

Keying System for RTTY Operation

By ROY WEISE, W2TKO, Buffalo, New York

I have been noticing some keying systems appearing in RTTY lately and thought this system might be of interest since it uses no change over relays or switches, and the printer will respond to the keyboard during receiving times so that carriage return etc. can be done without all the mechanical outriggers.

The original keying system in part was originated by W6OWP but I will run through it briefly.

Point A is at zero volts on Mark and plus 105 volts on Space. With 105 volts on the 6AL5 FSK diode, the frequency of the VFO is shifted lower. At the same the frequency of the audio oscillator is shifted higher. Also the NE2 strikes, pulling the 12AU7 out of cutoff and keying the 6V6 Keyer tube. Note that the 6V6 plate current is controlled by the screen voltage and the grid cathode is used as a clamp diode. The polar relay is used to key a model 12 reperforator. A model 14 could be readily used in place of the polar relay.

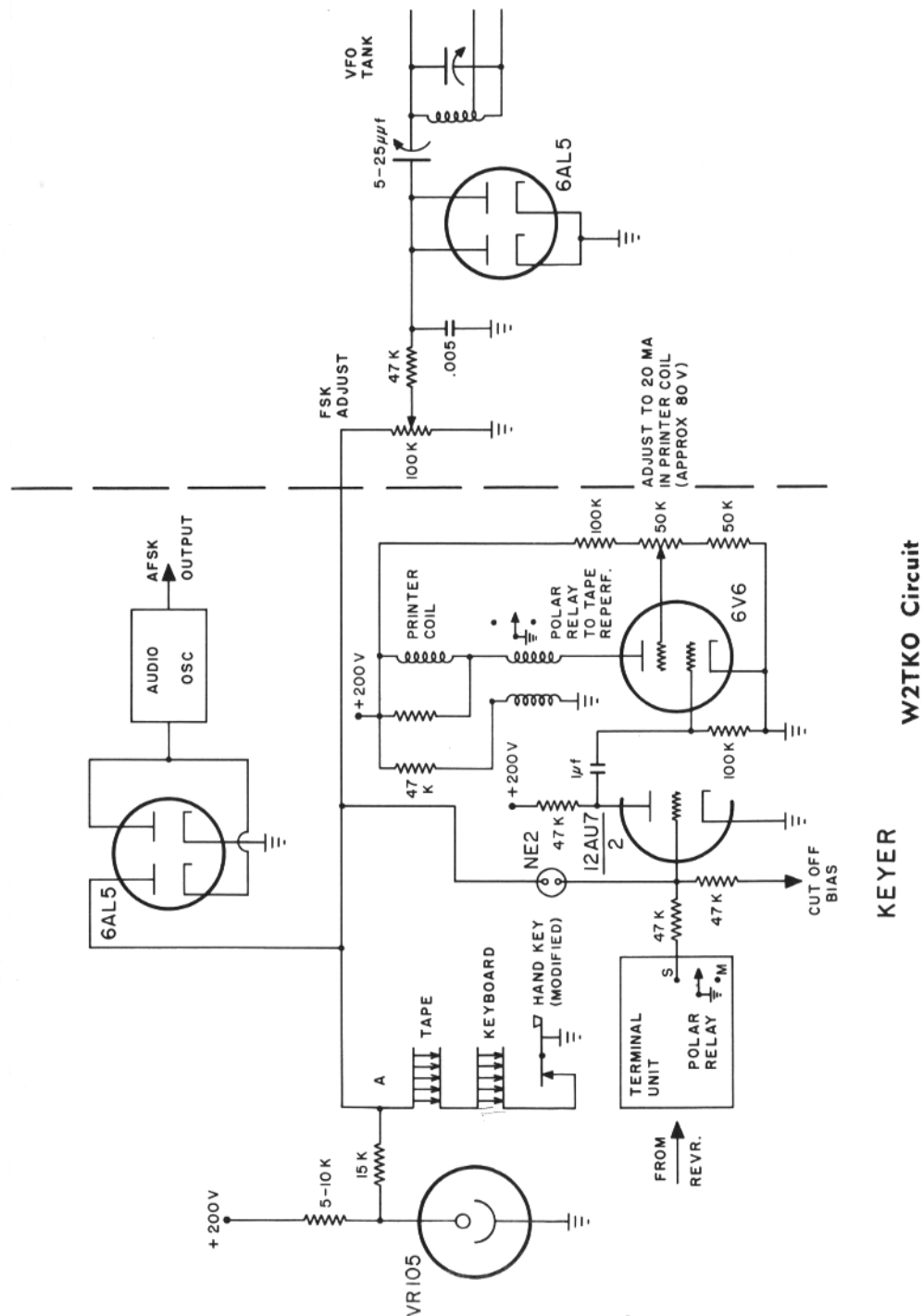
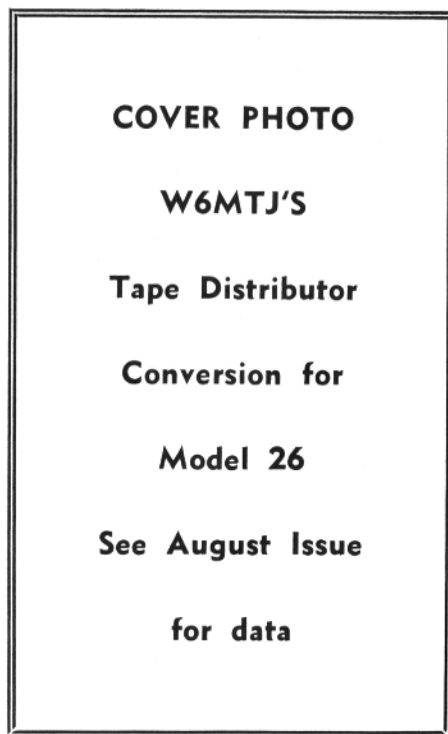
A polar relay is used in the Terminal Unit to balance out noise. (I have been very unsuccessful in getting the dual diversity system to work satisfactorily.)

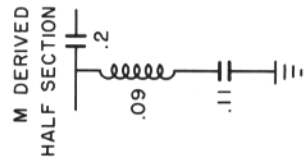
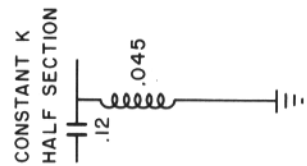
Please note the modified hand key.* This keys by FSK but prevents switching, which would be necessary if Make-Break keying is used. Many times before using this system I would come back to a station with the oscillator turned off by the hand key. Very disturbing to say the least.

By the way, what if any opinions did you get concerning FSK vs Make-break keying?

Your latest RTTY shows lots of activity, but where are they all? I rarely hear any one but the East Coast gang. Guess there is a lot of VHF activity which of course I can not take part in. I've yet to hear a station on twenty meters. Oh yes, I'll also enclose a high pass filter (See page 4) I designed from those toroids Marv, W5HZF has. Its quite unique and works well even though the attenuation is rather high . . . Best wishes, Roy . . .

*Key is modified so that it is normally closed and is open when operated. In other words, it keys backwards.



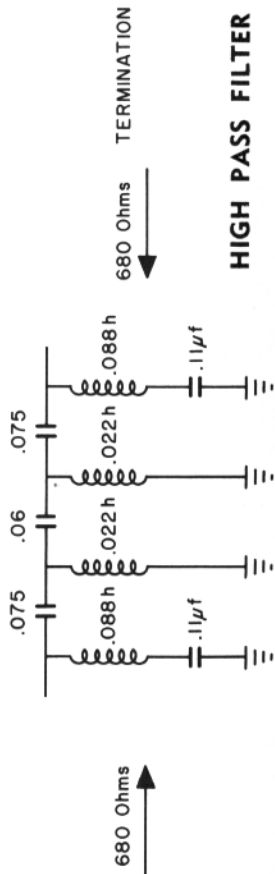
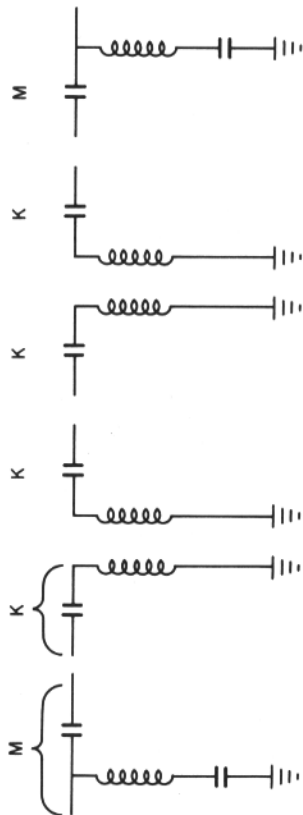
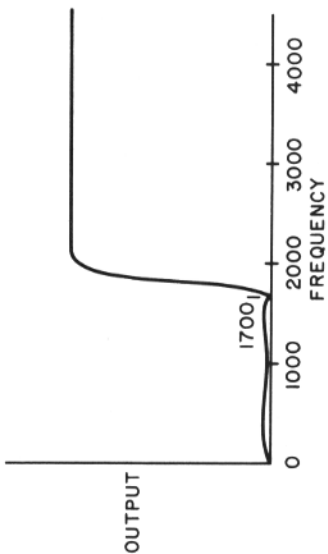


M DERIVED TERMINATING HALF SECTIONS
WITH CONSTANT K MID SECTIONS

ADDITIONAL MID SECTIONS MAY
BE ADDED IF DESIRABLE

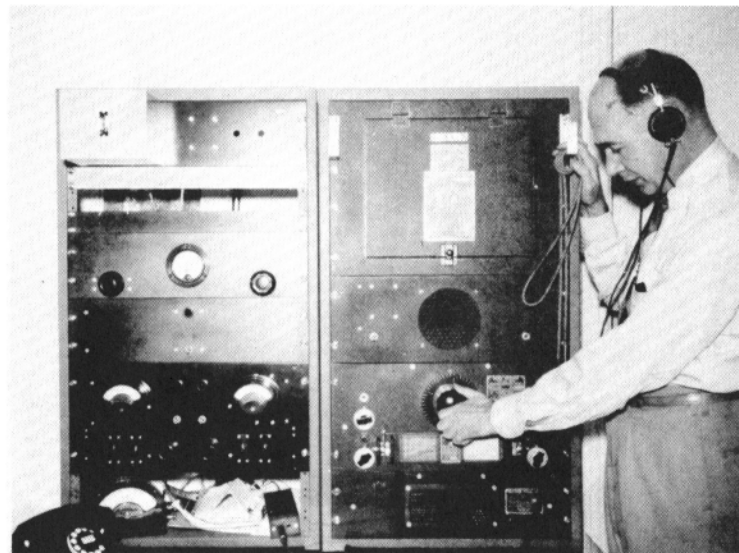
.088 h - BOTH COILS OF TOROID IN SERIES

.022 h - USE ONLY ONE COIL FOR THIS VALUE

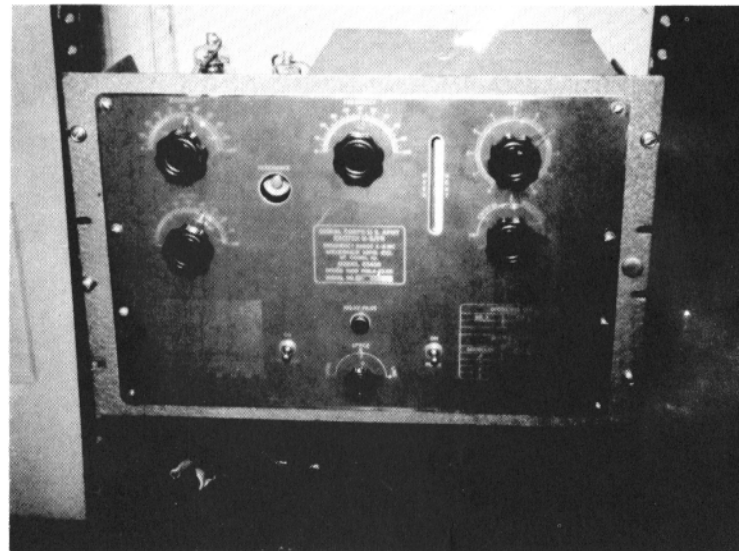


HIGH PASS FILTER

LOU BUCK VE2ATC, Montreal, Canada



0-5/FR FSK EXCITER



BELL SYSTEM PRACTICES

TELETYPEWRITER STATION INSTALLATION AND MAINTENANCE

MOTOR	FUSTAT	FUSTAT MTG
A-C SYNCH.	9025	BL-ON032
A-C SERIES	9016	BL-ON016
D-C	9008	BL-ON016

TABLE A

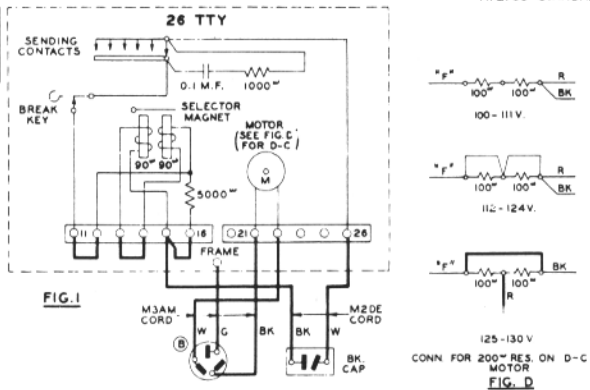


FIG. 1

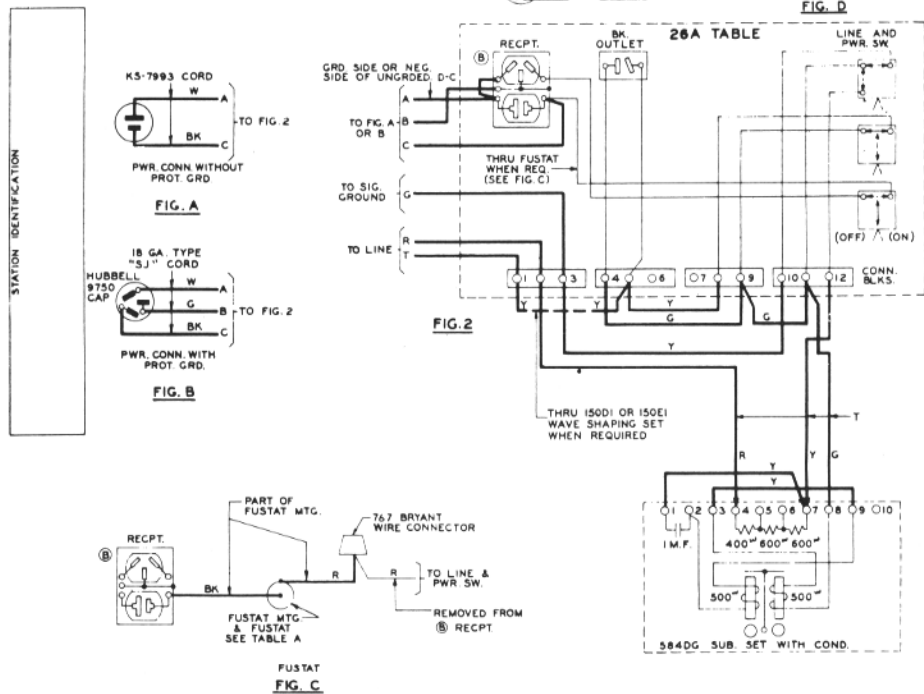
CONN FOR 200 RES. ON D-C MOTOR
FIG. D

FIG. 2

FUSTAT
FIG. C

26 TTY - 26A TABLE
LOCAL ATTENDED TWX SERVICE
NO LINE RELAY - SWBD. NO. 1 OR IA
115V A-C OR D-C

BELL TELEPHONE LABORATORIES, INC.
PRINTED IN U.S.A.

WIRING DIAGRAM FOR MODEL 26 TABLE
(For those who did not get one with the machine)

Revised Gate Terminal

W2JAV Phil Catona

Editors Note: The original circuit appeared in RTTY in October 1954. Many have been built and are operating very well, however as with any of the TU's in use, improvements can be made.

The original Gates circuit did not employ limiters of any type, and as such QSB caused quite a bit of trouble at times. So the addition of a limiter or limiters seemed in order. Separate limiters were used in the final version. Following the two limiters are two tuned stages, one for the mark and one for space. This smoothes out some of the square waves from the limiters and also improves the selectivity.

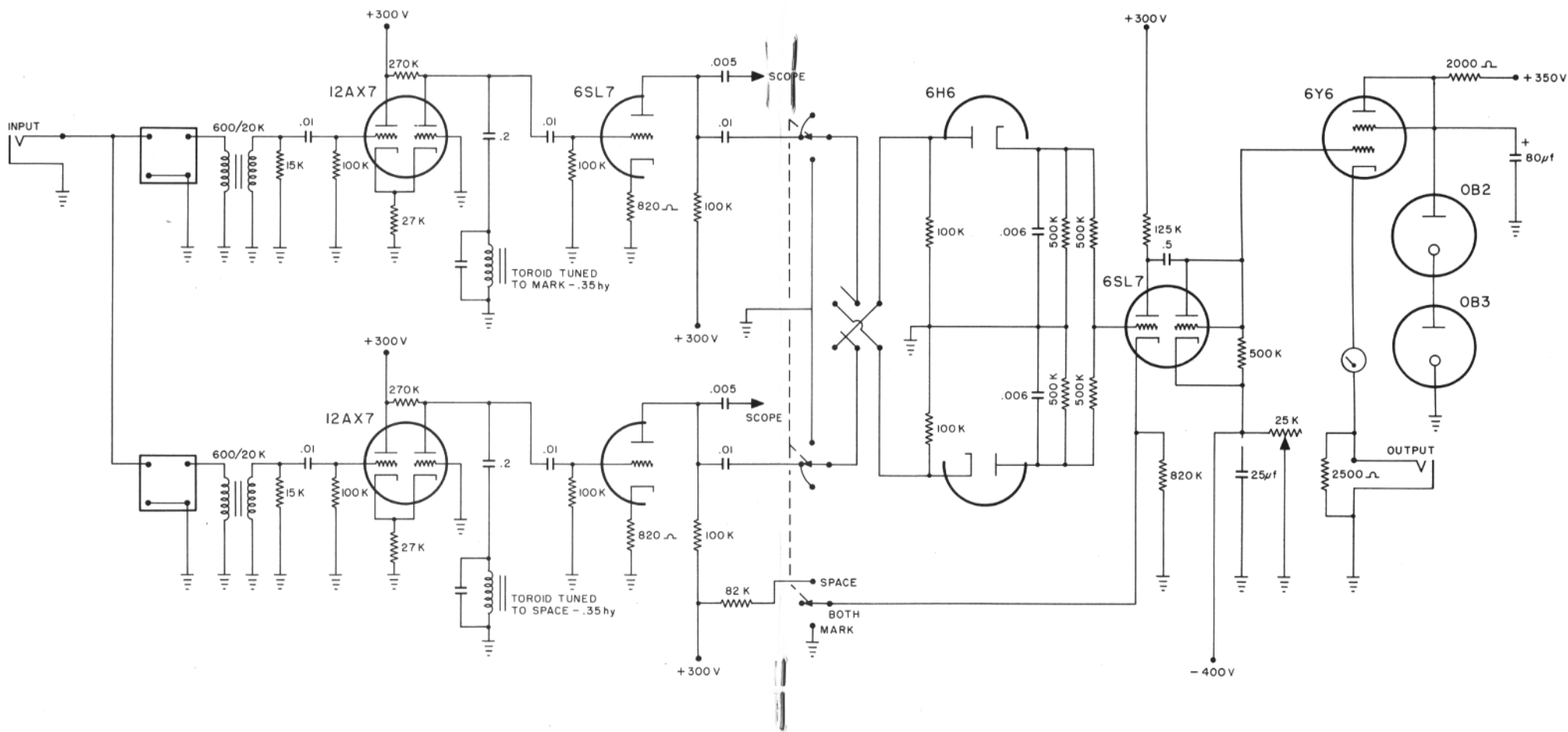
Following the tuned stages, is the detector circuit and semi-diversity circuit (RTTY, August 1955) which is somewhat different from that in the original Gates TU. Provision for normal and reversed shift, as well as Mark only, Space only or FSK are made.

The DC amplifier has been modified also, by the addition of two OB2 voltage regulator tubes, and an 80 mfd capacitor. An additional switch deck has been added to change the bias point when changing from one mode of copy to another. The original DC amplifier was quite bad in that any small change in DC due to fading etc. would trigger the printer causing "Hits". This circuit has been found to overcome this very well.

I have started to make a series of tests on the various TU's, (those which I could get my hands on or build) and guess that I have found something of interest, and some things I would rather forget. Seems like I had to revise my thinking and mode of testing. For

one, I find that testing with RY's doesn't tell the whole story. I find that testing at hand and at tape speed with the LTRS and Balnk key pulses, and using the lowest possible signal input level to produce solid copy is a good indication of the sensitivity and distortion of the convertor under test. Also running the same tests with overload level must be considered, while these tests are underway the ranging should be checked and recorded. (Machines range should be established by simple DC loop before the converter tests are run.)

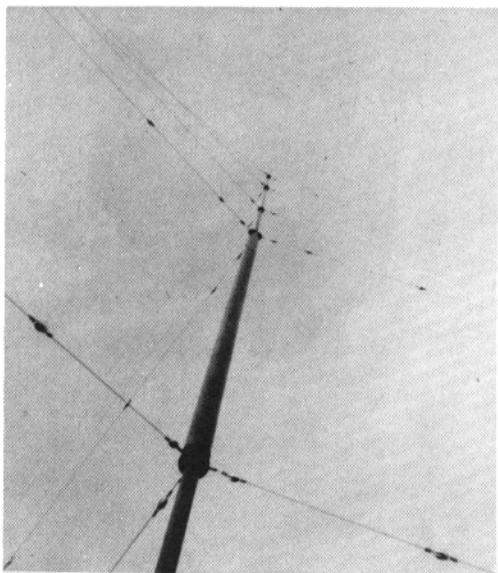
I have been checking the pass band of the converter by operating the unit just over the limiting level at the detectors and then dropping the input to half the indicated value. Also have tried to establish the limiting levels by overriding the input and checking the detector output. (On the band pass check the frequency is varied to drop the voltage to half value.) Another test that I have been using for some time is a wire recording with various levels of random noise overriding a test text. I frankly admit that I cannot draw any solid conclusions. But for one, I find that polar keying is still best for me. Neutral keyers just don't balance out noise and are certainly biased. Flip-flop keying is better but I don't have much experience with them. In any event, polar relays certainly iron out more unwanted voltage from the detectors than I can mention. With neutral keyers a low pass filter is a must. As for limiting, well one just can't get enough. I have indicated over fifty DB of difference between Mark and Space tones on many long haul signals. I am still fascinated watching the levels vary on the scope, but it is something we have to face.



REVISED GATES TERMINAL UNIT

V-37 Antenna

By W6ZNU, Frank Azevedo, Jr., Chico, California



CLOSE UP



BASE

IT ALL STARTED WITH

Start **STOP**

No, "Start-Stop" isn't gobbledygook or the name of a new game. It's a method of transmitting printed characters—and is the basic invention on which modern telegraphy rests.

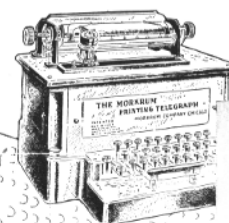
The inventor was Howard L. Krum, a young Chicagoan with a degree from Armour Institute whose father, Charles L. Krum, was experimenting with printing telegraphy. Financial backing for manufacture came from another Chicago source, the Morton family—and the company's original name, Morkrum, was a contraction of the names Morton and Krum.

All this took place during the first decade of the present century—which might be called the incubation and invention period in Teletype's history. By 1920 the new telegraph instrument based on "Start-Stop" was well developed and sales had been made to telegraph companies, railroads, press associations, and others; and by the end of the succeeding decade telegraphy by Teletype was established throughout the world.

The 1930's saw the introduction of switching methods, notably the establishment of TWX (Teletypewriter Exchange) which made Teletype service as easily available to business as the telephone. With the 40's came the war and the adoption of Teletype communications by the military on a vastly increased scale.

And now in the 1950's new frontiers for Teletype equipment are beckoning—in the handling of business records and a host of uses for controls from tape and keyboard.

Yes, the Chicago industry that started with "Start-Stop" has come a long way—and is still growing lustily. We look forward to the future with full confidence that it will be a good one, for the Teletype Corporation and for the great city in which it is located.



TELETYPE CORPORATION 1400 Wrightwood Avenue Chicago 14, Illinois

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TAPE OFF THE FLOOR

W9KOV, Bob Calhan and I demonstrated our RTTY equipment at the Starved Rock Hamfest last June 5th, and the two separate "stations" intercommunicating between each other across the auditorium room attracted considerable attention. Bob had his Model 26, BC348, and exciter set up out in one corner of the room, and I had my Model 26, reperforator and tape equipment, with BC348 and exciter set up in the opposite corner. Of course our signals were S9 plus both ways, operating without antennae on the transmitters. A few times I picked up a commercial press station and rebroadcast him to the other corner of the room, and thus we had both of our 26's printing press. Sure attracted crowds at both places. Other times Bob and I qso'ed each other on RTTY, sometimes punching tape from my own keyboard, other times taping from incoming signal, and playing the tape on the distributor. RTTY hams who were at Starved Rock Hamfest that time were W9VOK, W9TCJ, W9SPT, W9JBT, W9BHV, and several other hams who are just getting on RTTY.

R Y R Y R Y R Y R Y R Y R Y R Y

Well I am having fone QRM troubles. There is a BC-610 here in the front of the building which takes you and my own local copy out. So guess until he goes to lunch, won't be able to do much good. The BC-610 are noted for their QRMing ability So here is a repeat of this xmission. W6DOU W6DOU Es W6IZJ W6IZJ De W6AEE/6 W6AEE/6 Fresno. Ar K K K

This is the first time I have had this old model twelve running in about four months Bob - - - - - It just seems that I do not get the time anymore to work this stuff - - - - - We are very busy flying these days with these new British Vickers Viscount aircraft - - - - - Well Bob I will it back to you and I wouldn't be surprised if my shift was out. I just set it by ear as I heard you calling and hurried so that I could catch you - - - - - Also we are having a thunderstorm so that does not help things either so back to you old timer. W9TCS De VE3GL in Toronto, Canada KKK

R Y R Y R Y R Y R Y R Y R Y R Y

W6UPY Es W6OWP De W6AEE/6 Fresno Calif. Many thanks for the reports and will QRT here as it almost time for the meeting. Have W6QZQ W6QZQ G here as well as W6MSG W6MSG.

R Y R Y R Y R Y R Y R Y R Y R Y

W6CG De W6UPY Rlg Hls fine Bud and tell Frank I sed hello Have been off long time as you know. Imagine Louie missed too cuz can't copy without sig on air and someone sure goofed up. Wonder if it is next Sat. Hi Hi Hi anyway will try at two and c u ard just after two-fifteen if no copy and later on if do hr them So ter now Gb Es Sk W6CG De W6UPY Rlg Off and clear fer lissen Afd Msg.

R Y R Y R Y R Y R Y R Y R Y R Y

W6AEE/W6ZVB/W6NFY De W6CMQ OK Merrill has more company. Bet that's why he likes RTTY, he can copy without listening or paying attention at all, huh? I still say Merrill better get that two meter antenna up where it can see something. Roy is S-7.0 on my S meter. Anything over S-0.5 is solid copy here.

Roy, you better build a paper rewind for the used copy like I have. When you roll up an entire roll of paper you just put it back in the machine and use the other side. Also it keeps the deck free of paper. I sure like mine.

Right on the facsimile gear. Merrill and I have been talking about that for some time but so far we have not done anything about it as the prices on all the surplus facimile gear are out of this world. Do you know where to latch on to some cheap Roy?

You have an idea there, Roy, about slowing down the tape. Will give that some further thought.

NM here. Think I will get back to work in the shop. SA 73 for now and see you all later. Over to Merrill or Cec if Merrill misses. W6AEE/W6ZBV/W6NYF De W6CMQ K Merrill or Cec.

Here is Frank W6ZNU to tell you about it. Also have W6VPC W6VPC Es W6MTJ W6MY W6MTJ Es W6CBF W6:CBF Here is Frank W6NU on the keyboard Hi and how are you getting along Am glad to have a little chat with you today. I will be back on the air when I finish my Viking Ranger kit. I have Viking Kw which I will fire it up about few weeks later. Wonder if you are copying me all right. Merrill have a nice Heathkit Xmtr and he is enjoying with it Well here is Bob W6MTJ Hello Ed this is Bob at the keyboard W6MTJ Glad we were able to get someone finally to work on this station We are having a fine time here at Fresno the weather is fine but quite warmer than SF not many up here at the station yet but guess they will be getting in before long . . Well I'll turn this back to Bob now.

R Y R Y R Y R Y R Y R Y R Y R Y

Hi Ed this is Bob W6MSG here and having swell time at the convention. Perhaps will work you soon again. Seems everytime I hear you condx are not rite to work you. Here is W6MSW.

Hi Ed well these guys make me run this thing I work them at the Job but never on the air like Bob. I have a type 26 that is loaned to me by a LCL in Paso Robles but never put it on the air for Transmission but listen occasionally.

R Y R Y R Y R Y R Y R Y R Y R Y

Here are some other characters. Hello Ed This is W6CBF Clyde from Oakland. I have a Model 26 receiving home too. But the Xmtr is not rigged for FSKing at present. Maybe by the time I get thru here Merrill and the rest of the fellows will get me straightened out. Here's Merrill W6IZJ De W6AEE6.

W2BDI De W9TCJ Roger Solid copy Ed Sure solid indeed The CW QRM doesn't bother you at all!!! OK on the discussion. Lets carry it on a bit! OK on the W4 W5ZF Toroid experiments there. Sounds like you have too much "Q" already in both cascaded filters. Damping it out is equivalent to lowering the "Q". You could just use one section instead of two. Oh yes, by the way, I find that the toroids are critical as to the capacitors worked with them. Ceramic capacitors are no darn good. Paper capacitors are fair. Mica or polystyrene capacitors are the best. Just some observations I made while running the "Q" tests with the frequency counter. Interesting huh?

R Y R Y R Y R Y R Y R Y R Y R Y

OK on condx on 80 meters. Glad to know that the RT net is struggling along! One of these days soon I want to report into it. What time does it start? 8 p.m. EDT? You might tell me.

W9TCJ W9TCJ De W2BDI. First part was solid then your sigs took a nose dive and we got garble .But got the sense of all but the last three lines .Well this band width bizz is what Phil and I argue about .Also Merrill and Marvin .The latter believe in pretty sharp filters But Phil says they can't be sharp without introducing bias and distortion which loses us the timing portions of the pulses .So he says he had better luck with about three hundred cycles bandwidth whereas W2TKO in Buffalo is using fifty !!!!cycles, bafid width and says "peace" its wonderful !!Hi .So these were about one hundred and fifty wide —just one of two sections so you can see I am concerned about what is happening to the shape of the pulses going thru only one section of a planned dual section filter. I know the second section will add its phase shift and delay and I am worried about the possibility of poor copy .Under strong signal condx wouldn't make too much diff cause you could re-shape the pulse —I think .But weak sigs don't lend themselves to that process .Fine on the type of capacitors—am now using paper —sealed in plastic .But think that the better type such as polystyrene would help. I know a lot of the loss can occur in the capacitor .These toroids of Marvins are said to have a "Q" of one hundred at 88M.H. and at forty I think the "Q" would go to perhaps one fifty .Wotta "Q" .So we can by resistive loading to get more bandwidth but hate to do it if there is any other way .What do you think Bob ?Funny the the way the sigs are up and down. Lets try some more from you W9TCJ De W2BDI Ar K

R Y R Y R Y R Y R Y R Y R Y R Y

WØFKK/7 Scottsdale, Ariz. De W6UPY Rolling Hills Well Floyd Merrill came on up there at the hamfest in Fresno and clobbered you all up just when you were sending me an answer Hi W8DVL W8DVL De W1FGL Belmont . Glad to hear you Herb . Well won't hold you if you have to run off . Was up in the attic and heard you and Bob going and so rushed down to the shack in the basement and quickly returned the transmi ter to this band . Was on 80 band as we had the regular net tonight . Just wanted to let you know I was printing both you and Bob solid copy here . Very nice signals . The static on the 80 band is terrific and couldn't copy anyone during the net but it doesn't seem to be so bad here . Well Herb sorry you have to run along as signals seems to be very good tonight . But will be seeing you again before long I hope . So best 73s for now . W8DVL De W1FGL Belmont, Mass. K

W5JE W5TJE De W9TCJ W9TCJ Roger. Partly OK here. Yes I remember our QSO courtesy W6AEE. He did all the relaying for us . . . Se have some trouble copying you . . . Guess selective fading. OK on Arlan telling you about our meeting at Marvin's house in Fort Worth. Sure would have liked to met you.

We have visitors here. W9UAU and W9BP. Visiting with us in the ham shack here. Will turn it back to you first though to see how well we are doing here . So what say Oh Whats ur name???? This is Bob W9

RYRYRYRYRYRYRYRYRY

K5WSP De W5SZM Nr 20 21 May 55

RYRYRYRYRYRYRYRYRY

W5TJE W5TJE W5TJE De W9TCJ W9TCJ Williams Bay, Wisconsin Roger and a good evening to you in Dallas, Texas . . . Sure nice to meet you. Don't think we have worked before, have we??? Name here is Bob Bob and we are reading you fairly well here. Lots of QRN QRN here tough. How are you printing us????

Last Sunday, Beep (W9BP/WØBP), Doc W9AU, and their families came out here for a fine visit with us. We had a picnic on the side lawn of our house—and afterwards while the women and children went to the beach for a swim we went over to the Observatory and (naturally) gravitated towards the RTTY hamshack in the basement. Made a few calls and raised VE3GL (Rube) only to lose him through skip. And we worked another station afterwards. We had a fine "hamfest" visit together and discussed the forthcoming plans for "short-shift", new rigs, machines and the like. Beep is going to be in Minneapolis more and more, and probably permanently soon now that he has sold his broadcasting station WRRR. —73—Bob, W9TCJ

I guess the best solution for this will be an I.F. type of converter, I have one here with forty kc coils and an FM detector, but I have not found a conclusive evaluation for it. Marv, W2PAT has one also. But this could go on forever.

I have tested the revised W2BFD, Marvins, W5HZF, W6AEs, Gates, NEMO, Revised

Gates. And still find the revised W2BFD job gives a good account, even with its very broad pass band.

Marvins (W5HZF) looks good on static tests but still does not copy well. I suspect that the pass band is too sharp and rings. Also the keyer needs much revision. Have tried it with a polar relay with much improvement but it still has lots of extra hits. I don't get it, but thats the story. It would seem that the best compromise thus far is about 300 cycles for pass band. That is my story, right or wrong.

—73 Phil . . .

HI MERRILL;

First off I want to thank you very much for answering me when I called you. This was the first time that I have managed to get in touch with a teletype station and it boosted my faith in this transmitter. I wasn't sure that I could get out at all well with it but seems that there may be a chance. It has done well enough as a CW Xmtr, since I added a frequency meter to the BC-61Ø/E as a VFO, but it never did too well on 40 meters. To add to the troubles, the antenna is not loading properly and I haven't gotten around to fixing it. The FSK I produced by grounding a piece of aluminum foil that was wrapped around the Xtal. It was keyed by an ordinary surplus relay that I jumped across the KBD contacts. As you may guess; this leaves much to be desired. The TT equipment consists of an army TT-4/TG which is the Kleinschmidt printer with keyboard. No tape provisions as yet, but I have hopes!! Your copy was not perfect, but never so bad that I couldn't catch what u were saying. The FS converter is a homemade unit that isn't adjustable and is now set at about 600 cycles shift. There is no type of tuning indicator except my ears and the page copy, so when I get it fixed up properly we may be able to do a bit better. My biggest complaint is the operating time of the TT stations that I hear. Being three hours ahead of us down there, they usually sign off around 7:00 p.m. AST (10:00 p.m. PDST) and that is just about the time that the sigs are starting to come in decently up here. Wonder if you might know of any that work a bit further into the wee hours of the night. I would greatly appreciate that circuit data that you mentioned and if any reimbursement is required just say so and I will send it along. My address is at the end of this bunch of rambling. One other thing of interest up here is some way to cut out misprints due to static bursts. We don't usually have too much QRN, but when it comes on it is wicked. Can't think of much more now so will toss this in an envelope and get it off to you.

Bill W2JOP/KL7

Traffic Net News

By EMILE DUVAL, W6FLW

The RTTY Cociety of Southern California Net operates every Tuesday evening at 8:00 p.m. on 147.85 mc.

ACTIVITY FOR THE MONTH OF JUNE, 1955

June 7 — W6CMQ, NC — 26 Checkins

W6AFX	W6NAT
W6BPG	W6NWM
K6BPI	W6OZO
W6BTK	W6SCK
W6CAP	W6SCQ
W6CKS	W6VAD
W6DNJ	W6WYH
W6DYB	W6ZBV
W6EV	W6CND
W6FLW	W6EGZ
W6IZJ	W6KMT
W6JAU	W6RCM
W6JFZ	W6CMQ

June 14 — W6CAP, NC — 24 Checkins

W6AFX	W6IZJ
W6BJX	W6JFZ
W6BPG	W6KJO
K6BTK	W6LGO
W6CKS	W6NAT
W6CMQ	W6NCP
W6CZ	W6NWM
W6DNJ	W6RCM
W6EGZ	W6SCK
W6EV	W6SCQ
W6FLW	W6VAD
W6IAL	W6PSW

June 21 — W6NAT, NC — 20 Checkins

W6AEE	W6JAU
W6AFX	W6JFZ
W6BPG	W6NAT
W6BWQ	W6NCP
W6CKS	W6NWM
W6CZ	W6RCM
W6EGZ	W6SCQ
W6EV	W6TLO
W6FLW	W6ZBV
W6FNW	W6PSW

June 28 — W6CMQ, NC — 26 Checkins

W6AEE	W6JFZ
W6AFX	W6LDG
W6BPG	W6LGO
W6CAP	W6NAT
W6CK	W6PSW
W6CKS	W6RCM
W6CMQ	W6SCQ
W6CZ	W6ZBV
W6EGZ	K6BTK
W6EV	W6BWQ
W6FLW	W6CQ
W6IZJ	W6KMT
W6JAU	W6NWM

Mars Net News

E. C. (Buck) Buchanan W6VPC Oakland

The first Mars Net in the Sixth Army on the 80 meter band was activated as the A-6-VPC/A net operating at 0200Z. Thursday or in plain language 7:00 p.m. PDST each Wednesday evening.

Authorization was given for operation on 3275KC with F-1, A-1 and A-3, primarily the intention is to operate the net with RTTY Mars stations.

The first drill was held May 4th with the following participating; A-6-VPC, NCS, A-6-ASJ, A-6-FZC and A-6-WAP.

We now have the following members on this net, A-6-VPC, NCS, A-6-MSG, ANCS, A-6-ASJ, AA6EAD, A-6-FDJ, A6FLW, A 6FZC, A6MZO, AA6WAP. With applications pending from A-6-ZSS, A-6-ZNU, and several others.

With increased activity it is planned to activate additional nets according to the time and date available and which would be most acceptable to the participating members. Mars director Sixth Army has several other available frequencies on the 80, 40, and 20 meter bands as well as intermediate frequencies in vicinity of 5 and 6 megs.

We would be pleased to have any Mars members or prospective Mars member interested in joining or forming an RTTY net drop a line to Mars Director, Sixth Army Presidio of San Francisco for application blanks and request for assignment, if already Mars member.

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