work as described.

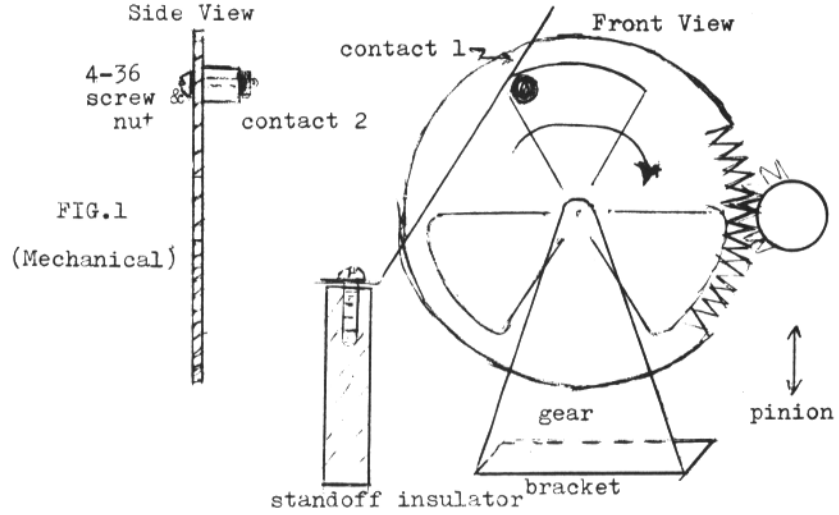
Disadvantages of the system:

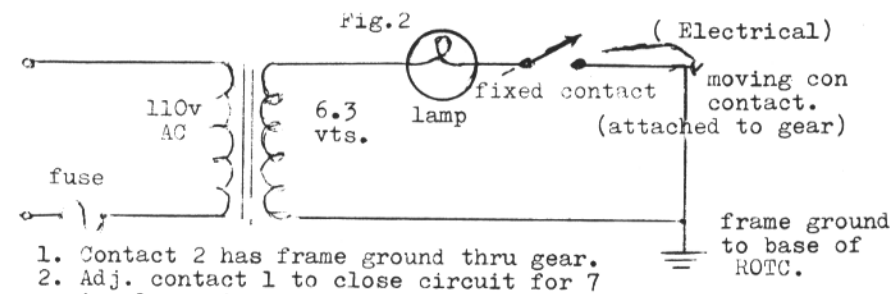
1. It will count every pulse, sent by the keyboard, including the non-typing functions such as Carriage-Return, Line Feed, Letters, Space, Figures and Blank so that if one of these functions were "hit" repeatedly, it will be counted as a character. This would cause the lamp to light "earlier" than the "actual" end of the line and would result in a shorter than normal line. This is of no consequence however as the commercial counters will also do the same (for the Model 14 ROTR.
2. Does not "reset" to zero by hitting the carriage-return key as the counter on a Model 28 ASR would do, since the gear is a continuous movement, rather than a system that actuates solenoids or reset function levers.

With practice, the text can be such that the end of lines are even and no overlining or pile-ups will take place. Since the advantages out-weigh the disadvantages it will benefit the builder to add this simple unit to his machine. The end of line lamp, can be mounted right inside the Model 14 ROTR, or it can be mounted right at the keyboard of the Model 15. (If leads are extended out of the machine, it would be advantageous to use some kind of connector, to facilitate maintenance of the machine.) Either way works well, the main idea is to put the lamp where the operator will see it, when typing from the keyboard; and if the typist is of the "Touch-Type" school, his eyes will not be on the keys and so the lamp should be mounted at eye level. If on the other hand he looks at the keys, it would be better to mount the lamp and socket right under the keys themselves, (this latter method is used on the model 14 perforator). The intensity of the lamp varies with the room illumination but the brighter the lamp is, the more noticeable it will be.

Be sure to fuse the electrical circuitry for safety.

The author had been looking for a simple system for some time and this "End-Of-Line Indicator," was the answer.





1. Contact 2 has frame ground thru gear.
2. Adj. contact 1 to close circuit for 7 impulses. ie; closes at 66 and opens at 73.
3. If line length is too short, contact 1 can be adjusted for less than 7 impulses.

TERMINAL UNIT or DEMODULATOR?

Terminal units describe the type of equipment used in wire circuits for teletype operation. Their function is to shape or refine incoming and outgoing electrical signals to assure the best possible teletype machine operation. They also supply power to operate the machines (d-c).

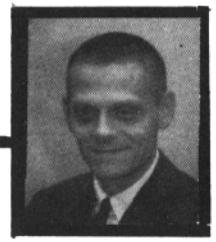
Demodulators is a general term used for equipment which processes radio or audio frequency signals and converts them into electrical signals for teleprinter use in radio links between sending and receiving stations. Aside from their use in teleprinter operation, similar units are also used in translating hundreds of radio channels of information from sattelites and manned-space vehicles. They convert audio tones present on RF carriers into a variety of d-c voltages which can be read out to determine various temperatures, velocities, attitudes, and pressures in the space vehicle.

Take your pick. You'll find hams using both terms, although demodulators is coming into more and more use.

▽ ▽

VFH RTTY NEWS

RON GUENTZLER W8BBB Editor
988 Chelston Rd. South Euclid, Ohio. 44121



OPERATING FREQUENCIES

As mentioned previously, one of the purposes of this column is to give suggestions for VHF RTTY operation. We have recently become aware of a problem that we thought had disappeared at least eight years ago: lack of communication regarding operating frequencies on the VHF bands.

Because the lack of communication apparently continues to exist, we want to fully explain the operating frequency "standards" that have been set up for all VHF FM operation. This should be of interest to the AM as well as the FM operator. Frequent mention will be made of the wide-band FM voice mode (40F3); this is necessary to explain fully why the RTTY frequencies are where they are.

Before going into things further, we would like to say we are fully aware that any licensed amateur may operate in any band permitted by law and his class of license.

Commercial-quality FM equipment is crystal controlled (both transmitter and receiver). Most of the equipment requires commercial grade crystals running about $6 each, or $12 per pair. This is a fair hunk of cash to tie up in just a pair of rocks; therefore, before buying the crystals, make sure that the frequency you are planning to operate on is used by others operating the same mode, and/or that it is not being used for some other mode. Also, the cash investment tends to discourage changing from one frequency to another, especially if one tries to get a whole "net" to move; this makes it doubly important to start off on the right frequency.

Because of the rock-bound nature of commercial FM gear, some standardization is necessary. The group at Tri-State College ARC, W9BF, (and other groups) undertook the job of "standardizing" certain frequencies in the two and six meter bands. 146.940 MHz was chosen as the primary frequency or channel for voice operation (40F3). Possible frequency stability problems and the 40 kHz bandwidth required for wide-band FM made 60 kHz channel spacing desirable. (The commercial and public-safety users of "high-band" FM equipment were spaced 60 kHz apart by the FCC.)

The following frequencies have been "standardized" for VHF FM operation on two meters:

146.940 MHz: Main channel, 40F3;
146.880 MHz: First alternate, 40F3;
146.760 MHz: Repeater output, 40F3;
146.700 MHz: RTTY Main channel, 40F2;
146.340 MHz: Repeater input, 40F3.

Notice that these channels are either 60 kHz or an integral multiple of 60 kHz apart.

The following channels are representative of the channels used for VHF FM operation on six meters:

52.525 MHz: Main channel, 40F3;
52.600 MHz: RTTY main channel, 40F2;
52.640 MHz: First alternate, 40F3;
52.720 MHz: Alternate channel, 40F3.

Essentially these channels are 40 kHz or an integral multiple of 40 kHz apart with the exception of the main voice channel which "just growed". (the 40 kHz spacing was patterned after the FCC "low-band" assignments.)

In some areas, the RTTY traffic is heavy enough to require alternate RTTY Channels. Therefore which channel or channels should be used as RTTY alternates? The following points should be considered when choosing alternates: 1) The frequencies should fit into the general plan of 60 kHz spacing on two meters (40 kHz on six); 2) They should be relatively close to the main RTTY channel (146.700 or 52.600 MHz) so that crystal switching can be employed without the necessity for retuning the receiver front end and the transmitter final stages; 3) If possible, the alternate channel should be close enough to the main voice channel (146.940 or 52.525 MHz) so the equipment can be used for voice operation, if desired; 4) Determine the frequencies presently being used in your area for other modes and avoid them; and 5) Avoid 146.760 and 146.340 MHz because of their popularity and increasing use for voice repeaters.

We therefore recommend that 146.820 MHz be used as the first choice as an alternate RTTY channel and 146.640 MHz be considered for use as the second alternate RTTY channel (subject to prior use).

The use of frequencies that are not an integral multiple of 60 kHz on two meters and of 40 kHz on six meters is to be discouraged because of the possibility of adjacent channel interference. For example: DO NOT USE 146.720 MHz!

Readers are encouraged to send to us any information available regarding the use of various frequencies on six and two meters. We are especially interested in suggestions regarding alternate RTTY channels.

We presently have very little information regarding AM operation (6A2) and therefore cannot make any specific recommendations to the AM operator. We do not mean to slight the AM'ers. It appears that the specific channelizing for AM operation has not been necessary because of the prevalence of VFO techniques with AM equipment; if we are wrong, let us know! However, as mentioned last month, crystal control is desirable for auto start operation.

Another reason for devoting this much space to the "standards" used for FM frequency assignments is to try to stop (or prevent) "wars" between the AM and FM operators by explaining the "why" and "where" of FM operations.

So What's New?

Here are more stations operating VHF RTTY.

The following stations are operating on 146.700 MHz, 40F2, vertically polarized:

Notes: *Char. recognition used for AS (W8GBT); ? Indicates information not available; The call in () is the reporting station; All stations are using 2125 Hz Mark & 2975 Hz Space.

Cleveland Ohio Area
WA8OZB Sue Jenkins, Cleveland, 60W, GP, AS/C.

Detroit Michigan Area (K8AQC,W8DYV)
K8BOD Don Rusky, Dearborn, 50W, Beam
W8DLT Ralph Leland, Pleasant Ridge, ?
W8GBT Bob Leland, Southfield, 25W, ~~Gp~~, AS*
W8LTW Tom Mitchell, Inkster, 30W, GP, AS/C.

The following stations are operating on 147.600 MHz, 6A2, vertically polarized:

Los Angeles California Area (WA6AWD)
WA6AWD Alan Burgstahler, Van Nuys, 10W, Beam, AS/24
K6QGR Bob Bean, Redlands, 10W, Beam, AS/24.

The following stations are operating on (or near) 146.7 MHz, 6A2, horizontally polarized:

Portland Maine Area (W1GKJ):
K1AJE Jesse Bryant, Kittery, ?
K1EVU Rich Duntley, Eliot, Beam, AS
W1GIU Ned Foye, Kittery, Beam, AS
W1GKJ Norm Davis, Old Orchard Beach, 180W, Beam
W1JWJ Bill Meehan, Portsmouth, N.H., Beam
W1LBG Frank Waterman, Eliot, ?
K1LMJ Gil Bineau, Gorham, ?
K1QPS Walt Becker, Portsmouth, N.H., AS
K1VIP John Waterman, Eliot, ?
W1WHI Tom Goss, Kittery, Beam
W1YTW Frank Dennett, Kittery, ?
K1ZDF Dave Evans, Kittery, Beam
K1ZIT Larry Allen, Kittery, Beam

The following stations are operating on 145.92 MHz, 6A2, vertically polarized:

San Francisco Calif. Area (W6SAW)
K6DZN Orv Magoon, Menlo Park, ?
WA6KMN Bob Maklin, Sunnyvale, ?
WA6RRH Chuck Miller, San Bruno, ?
WA6SAW Herb Mesler, San Carlos, 75W, Beam(C.Pol)
WB6SIJ Phil Oak. ?

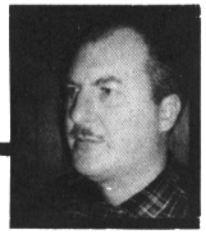
The following stations are operating on 52.600 MHz, 40F2, vertically polarized:

Twin City Area (WOHAH)
WODKN Art Lane, St. Paul, 50W, GP, AS/C
WODPQ Sandy Sanford, Minneapolis, 50W, Coax, AS/C

Continued on page 15

"Up here on two meters I never talk to half the guys I hear because with crystal-controlled receivers, they never tune the band - or because I like AM and they're all on FM, or because I like FSK and they're all AFSK, or else its my horizontal beam and their ground-planes. Life is much simpler down on "80"!"

RTTY-DX



JOHN POSSEHL W3KDF Editor

P.O. Box 73 Blue Bell, Penn. 19422

Hello there...

Thought I would start to write the column this morning; can't do much else as there is a howling blizzard going on outside and we are pretty much snowed in. The snow static on the beam is about S-9 but as I tune across the RTTY corner of the twenty meter band I print a call directed to me. It is Arthur, ON4BX, overriding everything. He had a couple of short messages; revising his "countries confirmed" list upwards and advising Of his correct QTH for mailing the Journal. In ten minutes it was over and Art was on his way and I'm scanning the band again. That's how easy it is to pass on information. I'm usually lis - ening at the times indicated in the January issue. Try it fellows.

From the comments of the fellows that I have heard or worked on the bands conditions apparently have been quite variable this past month. Let's tune in by continents again and see what has been going on.

NORTH AMERICA

A nice letter from Bill, KL7BAJ indicates that after the usual mid-winter low point in conditions in that area things are beginning to improve. Bill had a fb qso with KA9AK and forwards some additional information on Cas' activity, of which, more later. A new station in that area is KL7DRZ who is somewhat blocked by mountains toward the states but has a clear path over the Pole toward Europe.

Those of you looking for some of the less heard from Canadian provinces can look for VE4BJ, VE5DR, VE5LG, and VE6FQ. All have been on this past month with very good signals. Bill, VE4BJ had a four to five day stay at the hospital recently but by this time he should be back at the keyboard looking for new countries. His Canadian Centennial project is to get the QCA 50 award so help him out fellows. We hope that you are as good as new again Bill.

Jean, FG7XT has been on quite consistently but complains of poor conditions to all points except North America. Jean has been hard at work with his satellite weather station and after long delays in obtaining parts is finally in a position to do some testing shortly. Ray, W2LNP who has been working closely with Jean on this project will visit Guadeloupe for the initial testing so we hope to see the results of their noteworthy achievement in the near future.

Those of you looking for some activity on 40 meters can tune in a group that includes K5PJB, W3ILZ, and W1WL on 7090 at 12-1300z daily. It is reported that propergation conditions to VK-ZL are very good and conditions to Europe and Asia fair at these times. The frequency is fairly clear too.

Puerto Rico has been well represented with KP4AST, KP4ARY, KP4JM, and KP4BKS. Down Mexico way, XE1HHX was on from time to time, as was XE1YJ after a Caribbean trip and a visit to Jean, FG7XT.

SOUTH AMERICA

There were some indications that there would be some activity from Aves Island in early February by YVØAA and YVØAC but at this writing there is not too much information regarding this operation. In a qso with Bill, VK2EG, he said that he was in qso with YVØAA on SSB and that there were some problems which cancelled out the RTTY operation. Anyone with the full story of this DXpedition?

In tuning across twenty meters in late January I came across 8R1P in qso with W8NUQ. This station is in Georgetown, Guyana (formerly VP3) and he indicated that his qsl manager was WA4-UOE. I have not been successful in printing him since. He certainly is a rare one for rtty.

Horacio, LU1AA recently completed a new rig for 15 meters and comes through with a terrific signal on this band. He has also been heard several times exchanging tape transmissions with LU8DR on fifteen. At the present time these are the only two stations on from Argentina.

Venezuela has been represented by Rafael, YV5AVW, Eva, YV1IK/5, and Roman, YV3AY.

EUROPE

As indicated in previous columns, Europe is a consistent source of DX contacts. In the absence of any startling news from Europe I would like to list some of the stations printed recently. Bear in mind that these only represent stations logged from approximately 1200-1330z and 2200-2300z and this is not the time of peak activity.

ON4NE, ON4BX -- PAODOK -- EI6D -- HB9P, HB9ET -- LA4KF, LA1K, LA1SH -- G6JF, G3LPC, G3IYG -- F8KI, F3PI, F5LG, F8KW, F2LC -- OE2SJL, OE3PWW, OE1KRW, OE3HPA, OE2WSL, OE2SKL -- UA1KBW, UA1KAL, UA1IM, UA1KAY, UA3KAA, -- UQ2KBH -- SM7CJZ, SM6OH, SM3AZI, SM6CEO, SMOMC, SMOBCV, SMOKV, SMODRV, SM5EX -- I1ZWY, I1CLC, I1II, I1ORS, I1KG, I1LCL, I1BAX, I1ROL, I1CAU, I1FOS, I1CAQ -- DLOEL, DJ5WU, DJ1VW, DL8UO, DL31R, DLOFF, DJ90Z, DJ8NT, DM2BRN. Most of the above stations were logged in 14 mc., some few being on 21 mc.

Serge at UA1KBW says that UB5AC will be returning to RTTY early this spring. Let's hope that Valentin gets on in time for the BARTG contest, it would be a real good multiplier.

Ray at G3LPC is looking forward to retirement from the British Army (Royal Signals) in May. Best of luck Ray and we look forward to printing you from your home call of G3LPG.

Horst, DJ8NT is recovering from a recent illness and is back on the bands with a fb signal.

AFRICA

Can only report very little activity from this area. Orbra, EL2F has been supplying most if not all of the contacts. A new addition from the Monrovia area is EL2AI who was recently heard testing with EL2AL. perhaps the spring contest will bring out some of the boys from ZS

OCEANIA

The exciting news from this part of the world were the RTTY signals from Tom, VR6TC on Pitcairn Island. This was first reported by Orbra, EL2F, who printed Tom on Feb. 5th at about 1730z on 14090 kc. I understand that he was also heard by Jean F8KI. and more important, he has been worked by Lou, I1ORS. Further details are lacking at this time and I hope to have more information on VR6TC shortly.

Lou also reported a contact with FO8AA, Radio Club Oceanien, at Tahiti. Although this contact was a while ago Lou says that they were testing out a new model 32 ASR and the Collins S Line. This kind of equipment usually doesn't lie idle for long. Anyone in contact with this station recently?

The stations from Australia are quite active via both the long and short paths. I had the pleasure to contact a new station on from Sydney recently. Karl, VK2KM is on with a fb signal using a Swan 400.

From Hawaii Freeman, KH6AX is very consistent and comes through well in all kinds of conditions. No matter how many times you work Freeman he always comes up with something that will either make you smile, laugh, or roll on the floor. He usually has me doing the latter.

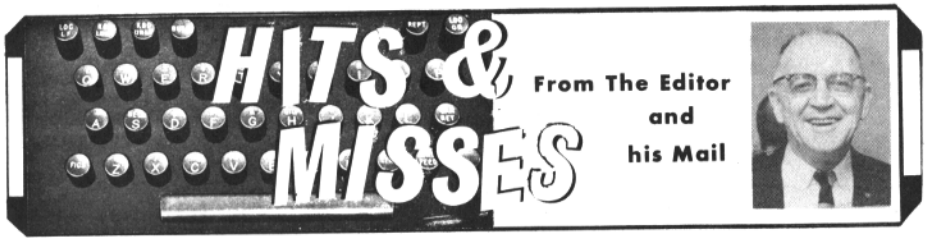
In addition KH6EDW and KH6 AVX

Continued on page 15

☆ DX Honor Roll ☆

	Countries Worked	Confirmed
FG7XT	67	54
W3KDF	56	50
I1KG	60	49
W6CG	51	46
ON4BX	53	41
W8CQ	46	40
W1GKJ	40	36
K8YEK	45	33
UA1KBW	36	33
VE4BJ	28	28
W3ISE	31	26
W8CAT	24	23
VP9BY	26	18
K9QNV	24	17
WB6ADY	18	12
W6LDA	19	9
K6YUI	5	4

This is the first listing of a feature we hope to present quarterly. Some of you included other awards i.e. WAC, QCA, etc. If you would like these included in future listings please let me know. They could easily be included if the majority includes them in their listings. The next listing will appear in the June issue so I must have your list by May 10. Many thanks to all of the above who helped get it rolling. It is a good show for a first attempt and I'm sure the list will get longer in future issues.



Well "Crys," our staff, got her first certificate - courtesy of "Dear Mabel" and the Florida Skip Magazine. We offered to hang it in the shack but she insists on the kitchen. Says it is to Honor the long suffering XYLs, and she wants HER friends to see it, not hams. Might work out fine, some nite when the staff thinks she has earned a dinner out we can say "Lets just eat in the kitchen and we can admire your 'certificate' "

The past month has been a busy one because of so many subscriptions coming in. We have been fortunate that some of our good friends have sent us articles to fill both issues so far. We would like to have enough articles on hand however so that a variety can be presented each month and a few on tap for future issues. We also would appreciate pictures and please, if possible, include the operator. Short articles are just as useful as long ones. Some gimmick or "easy" way to do something is often of interest to many fellows.

▼ ▼ ▼

Something has got to be done - and we can't do it.

Answering the number of letters we get asking for information on RTTY. How do I start - Where do I get machines and a various assortment of technical questions. At present we just do not have the time - or ability - to take care of these letters, yet here are the very people that we want to serve and help as much as possible.

So we have an idea. . .Knowing that there are hams around the country that would enjoy helping others get started, and have the knowledge and time to answer questions, we would like to have a list of such people and run it every month in the Journal. Letters could be sent direct to these people depending on the geographical location or the specialty they would like to handle. Later a number of the most common questions and answers could be printed in the Journal under a "Question and Answer Column." Do we have any volunteers or suggestions?. . . .

Just a few mechanical details to help us keep things in order.

Please include your call and Zip number on subscriptions or correspondence. We file our mailing stencils by calls then by names in alphabetical order in call districts. The abreviation such as "dec7" indicates that your subscription expires with the December 67 edition. In some cases where odd amounts of money have been received the expiration date has been adjusted to the amount received.

In submitting copy a regular typewriter is better than RTTY copy as we have to retype all such copy. Drawings are best in black ink on white paper. However if drawn neatly in pencil we can go over them with a black carbon ball point pen and this works fine. Drawings that are 6 1/4 inches wide will fit our paste up sheets exactly and will be reduced 25% in final printing. However don't let this stop you from sending in anything that we may be able to use. We are always willing and able to redraw or retype a good article.

▼ ▼ ▼

Being one of the older generation we will never feel familiar calling a "cycle" a "hertz". We grumblingly accept it, but issue warning now of an eruption if they start calling an "antenna" a "kennedy". A "halo-kennedy" on six meters, a long wire all band kennedy, a tri-band signal squirter kennedy, or as our present kennedy is, after the sleet storm, a broken and bent quad kennedy.

▽ ▽ ▽

A definite project - for some of our readers -

We have had a great number of requests for - HOW do I FSK my HT32 - M2 - DX100 - SB300 etc., etc. Both wide and narrow shift. These have been published piece meal several times and also the general theory for FSKing almost any exciter BUT - we still get requests. We would like to accumulate a short description, with drawings, and any special notes on the physical installation of as many of the popular exciters as possible. If we can get a number of them we will include them in one issue and feel it will help a lot of fellows get started. Heath kit style please - we are all not experts.

In writing the above paragraph we are reminded of the many sides to Ham Radio - We are a firm believer that it is a HOBBY not a profession. Every person is entitled to his own ideas and help in pursuing his hobby, the doctor that is perfectly capable of doing a complicated operation on you or I may be lost when he looks at the wires in a printer. By the same token the designer of a complicated computer is lost when he has a pain in his side. Ham radio is a hobby for both.

Lets be tolerant of the fellow that asks for 'simple things' (to you) and share our particular talents to help a great hobby.

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Have a request from some fellows in Australia for a manual on the Kleinschmidt TT-4A/TG. # TM 11-2234. Can Anybody locate one for them?

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We hope to meet a lot of RTTY fans at the Dayton Hamfest. April 15th. The RTTY Journal has a suite of rooms reserved at the Dayton Sheraton Biltmore Hotel. Look for the number on the bulletin board. Everyone is welcome, usual custom is to arrive as early Friday afternoon as possible, hospitality until dinner, then more hospitality until wee hours. Kool Ade available. Saturday the RTTY Forum with good speakers. Rooms will be available, with parking, at the Hotel. Might be a good idea to get a reservation in advance however.

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Another hamfest with RTTY sessions will be the Oregon State Convention. The time - first week in June - coincides with the Portland Rose Festival and makes an ideal time for a visit. Details from Ron Mayer W7NGW.

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RTTY JOURNAL
P.O. Box 837 — Royal Oak, Michigan 48068
"Dusty" Dunn — W8CQ
Editor & Publisher
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U.S.-Possessions - Canada--
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National RTTY Group Formed in Canada

RTTY in Canada is growing fast. Although the supply of machines has been limited in the past, imports, a few machines from surplus sources and ham ingenuity in scrounging has allowed a number of active stations in nearly all sections of the country. An active RTTY society has been formed (CARTG) with 22 charter members and new members are being actively recruited. The CARTG will sponsor the annual fall DX Sweepstakes this year in honor of the Centennial Celebration now in progress throughout Canada. The rules will be the same as last year but special medals will be awarded the three top winners as well as a special Centennial Certificate to all persons submitting a log.

An active net is now operating on 3630kc every Tuesday and Thursday at 7.30 PM EST. Everyone is welcome and Canadian amateurs are especially welcome to ask any questions regarding the National Teletype Society. One of the present projects is the legalization of shifts up to 900 cycles. Canadians are now limited to 850 which makes it touch and go to stay close to 850 without possible violations. Sidney Burnett, VE3GK, (president of BARTG) 85 Fifeshire Rd., Willowdale, Ontario will be very happy to hear from any interested amateurs and answer any questions. And start planning for a real DX contest this October. Definite dates will be released soon enough for world wide publicity.

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— RTTY NETS —

While most nets are primarily for traffic, general news and information is also exchanged.

The nets listed are primarily lower frequencies, but usually have connections to VHF nets in the more populous areas. The VHF nets will be covered in W8BBB's column on VHF.

Northeastern Net - Daily except Sunday at 1900 EST. Approx 3635 kcs.

Florida Net - Daily at 1900 EST. 3704 kcs.

Canadian Centennial Net - Tuesdays and Thursdays at 1930 EST. 3630 kcs.

Auto Start Net - Continuous - 3637.5 kc 170 Shift only.

A more complete listing will be published as we receive information.

* *

- 7.0 vs. 7.42 Unit Speed -

continued from page 5

between the receiving teleprinter and the transmitter, the selector magnets must be energized at the time the cam sleeve assembly completes its revolution, in order that the cam sleeve may come to rest and remain at rest until the next start pulse is received. If the rest pulse begins too late or ends too early the stop pawl will not latch up the cam sleeve at the end of its revolution and errors will result.

At 420 rpm the receiving cam sleeve completes one revolution in 0.1428 seconds and this time is entirely independent of the range scale setting. When a start pulse is received, a definite time is required for the selector magnet to release and time is also required for the clutch to accelerate the cam sleeve assembly to 420 rpm. The total of this release time plus the clutch take-up time for the teleprinter illustrated in Figure 2 is approximately 6 milliseconds. The cam sleeve assembly will therefore complete one revolution approximately 148.8 milliseconds after the beginning of the start pulse. The total length of the start pulse and the five code pulses is 132 milliseconds and the rest pulse thus begins 132 milliseconds after the beginning of the start pulse. That is, the rest pulse begins 16.8 milliseconds before the shaft completes its revolution. This provides ample margin to allow for the operate time of the selector magnets and also to permit the teleprinter to operate satisfactorily when the signals are affected by spacing bias and the fifth pulse is a spacing pulse. Since spacing bias delays the beginning of a marking pulse, a spacing bias of sufficient magnitude may cause the selector cam sleeve to fail to stop at the end of its revolution. The teleprinter will then make errors and these errors will occur regardless of the range scale setting.

7-Unit Versus 7.42-Unit Code

In the 7-unit code, the end of the rest pulse occurs approximately 5.2 milliseconds after the cam sleeve has completed its revolution. This allows ample margin for variations in the release time of the selector magnets and the take-up time of the clutch. It also permits some variation in the speed of the receiving shaft, which may occur when a governed motor is used to drive the teleprinter. Since no selection is made during the rest or the start pulse, the end of the rest pulse does not affect the range obtained on the teleprinter; that is, if the transition from the rest pulse to the start pulse occurs too early the teleprinter will make errors and these errors will be independent of the range scale setting.

The 7-unit code permits transmission of a greater number of characters per minute than the 7.42-unit code, and this is the only real advantage obtained by using a 7-unit code. This is a considerable advantage, however, since the 6.12 percent increase in output results in a saving of line time and operator time.

A 7.42-unit code provides greater margin against error in the receiving teleprinter motor speed than does the 7-unit code. If a teleprinter motor runs too fast, the teleprinter will have the same margin regardless of which code is used, but if the motor runs too slowly, the 7.42-unit code with its longer rest pulse will provide greater margin than a 7-unit code. This advantage may have been of some importance during the early days of the printing telegraph industry, but with the development of fractional horse-power synchronous motors and improved governors for nonsynchronous motors, this advantage is now of little significance.

This discussion has been restricted to a comparison of the 7.42-unit code at 367.5 opm with the 7-unit code at 390 opm, since Western Union uses the 7.42-unit code at all speeds greater than 65 words per minute. One reason for this is that the teleprinters developed by other companies in this country are designed to use a 7.42-unit code and there is considerable advantage in using commercially available equipment without special modifications to suit Western Union requirements. Another reason is that the selector magnet release time, which does not vary with speed, represents a greater percentage of the rest pulse length at the higher speeds and thus reduces the margin by a greater amount.

* *

- DX NEWS -

continued from page 11

were printed, both with excellent signals.

ASIA

Cas, KA9AK is apparently still the only station on from this area and is quite active. I was fortunate to have made contact on 28 January after first finding Cas on CW at about 28050. A qsy to above 29 mc. resulted in rtty contact.

As mentioned earlier, Bill, KL7BAJ forwards some further information from Cas as follows. He usually hits the band at about 2200z daily. Signals to the East coast peak at about 2300z which is about the time Cas has to go to work during the week. Cas has a sked with VK2EG each Saturday at 0245z and with VK3KF at 0330z on Sunday. The VK stations are all on 28950.

These times may be appropriate to other areas also so if you wish a contact with Japan it may pay off to listen for Cas' skeds with the VK boys. (Editors note: On a short QSO with Cole K5OLU we understand that he and several of the fellows including K5PJB worked Cas on Feb. 4th.)

That about covers things for another month. It seems to me that activity on Ten and Fifteen is increasing rapidly, particularly on week-ends. George, W4AIS has been sending tape on about 29015 and being rewarded for his efforts with some qso's from Europe.

The BARTG Contest this month will be a good time to really give these bands a try. I'm sure you will find your scores increasing manyfold.

GOODLUCK IN THE CONTEST....

73 de John

▼ ▼ ▼

- VHF NEWS -

continued from page 9

WOHAH Bob Stanek, Minneapolis, 50W, GP
WOJFZ Don Runmark, Minneapolis, 50W,
KOKWK Dave Friedman, ?, 50W, GP
KOKZD Dave Sundquist, Minneapolis, 50W GP
WORTE Matt Simonich, Minneapolis, 50W, GP
WOZAU Ed Field, Minneapolis, 50W, GP, AS/C
Wheeling, W. Va. Area (K8AQC)
K8QPA Emil Kittel, Blaine, Ohio, 300W, Beam(C. Pol), AS/24.
Flint Michigan Area (K8AQC)
WA8AEE Al Schook, Clio, ?
W8FYF "Stu" Fillingham, Flint, ?

In order to preserve the information previously listed here, a "box score" will be given each month.

Akron Ohio (146.700, 40F2, Vert) - 1;
Cleveland Ohio (146.700, 40F2, Vert) - 4;
Detroit Mich. (146.700, 40F2, Vert) - 11;
Flint Mich. (146.700, 40F2, Vert) - 2;
Los Angeles Calif. (147.6, 6A2, Horiz) - 2;
Portland Maine (146.7, 6A2, Horiz.) - 13;
San Francisco Calif. (145.92, 6A2, Vert) - 5;
Twin City (52.600, 40F2, Vert) - 8;
Wheeling W. Va. (146.700, 40F2, Circ.) - 1;
Wichita Kansas (146.700, 40F2, Vert) - 5.

Again, please keep the information coming. The information should be as complete as possible so it can be put into the form given above. (In fact, it would be very helpful to us if it came in exactly the form given above.)

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Additional Classified Ads.

See Page 16

FOR SALE. Model 14 TDs. All with sync motors and end-of tape - sensing pins. Two types- 65 wpm Western Union 7. unit compatable with 60 wpm equipment or 75 wpm Standard 7.42 unit. New $35.00, good used condition $18. Packing, shipping extra. Keith Petersen, W8SDZ, 1418 Genesee Ave. Royal Oak, Mich. 48073. Phone Area (313) 585-4431.

WANTED MODEL 28 teletype complete or sub assemblies. Cash, or trade for new amateur equipment. Altronics-Howard Co. Box 19, Boston, Mass. 02101 (617-742-0048)

SALE - W2JAV factory assembled transistorized RTTY Demodulator. Power supply and filter $55.00. Control unit C-292/TRA-7 $45.00. Jack Kulish K7YNV Box 201, Stanford, Montana. 59479.

BUY - 28 TYPING units, etc., and all parts. Sell 14s 15s 28KSR, parts. W4NYF, 405 NW 30th Ter., Ft. Lauderdale, Fla. 33311. Phone 305-585-0340 after 9.

WANTED - Your Model 28 typing units, other components, and all parts. Sell 14.15, 28s and parts. (fast Service) Fred G. Schmidt, W4NYF, 405 N.W. 30th Terr. Ft. Lauderdale, Fla. 33311 - (305) 583-1340.

RTTY CHANNELL FILTERS, octal mounted, 1275/2125 cps or 2125/2975 cps. $5.95 pair. 88 mh toroids, uncased, 5 for $2.50 Herman Zachny, WA6JGI, 3232 Selby Ave. Los Angeles, Calif. 90034.

More Ads on Page 16