

THE W7LHL TU

ERNEST P. MANLY, 429 10th Avenue West, Kirkland, Washington 98033

The best method for sending and receiving or relaying traffic is by radio teletype. A teleprinter terminal unit is required in order to receive teletype. This radio teleprinter terminal unit is an audio type limiterless converter that utilizes the latest techniques at a moderate cost. The terminal unit has the following features.

1. All solid-state circuitry using inexpensive transistors.
2. Unit directly couples to the receiver speaker output.
3. Choice between 170 or 850 cycle shift.
4. Operation on mark only or space signal only or both mark and space signals at machine speed or hand typing speed.
5. A 20 DB per octave low pass filter.
6. Automatic lock-up circuit to keep the printer running open on either mark or space signal.
7. Noise threshold circuit (auto start).
8. Copy either normal or reverse copy.
9. Minimum number of controls on the front panel.
10. No circuits are critical to supply voltage.

Circuit Description

Referring to the block diagram (Figure 1) the bandpass filter restricts signals and noise to a bandwidth of 2000 to 31000 cycles. The output from the bandpass filter drives a Class A amplifier (TR1). This stage uses a 2N301A transistor which is a rather large transistor for the requirement. There is no danger of overheating the transistor. This stage has a 24 DB gain and requires approximately 30 milliwatts from the receiver to drive the mark and space detectors. CR1 through the CR4 diodes limits the audio to the 2N301A transistor if the receiver audio gain control is turned up too high or when tuning in a local station. The 500 ma meter in this stage is an indicator of how hard the amplifier is being driven.

The mark-space detectors are tuned to 2125 and 2295 cycles for 170 cycle shift. The frequency of 2125 and 2975 is used for the 850 cycle shift. The detector circuit will allow copy on mark only or space only and both mark-space. A description of this type of detector is described in September 1963 RTTY Bulletins "What is the Two-Tone Detector?" The band width of the mark filter is 94 cycles at the 3 DB point, 104 cycles for the 2295 cycle filter and 130 cycles for the 2975 cycle filter. The cross over point at 2550 cycles for the 850 cycle shift is 19 DB down.

Following the mark and space detectors is a low-pass filter. The low-pass filter starts its roll off at 25 cycles and is 3 DB down at 30 cycles. Following the low-pass filter there is a unity gain amplifier (TR2, TR3) use for impedance matching. The output of this ampli-

fier will be plus voltage on mark and minus voltage on space. Without any signal the amplifier has zero voltage output. The amplifier starts to saturate at an output of plus and minus 10 volts. The differential amplifier and trigger stage (TR4, TR5, TR6) will trigger at less than 0.1 volt input. Thus the unity gain amplifier has better than 40 DB dynamic range before saturation. A zero center micro-ampere meter is connected on the output of the unity gain amplifier as a tuning indicator.

Transistor TR7 is a driver stage for the flip-flop. The flip-flop (TR8, TR9) allows normal and reverse copy. Following the flip-flop there is a lock-up circuit (TR10, TR11). This circuit will allow the printer to lock up after approximately 200 MSEC if there is a steady space or mark signal depending if the TU is copying normal or reverse. R33 controls the time required to lock up the printer. The timing elements are C15, R31, R32, R33 and the leakage of the TR10 transistor.

The noise threshold circuit (TR12, TR13, TR14) is an auto start. This circuit operates from the output of the unity gain amplifier. C16, R45 and R46 control the opening and releasing time of the output gate. The smaller value of the R45 causes the output gate to open sooner and release slower. The smaller value of R46 is vice versa. The threshold level is adjustable by R39.

The output gate (TR15) will not switch until a signal is presented from the lock-up circuit and the threshold circuit. Normally on mark or no signal the output of the gate is zero volts. On space the gate switch and the output voltage is approximately 11 volts depending upon the load. The output of the gate will drive the control grids of a 6BL7 tube or a transistorized circuitry for operating the selector magnets.

Construction

All circuits were built on 4 by 4 inch surplus printed circuit boards. There are a total of 10 circuit boards, one for each circuit on the block diagram. None of the circuits are critical so the lay-out should not be too much of a problem. Coils L1 through L5 were constructed from cores stripped out of surplus filters made by Western Electric type D164902 and type D164905 filters. A Western Electric core and a C144 loading coil core were wound with number 30 Formvar wire. Fifty turns were removed at a time and the inductance was measured. A curve was plotted from this information (see Figure 2). Either type of cores perform equally well in the circuits. All coils are bifilar wound with number 30 Formvar wire. The 5 and 6 turn links of L4, L5 are made from insulating wire.

Continued...

FIGURE 1

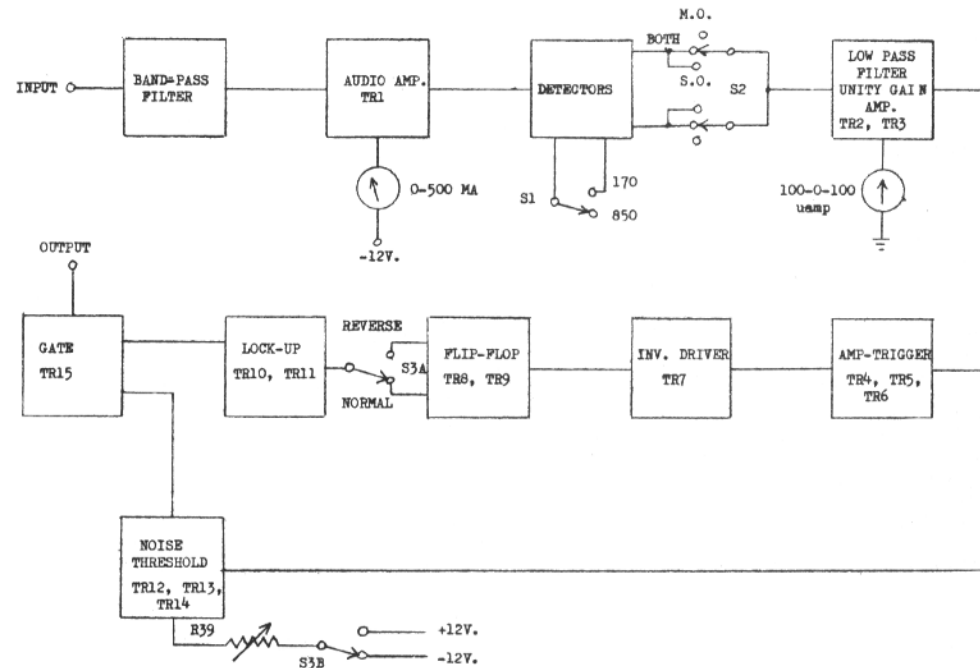
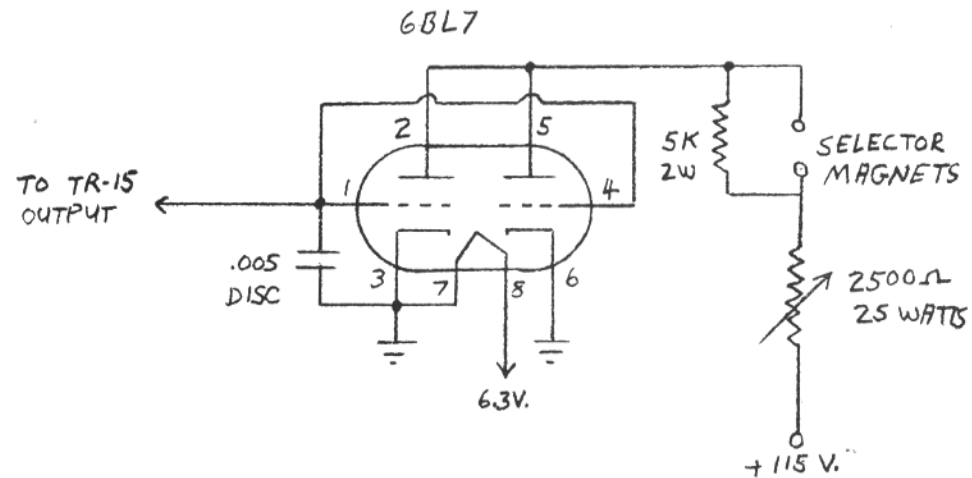


FIGURE 3



THE W7LHL TU (Continued) . . .

The TR1 transistor is mounted on a 2 by 3½ by .091 inch aluminum plate for a heat sink. This transistor is dissipating approximately 2.4 watts. S1 170 or 850 cycle shift switch, S2 mark-space switch, S3 normal or reverse switch and the R39 noise threshold control are mounted on the front panel. The ten circuit cards are mounted in a surplus card rack.

Adjustment

Without any input to the TU, adjust the resting current of TR1 to 200 ma by R1. Adjust R13 for zero voltage at TR4 base by using a low range voltmeter. Connect an audio oscillator to the TU input and align the mark and space filters to correct frequency. This is accomplished by changing the value of C5, C6 and C7. The zero center 100 microampere meter makes a nice indicator for this purpose.

The R38 trimpot is for balancing the sensitivity of the noise threshold circuit when copying normal or reverse. Connect a voltmeter to the collector of TR12, using mark or space tones from an audio oscillator, switching from normal to reverse, adjust R38 until the noise threshold circuit trips on the same level of mark or space tones.

To adjust the timing of the lock-up circuit, connect an oscilloscope to the collector of TR11. From the time a steady space tone is received until the TR11 transistor switches back to its normal state (as before the reception of the space tone). This time should be 200 MSEC. This elapsed time is adjusted to 200 MSEC by R33.

Two methods were used to drive the printer selector magnets. One method was using a 6BL7 tube and the other was using a transistor reed relay circuitry. Either circuits gave equal performance. Figure 3 and Figure 4 shows the completed circuit using the 6BL7 tube and the reed relay.

Power requirement for the TU is 10 ma plus 12 volts and 300 ma for the minus 12 volts. An adequate power supply for the TU is shown in Figure 5.

I would like to thank Fred Reid Jr., W7EJD for supplying me with the RTTY Bulletins and Bob Ellis, W7FNA for the C114 loading coils.

PARTS LIST FOR THE TU

C1, C3	.33 uf 100V Sprague Vitamin
C2	.033 uf 200V Sprague Vitamin
C4	270 uf 6V Electrolytic
C5, C6	.1 uf 100V Sprague Vitamin
C7	.047 uf and .022 uf 200V Sprague Vitamin
C8, C11	.022 uf 200V Sprague Vitamin
C9, C10	1 uf 200V Astron
C12, C13	.1 uf 200V Astron
C14	.001 uf disk ceramic
C15, C16	20 uf 25V Electrolytic

R1	1000 ohm 1 watt trimpot
R13	100 ohm 1 watt trimpot
R33	20K ohm 1 watt trimpot
R38	10K ohm 1 watt trimpot
R39	100K 2 Watt potentiometer Ohmite CU1041
CR1 thru CR4	1N660 Silicon diodes
CR5 thru CR8	Sarkes Tarzian F4 rectifiers 400 PIV
CR9 thru CR14	1N191 Germanium diodes
L1, L3	13 mhy Toroid
L2	120 mhy Toroid
L4	54 mhy CT Toroid
L5	27.5 mhy CT Toroid
L6	300 mhy choke UTC 0-13
M1	0-500 ma meter
M2	100-0-100 uamp meter
S1	SPST Bat handle switch
S2A, S2B	2 pole 3 pos rotary switch
S3A, S3B	DPDT Bat handle switch
T1	Argonne AR-119 3.2 to 500 ohms
T2	Argonne AR-166 400 to 16 ohms
T3	Argonne AR-503
TR1	2N301A
TR3, TR6	2N1304
TR2, TR4, TR5, TR7 thru TR15	2N404

The station here consists of the following equipment.

Antenna — Half Wave Inverted V.

Transmitter — A Home Brew Heterodyne Tube Type FSK Exciter Driving a Low Power Final at 70 Watts Input.

Receiver — NC300 with Modifications to the Audio Circuits.

TU — A Home Brew Audio Type all Transistorized TU.

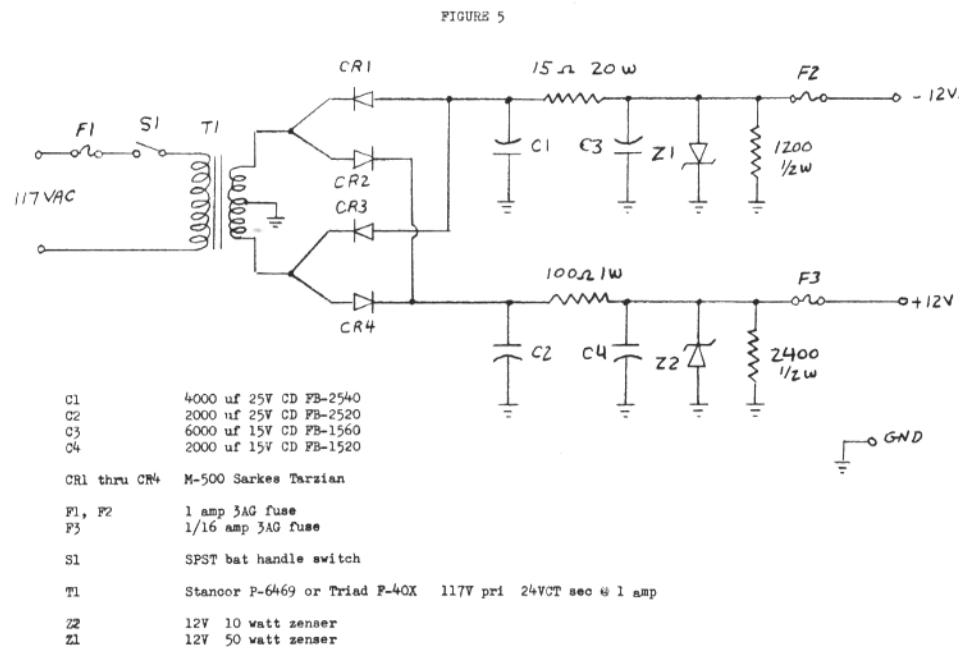
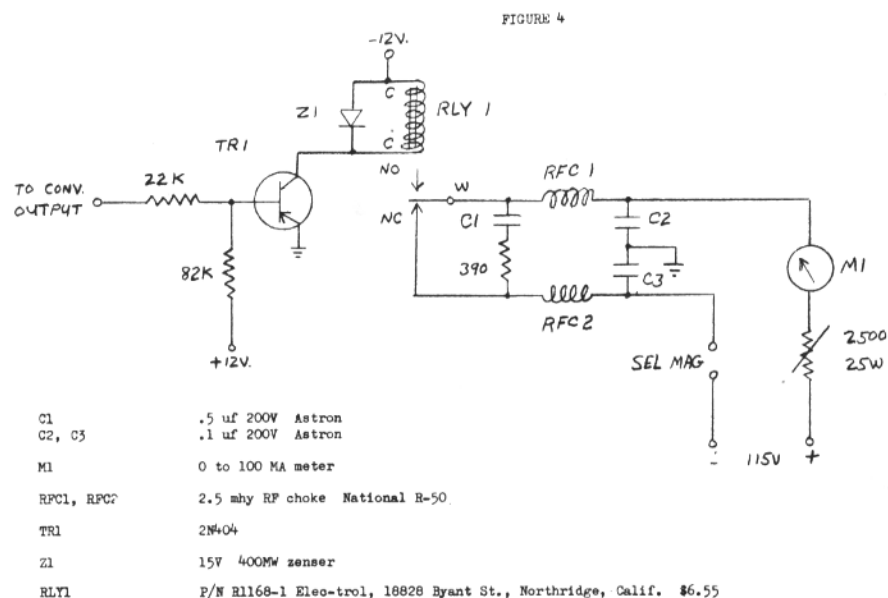
Model 15 Printer, Model 14 TD and a Model 1 & Typing Reperforator.

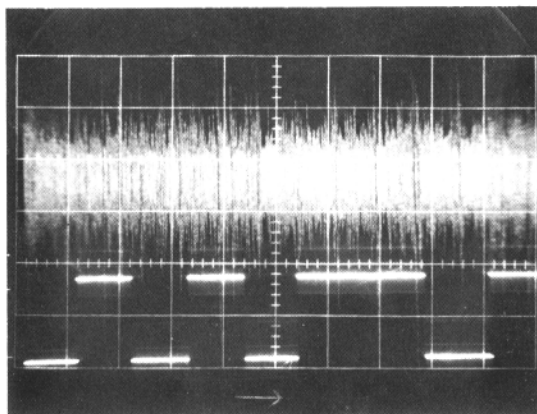
The basic principle of operation of this exciter is as follows:

There are two 6AK5 crystal controlled oscillators. One oscillator is FSK and the other oscillator determines the frequency range of the exciter. The output of these two oscillators drive a 6BA7 mixer. The output circuit of the 6BA7 mixer is resonated to the difference of the two crystal frequency. This new frequency and the output of a Collins 500 KC PTO is mixed in a 7360 balanced modulator to produce the required operating frequency. A low power class A amplifier follows the 7360 balance modulator. The output of the 7360 balanced modulator and the amplifier is tunable. The FSK exciter has the following features.

1. 170 or 850 cycles shift.
2. Constant frequency shift regardless of the output frequency.

At the present time I am working on a 4-250 Final. I hope by winter the final will be finished so there will be more time for operating.



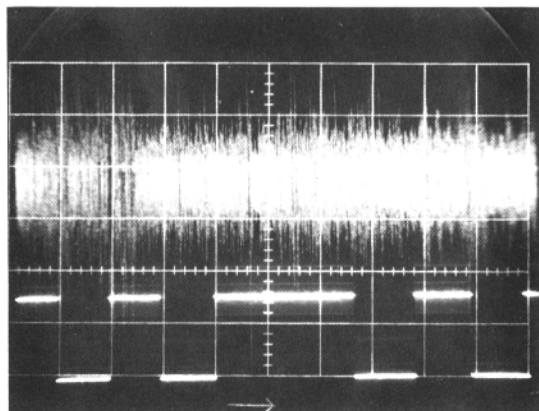


CONVERTER INPUT

CONVERTER OUTPUT

NOISE 800 TO 4200 cycles

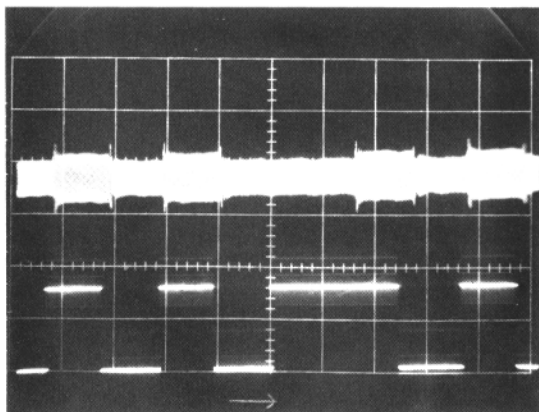
BOTH MARK & SPACE
AUDIO FROM TD - OSC.
PLUS NOISE FROM THE
NC300 21 MC BAND
THE ANT IS CONNECTED &
READY TO RECEIVE FSK
LETTER Y 20 MSEC/CM



CONVERTER INPUT

CONVERTER OUTPUT

MARK ONLY 20 MSEC/CM



CONVERTER INPUT

CONVERTER OUTPUT

BOTH MARK & SPACE
AUDIO FROM TD - OSC.
LETTER Y 20 MSEC/CM

WESTERN UNION SURPLUS PRINTER (WUSP)

Coordination Memorandum #3

SUBJECT: Direct Communication between Western Union District Managers, Technical Services, and Certified Amateur Radio Organizations.

TO: Certified WUSP Organizations.

An arrangement has been worked out with Western Union to provide for direct liaison between the Western Union Manager of Technical Services and the representative of the certified club in each district. This direct communication will facilitate exchange of information and more orderly flow of equipment through the appropriate organizations to licensed amateurs.

The area included in each Western Union District Headquarters is shown by the attached map. A separate attachment lists the name and address of each Western Union District Manager of Technical Services, and the certified amateur radio organization having responsibility for coordination within the area. Since the boundaries of each district were not known to me until this arrangement with WU was completed, in certain instances more than one club has been certified. In these situations I picked a single organization to be responsible — the one shown by the attachment. Since the district areas are somewhat large and are apt to be unwieldy from an equipment pick-up and coordination standpoint, I recommend that each responsible organization look to other certified organizations for assistance. Since each organization I have certified has provided me with a sworn statement of their agreement to distribute all surplus printers only to licensed amateurs and that no profit shall accrue from these actions, these other certified clubs are logical places to start to build your organization in your WU district area.

I have been receiving a substantial amount of correspondence from amateurs interested in obtaining surplus WU teleprinter equipment. These letters, some still unanswered, will be forwarded to you for reply.

It will be the responsibility of the certified organization in each district to establish its

Western Union
Individual Responsible

Eastern Division

°Syracuse, New York
R. J. Snook
351 South Warren St.
Syracuse, N.Y.

Amateur Radio
Organization Responsible

Western New York
Frontier Radio Amateur
Teleprinter Society
Lockport, N.Y.

Amateur Radio
Individual to Contact

Floyd Ziehl
199-201 Ontario St.
Lockport, N.Y.
Phone HF 4-3500

own priority list for clubs or individuals and to distribute equipment that is made available on a basis it determines as being equitable to all concerned. Priorities will be necessary; establish them on a logical basis you deem appropriate. Certain certified organizations have used as a basis for priority the fact that the amateur can demonstrate that he has a working terminal unit ready to use. I find this acceptable, however, the decisions are left to you.

I believe it would be advisable to keep track of those amateurs which receive printers so that duplication is avoided unless justified for some reason. For example, if an amateur handles a considerable volume of traffic using teleprinter equipment, it would be advisable for him to have a workable spare, since much of the WU surplus printer equipment is of a type for which spares are not available from any source.

As noted in WUSP Bulletin Nr. 2, it is permissible for certified WUSP organizations to recover out-of-pocket costs in connection with obtaining, storing, and issuing WU surplus printers. This is most conveniently accomplished by recovering an appropriate amount when each printer is released through you. The condition or type of printer may be a factor in such cost determination.

You will note from the attachment that no organization has been certified in certain areas. This resulted from the fact that I have not been able to find an organization that would take the responsibility. I invite your assistance in this regard since it is highly preferable that each district have a certified organization located within its boundary.

You are invited to publicize that your club is responsible for coordinating the disposal of surplus WU printers in your area. The task requires your being responsible and taking your time. If you feel, as a result of taking a look at the job to be done, that you prefer to let someone else be responsible, please advise me and I'll attempt to locate another club.

Sincerely,
Frank C. White
Coordinator WUSP Disposal

WUSP (Continued) . . .

Western Union
Individual Responsible

° *Boston, Mass.*
W. H. Seibert
230 Congress St.
Boston, Mass.

° *New York, N.Y.*
R. R. Hoagberg
60 Hudson St.
New York, N.Y.

° *Philadelphia, Pa.*
J. M. Farish
230 South 11th St.
Philadelphia, Pa.

° *Pittsburgh, Pa.*
W. L. Matteson
1601 Chamber of Com. Bldg.
Pittsburgh, Pa.

° *Washington, D.C.*
B. L. Krise
1405 G Street, N.W.
Room 800, Wash., D.C.

Gulf Division

° *Kansas City, Missouri*
C. A. Cromwell
7th & Walnut
Kansas City, Mo.

° *Oklahoma City, Okla.*
G. D. Housh
400 North Broadway
Oklahoma City, Okla.

° *New Orleans, La.*
A. D. Diebold
334 Carondelet
New Orleans, La.

° *Dallas, Texas*
V. G. McLendon
3131 Halifax
Dallas, Texas

° *Houston, Texas*
G. L. Watson
2006 White
Houston, Texas

° *Denver, Colorado*
A. Rabinoff
1339 Osage
Denver, Colorado

Lake Division

° *Cleveland, Ohio*
R. E. Givens
Room 532 Rose Bldg.
2060 East 9th St.
Cleveland, Ohio

Amateur Radio
Organization Responsible

Quannapowitt Radio Assn.
Wakefield, Mass.

Mid-Island Radio Club
Nassau, L.I., N.Y.

Phil-Mont Mobile Radio
Club, Inc.
c/o The Franklin Inst.
20th & Parkway
Philadelphia, 3, Pa.

Maritime Mobile Amateur
Radio Club
1317 Orangewood Ave.
Pittsburgh, Pa., 15216

Dorchester County Amateur
Radio Club
Boundary Avenue
Cambridge, Md. 21613

St. Louis Amateur Radio
Club Inc., Buder Park
St. Louis, Mo.

Jayhawk Amateur Radio
Society, Inc.
1600 Washington Blvd.
Kansas City, Kan.

Southeast Arkansas Amateur
Radio Club
3300 West 7th Ave.
Pine Bluff, Ark.

The Dallas Amateur Radio
Club, Inc.

None

None

Dayton Amateur Radio
Assn., Inc.
P.O. Box 44
Dayton, Ohio, 45410

Amateur Radio
Individual to Contact

Roy K. Breon
Chairman RTTY Committee
Quannapowitt Radio Assn.
47 Maynard St.
Arlington 74, Mass.

Dave Minott
352 Arkansas Dr.
Valley Stream, L.I., N.Y.

Clinton R. Spencer, Jr.
Phil-Mont Mobile Radio
Club, Inc.
124 Central Ave.
North Hills, Pa., 19038

John C. McKinley
Secy-Treas.
Maritime Mobile Amateur
Radio Club (same address)

Paul E. Mace, Vice Pres.
(same address)

Richard P. Whitton
225 Meramac Ave.
Suite 1023
St. Louis, Mo., 63105
Phone: PA 7-4122

Joe C. Hiss
4034 Silver
Kansas City, Kan.

Arthur Ideker
1505 West 14th Ave.
Pine Bluff, Ark. 71601

D. O. Jones
1415 Whispering Trail
Dallas, Texas, 75241

Frank C. White
National Coordinator
2706 Harmon Road
Silver Spring, Md.
Phone: Home 933-2257
Office 296-5800

Same as above

R. F. Zimmerman
311 Brookside Dr.
Dayton, Ohio, 45406

WUSP (Continued) . . .

Western Union
Individual Responsible

° *Cincinnati, Ohio*
R. P. Weyland
216 South Dixie
Terminal Building
Cincinnati, Ohio

° *Detroit, Michigan*
R. E. Meeham
536 Shelby St.
Room 603
Detroit, Michigan

° *Indianapolis, Ind.*
J. A. Overhage
107 South Capital Ave.
Room 209
Indianapolis, Ind.

° *Chicago, Illinois*
R. C. DeCou
437 South LaSalle St.
Chicago, Ill.

° *Minneapolis, Minn.*
W. R. Pumaerlo
317 2nd Ave. So.
Minneapolis, Minn.

° *Omaha, Nebraska*
G. E. Thorson
1323 Farnam Bldg.
Omaha, Neb.

Pacific Division

° *Seattle, Washington*
T. Criteser
239 S. W. Broadway
Portland, Wash.

° *San Francisco, Calif.*
742 Market Street
San Francisco, Calif.

° *Los Angeles, Calif.*
D. Thompson
745 Flower Street
Los Angeles, Calif.

Southern Division

° *Richmond, Virginia*
T. L. Hooper
201 North 7th St.
Richmond, Va.

° *Nashville, Tenn.*
C. W. Cooper
218-A Exchange Bldg.
311 Church Street
Nashville, Tenn.

° *Atlanta, Georgia*
E. M. Holberton
56 Marietta St., N.W.
Room 519
Atlanta, Georgia

Amateur Radio
Organization Responsible

Miamisburg Wireless Assn.

The Hills Amateur Radio Soc.
Box 55
Rochester, Mich., 48063

Greenwood Amateur Radio
Club
515 North Meridian
Greenwood, Ind. 46142

Illiana Teleprinter Soc.
9630 South Greenwood Ave.
Chicago, Illinois 60628

Radio Amateur Teletypist
Society of Minneapolis

Sioux Falls Amateur Radio
Club, Inc.
P.O. Box 91
Sioux Falls, S.D.

Utah Communication Advisory
Board, Radio Teletype Sub-
committee, P.O. Box 2771,
Ft. Douglas, Utah 84105

East Bay Radio Club
75 Ardmore Road
Kensington, Calif.

Palisades Amateur Radio
Club, Inc., P.O. Box 301
Pacific Palisades, Calif.

Albemarle Amateur Radio Club
2104 Twyman Road
Charlottesville, Va.

Wilderness Road Amateur
Radio Club
Danville, Kentucky

None

Amateur Radio
Individual to Contact

Ronald H. Will
4880 Walden Lane
Kettering, Ohio 45429

Richard Brooks
Chairman RTTY Section
Box 55
Rochester, Mich. 48063

Donald R. Powell
515 North Meridian
Greenwood, Ind. 46142

W. S. Soich
9630 South Greenwood Ave.
Chicago, Ill. 60628

Ed Field
5745 25th Ave. South
Minneapolis, Minn.

Dick Neish
904 Marday Avenue
Sioux Falls, South Dak.

Russell R. Bateman
State Communication Officer
Civil Defense Corps
1543 Sunnyside Ave.
Salt Lake City, Utah

Chet Murray, Secy-Treas.
75 Ardmore Road
Kensington, Calif.

Robert Eshoo
1023 Chelsea
Santa Monica, Calif.

Edwin Bernet
RTTY Group
Same address

Ronald L. Whitmer
Chairman RTTY Committee
Wilderness Road Amateur
Radio Club, Rural Route 4
Hardsburg, Kentucky

Frank C. White
Same as before

WUSP (Continued) . . .

Western Union Individual Responsible	Amateur Radio Organization Responsible	Amateur Radio Individual to Contact
° <i>Birmingham, Ala.</i> R. C. Sandifer 405 First Ave. N. Birmingham, Ala.	None	Same as Above
° <i>Miami, Florida</i> W. L. Johnson 3140 N. Miami Ave. Miami, Florida	Florida RTTY Society P.O. Box 6047 Daytona Beach, Fla.	Fred W. DeMotte Secy-Treas. Daytona Beach, Fla. Office Phone: 904-252-2744
° Western Union District Office Location (see attached map for area included)		

Sources of information on how to use the 5/16" wide paper tape in Western Electric 2B printer.

See RTTY — Publication of RTTY Society of Southern California — good magazine for those interested in RTTY. W6AEE Editor. Subscription rate \$3.60 a year. Airmail \$4.80 a year. See February 1966 issue, page 5, article by W3PYW on WU printer disposal, W3PYW suggests purchase 5/16" wide paper from "Paper Manufacturers Company, 9800 Bustleton Avenue, Philadelphia, Pa. Attn. Mr. Frank Walker. \$15.00 a carton of 60 rolls — 25¢ per roll (not sold by roll — only the carton.

Also see April 1966 RTTY pages 3 and 4. "Some Notes on the Western Union 2B simplex Printer" by WBBBB — tells how to use DC series govt. motor. He suggests modifying the printers to use the standard 11/16" wide

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I am enclosing a calling and answering loop like I use for all the calls that I get RTTY.

When a fellow calls me I let the printer run and I use a separate reperf and answer him on the reperf and when the tape comes out I cut it off at the right places and then splice it into a loop and put it on a different TD. When the calling station tells me K K K I just hit the switch and I use the tape all thru the QSO and for the sign off. Then I write the fellows name on it and his QTH and put it on a hook along with other tapes in the same zone.

Then when I get a call I glance at the already made tapes and then if there is one there for the caller I am in business. If not then I make one and use it. Sure helps with the QSO.

Am presently experimenting with a small transistor transmitter rated at eight milliwatts . . . really works fine too. Don't think I will use it for RTTY but for CW it is FB.

Am going fishing soon so best 73 CUL

FREEMAN, KH6AX

tape — he made the parts himself . . . removed the rear shoulder (opposite end from gear teeth) and cut S slots radially in the shoulder with (now worthless) hack saw. Filed ragged edges smooth.

Alternatively buy following parts from TTY Corporation, Skokie, Ill.
Part Number 6245 — Tape Guide, right
Part Number 6930 — Tape Guide left
Part Number 6932 — Feed Roll
Part Number 90139 — Tape Guide tube (for base). On some machines the feed roll will not require changing as it will work with either width of tape. Parts cost \$3.50 without the feed roll. The original platen roll should work with either tape width. If new one is needed, Part Number is 6960.

Frank C. White
2706 Harmon Road
Silver Spring, Maryland 20902

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It is with regret that RTTY reports the death of Jim Dyer in June of this year. We will miss W8OGP's RTTY signals.

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RTTY, INC., this month received a sample of "BUD" Type Cleaner. It consists of a pink plastic putty, which can be used to pull the dirt out of the Teletype type rather than washing it into the printer. Test on the 28ASR used at this station, show it to be a fast, clean method of cleaning the type box. It can be purchased from your local stationery store or from Bud Type Cleaner Co., P.O. Box 45, Timonium, Maryland 21093.

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THE HUGHES PRINTING TELEGRAPH

ALAN COLE — K6CHN

The odd bit of machinery on the cover of the June RTTY Bulletin resembling a cross between a grandfather clock, child's piano and erector set is, in reality, one of the world's first workable printing telegraphs. Invented in 1855 by David Hughes, the system was used extensively in Europe and, at a later date in 1889, by the British Post Office.

Unlike our modern start-stop method of printing telegraphy, the Hughes system falls into the category of synchronous teleprinters. With the help of the accompanying sketch I'll try to give a brief explanation of it's operation.

The type pallets were carried on the periphery of a type wheel, somewhat like the Model 26; the difference being there was only one row of type with 56 pallets rather than two rows. The type wheel was driven by a vertical shaft which revolved constantly, powered by a governor motor. The vertical shaft at the receiving end was kept in synchronism with the one at the transmitting end by a sync pulse transmitted once every revolution.

The keyboard consisted of 28 keys resembling piano keys. These keys represented the 26 letters; the remaining two corresponding to our "LTRS" and "FIGS." When a letter was to be sent its key was depressed and the tail

of the key lifted a pin up into the path of a hinged arm attached to the vertical shaft. The hinged arm was lifted as it passed over the pin causing a sliding collar on the vertical shaft to displace downward for an instant. This motion was transferred to a signal lever hinged to the frame of the machine. The signal lever then connected the battery to the line and a brief pulse was transmitted. At the receiving end this pulse caused the armature of the receiving relay to be released for an instant, tripping off a clutch. This clutch activated a printing mechanism which printed the character which happened to be facing the paper tape under the type wheel.

The important thing to note is that the type wheel never stopped revolving but rather the character was printed "on the fly." This concept was to be used in a much more refined system by Siemens and Halske in Europe before 1939 at speeds of 166 words per minute. By comparison the Hughes system operated at 30 words per minute.

The Hughes system served its day very well. It was stable and accurate and was used extensively over short submarine cables as well as land lines.

CLEANING FLUID FOR RADIOS AND TRANSMITTERS

Formula for one (1) gallon of solution:
8 ounces of ammonia
3 ounces Oleic Acid
4 ounces Acetone
7 pints WATER

Equipment:
1 small size sash brush
1 large size pan

Procedure:

Pour cleaner into pan. Place radio gear into pan and with brush apply fluid all over it, using a painting and daubing action.

Don't worry about getting fluid on IF coils, transformers and capacitors, etc. Don't try to clean every little particle of dirt. Let the solution do the biggest part of the work. After cleaning the unit for five (5) minutes remove from the fluid and wash well with luke-warm water. A small rubber hose will speed things up a great deal. After thoroughly washing unit, place in an over at 160 degree temperature and bake for two (2) hours, occasionally checking to make sure oven temperature doesn't get too high. When the two hours are up, place the unit on the test bench.

These instructions are from Mr. McNeill, G. E. Maintenance Engineer, Chicago.

W7ARS

ADDRESSES FOR RECIPIENTS OF MAIL FROM ANTARCTICA

122
MRS. GLADYS SHELTON
Box 139 R.R. 3
Mt. Pleasant, Iowa
52641

123
MISS JEANNE TREMBLAY
145 Oak Hill Avenue
Seekonk, Mass.

124
CAROL CABRAL
Norford Hotel, Rm. 317
1508 N. Pulaski Road
Chicago, Illinois

125
CDR. W. S. TRAINER, USN
Legal Office
U.S. Naval Air Station
Willow Grove, Penna.
19090

126
W. R. BOWERS, JR.
123 East Pitt Street
Canonsburg, Penna.
15317

DX-RTTY

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Hi DX'ers:

Its sure a rough deal to have to sit down and knock out a column on DX when all one's friends are on vacation and the mail bag is full of picture postcards but here goes. Congratulations this month to Lou, 11ORS, 1b, OZ8US and 11KG for making the WAC-RTTY honor roll this month. This takes us through Nr 78 on the WAC list which is growing like a mushroom. HL9TM was responsible for adding quite a few new calls to the list by furnishing Asia to about 30 typers who were needing that Continent. For those of you who have sent me QSL cards for HL9TM I can report that they have been sent to Joe and he tells me he will send cards to each of you as soon as he gets back to the States in the next month or so.

The column this month is a cooperative arrangement between Ed, K3GIF and myself. Ed and his good wife are staying here at DX headquarters to try and get even for the mess my XYL and I made of his shack last fall. Hi I can now report that Ed knows now, after operating here for a few hours, why I am about ten countries behind him in the DX marathon. Jean, FG7XT, has asked me to keep Ole Ed here long enough to slow him down so he (Jean) can pick up a few new countries without the competition from K3GIF.

According to most of the mail received here this month band conditions seem to be holding up fairly well this year for the summer months. John, W3KDF, reports working Leo, EI6D for a new one on the green keys. W3KDF also reports that CP1BX is back on the active list. Lou, 11ORS, told me in a QSO last week that he had sent a 50 Cycle sync motor via airmail to VS6AZ so this should be a good one to watch for very shortly. Lou promised to keep us advised about VS6AZ so I'll pass it along as soon as I hear anything.

Congratulations are also in order this month to Freeman, KH6AX, who was married on his 70th birthday in a most colorful ceremony at a chapel in an old missionary church in Honolulu. Freeman sent in a very wonderful description of the ceremony and reception which took place on one of the other islands — including the traditional flaming knife dance, the singing of the Hawaiian wedding song, etc. — If you get a chance to work KH6AX ask him to run his tape on the wedding story — its worth reading! Freeman mailed me a SWL card he received on his RTTY signals from a listener in French Algiers who included an excellent piece of copy. Speaking of SWL cards — in the last batch I

received from the QSL bureau I was surprised to receive a report from an RTTY listener in Azerbaijan (UD6) and one from Vladivostok (UAØ) both of which checked with my log. Sure hope we can get these chaps on the transmitting side soon since they would be a most acceptable addition to the country list.

The "down under" gang are very active now since winter conditions prevail on that side of the World. I got quite a kick out of listening in on a four-way QSO last week between VK2EG, VK3KF, ZL1WB and ZL3HJ. They all boil in here on the West Coast around 0500 GMT on 14Mc. VK2EG asked me to try and find out if any of you readers are interested in scouting. Bill is a Group Scoutmaster in Sydney and is very anxious to get some name tabs or badges of various American Scout Troops. Can help? Eric, VK3KF, has had some problems getting QSL cards to some of the stations he has worked so in order to be sure everyone needing cards from him are taken care of, he is sending me his log and the necessary cards. If any of you have not received your VK3FK QSL card please send me a SASE and I will take care of the situation for you. Eric is still keeping his RTTY skeds with Cas, KA9AK, on ten meters but says that conditions are getting quite poor. The last FEARL bulletin reports that the KA gang are making another strong effort to get RTTY frequencies assigned on the other bands so lets all keep our fingers crossed that they will be successful.

Just received a letter from Jerry, KØPIV/6 (Ex CN8IF, KR6BQ) who says he will be glad to QSL to any of the gang who failed to receive his QSL card when he was on RTTY from Okinawa. Just send a SASE to him at 615 Bainbridge Avenue, Alameda, Calif. 94501. Jerry also asked me to mention the following in the column — "I have just recently modified my printer for automatic carret and line feed functions. Since putting it into operation I find that a great many typers send multiple car ret's while they are thinking of what to say next. As you know, this is extremely hard on the paper supply!" Take it easy on the other guys paper roll — fellers, — a lot of the gang are having trouble getting their hands on enough paper to keep going. One chap in a certain foreign country wrote me that he was using paper towelling in his printer!

Had a nice long letter from Bill Brennan, G3CQE, this month says he will be back on the RTTY channels this Fall with a new set up. He has been very busy travelling all over the UK for the BBC and has never completed

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DX-RTTY (Continued).).

his set up since he moved from Norwich. Bill says the BARTG has decided to accept logs from the BARTG contest as proof of QSO's with the various countries in order to qualify for the QCA Award and he points out that if you had — for example — 20 countries in the Contest, you would just have to send in an additional five confirmations to get your award. That's a good deal and worth checking into. If you had worked 25 different countries in the BARTG Contest you would be eligible for the Award with no further confirmations necessary. Bill also mentioned that he had a nice letter from VE3AYL who says she is close to fifty countries but is having lots of trouble getting the cards in.

I should put a disclaimer on this month's effort because it has really been written under pressure. Please excuse any mistakes in spelling and poor sentence structure. With the Boss Editor (W6AEE) breathing down my neck and Ed, K3GIF leaning on my shoulder — it hasn't been easy. If all of you will excuse me, I will sign this off and head for the decompression chamber before I get the bends — the pressure in here is fierce! I'll let all of you in on all the DX secrets I managed to wheedle out of K3GIF after he leaves here. I can tell you this — he's got more tricks up his sleeve for working those rare ones — than Mandrake, the magician!

73

Bud, W6CG

Read but not approved, Ed Clammer, K3GIF

Merrill Swan, W6AEE

M. Swan

FOR SALE: Model 19 complete with accessories including table, \$140.00. Electrocom FSC-250 converter \$320.00. Electrocom TK-100 tone keyer, \$50.00. Discount 10% for group sale and include four boxes sprocket feed paper, WA6ZCO, 1312 Micheltorena, Los Angeles, Calif. Phone NO 3-1581.

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