

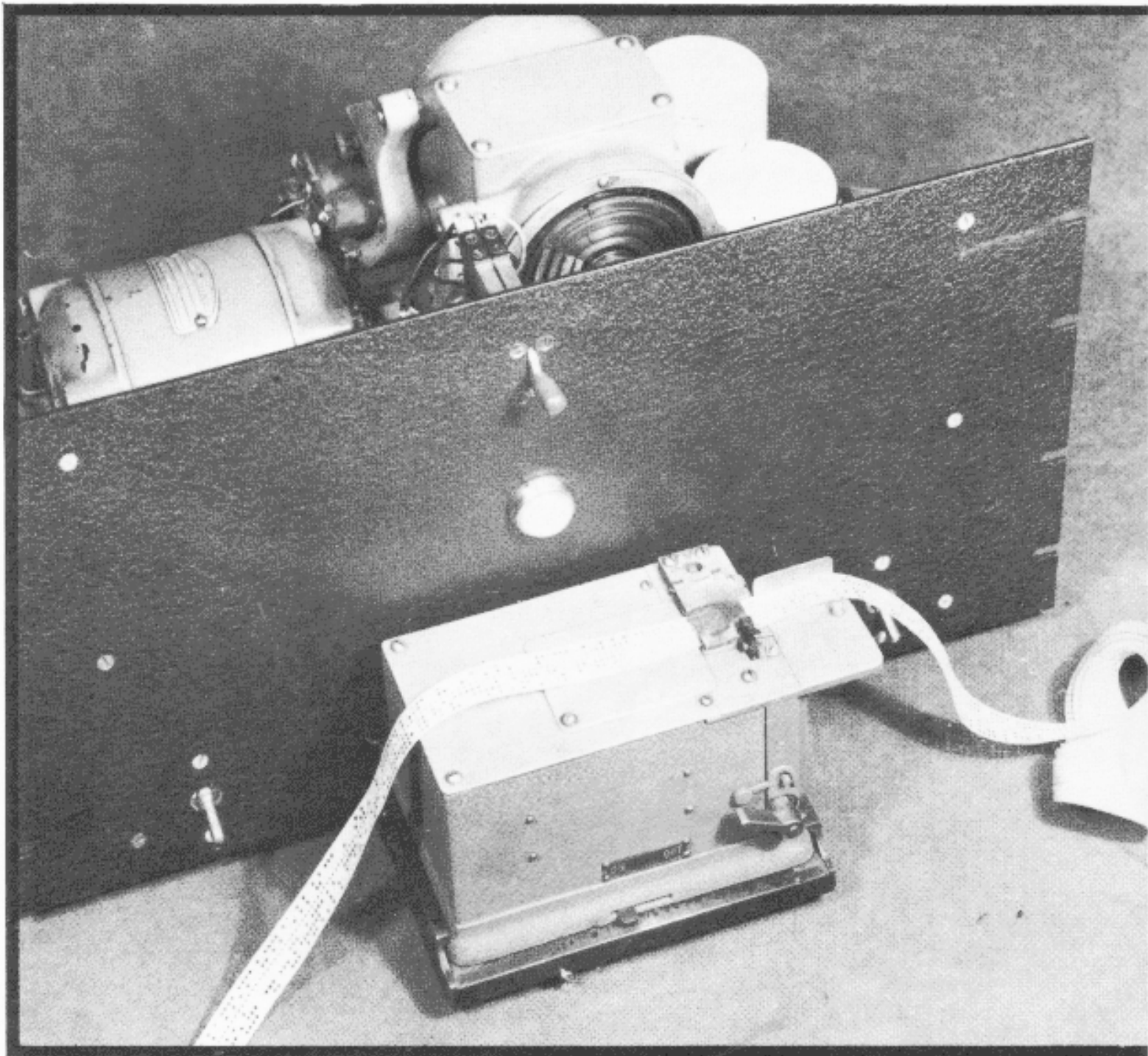
# GQ

*Teletype*

MARCH  
1955

35c

## **RADIO AMATEURS' JOURNAL**



**This Issue =**

**# 36**

## WHAT ABOUT THIS TELETYPE STUFF?

Some slight introduction is probably in order since this issue of the ARTS Bulletin will be pretty widely read and may well wander into the hands of someone newly interested in our strange branch of the amateur radio hobby.

The whole thing started soon after the last war with the experiments of John Williams, W2BFD. In order for him to get the two or three teletype printers he wanted to play around with locally he had to set up a Society. His doings on two meters raised considerable interest from other locals and before long he was in the business (non-profit) of procuring machines for quite a few locals. Publicity, and the article in the November 1946 CQ spread the word. To date I believe that John has procured something over 2500 printers for fellows all over the country. For the latest list of available equipment drop a line to the VHF Teletype Society, 38-06 61st Street, Woodside, L.I.N.Y. I recently bought two more printers from him so I know there are some available.

In 1948 I heard the strange doings on the high end of two meters and asked around about it. A few weeks later I was on the air and having a fine time working the local gang. In 1951 I took a TV directing job in Cleveland and found to my surprise a fine mimeograph machine sitting there. Since I had been of the opinion for some time that the one thing that TT needed to make it grow was some sort of communication medium I set right out and put the first issue of the Bulletin together. The first issue went out to the sixty fellows that I knew were interested. By the next month my mailing list had grown to over 400! The Bulletin came out every month regularly until January 1954, when business began to interfere with pleasure and my work with Karlson Associates slowed things down.

The Bulletin has, I believe, served its purpose. Interest in TT is now at an alltime high. We have managed to get FCC approval for low frequency operation, despite ARRL attempts to block us and restrict us to the 40 meter Novice band. It was Bob Weitbrecht, W9TCJ, who petitioned the FCC for RTTY on all A-1 frequencies. ARRL cross-petitioned and forced the FCC to consult the hams. Through the Bulletin and the RTTY Column in CQ we managed to get the ruling decided in our favor.

Today we have considerable activity on most amateur bands. Probably almost half of the active TT stations are on two meters. Around New York the two meter nets have worked so well that few have had any incentive to fight the QRM, TVI, etc., that goes with low frequency operation. A reasonable estimate of the number of active stations is somewhat over 400.

Mention was made of the RTTY Column in CQ. In December 1951 I started a bi-monthly column in CQ in order to explain and sell amateur teletype. This column continued until I ran out of the time necessary to write it.

By 1953 the Southern California group had grown to the size that they were able to publish a monthly bulletin. Having a couple printers in their club they have been able to put out a consistantly professional looking bulletin. The fierce nationalism of their early issues has since been considerably tempered and you ought to subscribe.

Gosh, I wish I had the time to continue writing this Bulletin for I have sure enjoyed doing it. With this thirty-sixth issue I turn the editorship over to others. Those of you that have been reading the Bulletin know of my increasing work with Karlson Associates where I act as Vice President and General Manager. The hi-fi bugs know of the success of this venture for the Karlson Enclosure is now accepted as the standard pretty much throughout the industry and is, I believe, the largest selling enclosure on the market. I now have seven factories building our units for us and have recently set up a west coast office in Pasadena.

The last straw was when I accepted the editorship of CQ in January when Perry Ferrell became editor of Popular Electronics. This, all in itself, is quite a job and has just about removed the last spare time that I had been squandering on such things as this Bulletin, ham radio, horseback riding, girls, etc.

Perhaps I exaggerated just a bit for I am sneaking in an hour or so after midnight to get the shack set up again. Weekends see some help from K2IEG, W2OKU, and anyone else I can draft to put up antennas, etc. I should be on SSB in a few weeks. Right now I do get on the low end of 75M from midnight to one AM frequently. Will be back on TT soon too. Clay Cool has my printer and panel up at the Knickerbocker Radio Club and won't bring it back. Look out for my KW on 3620 one of these nights when it finally returns. I have inveigled a couple of the real local ops to try TT and we may soon see K2CBO and W2OKU on the bands. Both are within three blocks of me and both will be running at least a KW. Ow! Lets see the CW monsters QRM our three-way QSO's, hi. K2CBO, incidently, is the fellow who puts out the DX Hound Beam. This beam is selling pretty well and has created a sensation.

One of the projects at CQ is to fatten the book a bit. This means that I will have some room available for a column or two more. The April editorial mentions that I am looking for a VHF Editor. I also would like to be able to run a TT Column and an SSB Column. The problem is, who can write them? The TT Editor must know his stuff, be active, write well, preferably with a humorous twist now and then, and have the time to get the column written before the CQ deadline. Well?

Say, I wish you would say hello when I get to your town. I'm at every audio show (in the Karlson room, of course) from Los Angeles to Chicago, Washington, Philadelphia, New York and Boston. As editor of CQ I'll try to get to all the ham-fests I can too. Like the Dayton Hamvention forinstance.

I don't know if you've noticed it or not, but the staff of CQ is pretty well loaded with TT men. In addition to me there is John Williams (Technical Editor), Jim Morrisett W8BAJ (Editorial Assistant), Brownie W2PAU (Technical Consultant), & Jack Brown W3SHY (Contributing Editor).

## LETTERS

WLUHE: Here is my \$3.00 for ARTS. I have a Model 12 printer and electronic keyboard, both work fine. Also have separate send-receive distributor. In my spare time I'm building John's (W2BFD) converter panel. My temporary converter for receiving is not selective enough.

If you ever hear of an electronic distributor diagram or information, then I would like to hear about it. This would eliminate a noisy motor and gear work.

--Norman H. Patenaude

(Article on electronic distributor coming soon. --Ed)

W3LDS: Enclosed find renewal... I have a Model 12 printer only with no distributors and a 21A. I have all other gear made including John's electronic key board. How about W2BFD's electronic distributor? I've been waiting a long time for it to be published.

--Tony

W7AVC: Enclosed find money order for ARTS... Hope to see technical articles on RTTY in the bulletin.

--E. A. Freeman

W4ZC/2: Here's my check to cover renewal... Have not been active all winter. first, because of intense pressure in the Laboratory; second because my equipment needs a thorough routine clean-up, which I can't seem to find the time to do; and third, I have been ill more than my share this winter. I'll get with the gang soon tho.

--Stu Davis

W0DEL: Enclosed is my check... I am very glad to know that this fine publication is going to continue. I have a complete file starting with #8...

I do not have any TT equipment at present, but hope to some of these days. I did do some make-break TT while at Kansas State

College (W0QQQ) in 1950...

Operation in the Midwest Division is mostly in the vicinity of Omaha, Nebraska.

--Wilbur Goll

W2CTQ: I am enclosing a check... May I wish you success as the new editor of the bulletin. Under Wayne it has kept the spark alive in me for TT and I hope you can do as well. . . I hope to get on the air with TT some day, I do not know when. . .

I have a printer, no keyboard, a transmitting and receiving distributor. I hope to get a keyboard for my #12 printer. . . I would like a newer and better page printer and a perforator for use with the tape transmitter which I have. . .

I think after several months struggle I have cleared up my trouble with my printer relays and distributor. I have a new converter built but I had trouble tuning it and then my printer started causing trouble so I have not completed it. I also started work on a transmitter with FSK.

I operate on phone 75 and 160 usually; I can operate on 40. I would like to contact you or some of the others on 75.

--Frederic C. Carpenter

## BOOKS

ARTYPING by Julius Nelson (McGraw-Hill) 47pp, soft covers, 8x11. Shows how to draw pictures on a typewriter. \$1.75 via ARTS

REMOTE CONTROL BY RADIO by A. H. Bruinsma (Philips Technical Library) 104pp. Treats two types of systems. An amplitude modulation system uses two independent channels. A more versatile system is based on pulse modulation and permits simultaneous transmission of 8 independent signals over one carrier wave. Two demonstration boats equipped with the systems are discussed.

On March 21st it happened. Egad, well over 25 gathered for dinner, keynote speeches, general bragging and complaining. Well known TT men from all over (in town for the IRE Show) jostled elbows. Among those present were Merrill Swan W6AEE, Lou Buck VE2ATC, Bob Weitbrecht W9TCJ, Frank White W3PYW, and most of the more active eastern gang. Tom Howard W1AFN and Jack Berman W1BGW were down from Boston.

W7CO mentioned a few weeks ago that KL7CK is back on the air and can be found around 7135 Kc.

W9QBH, Riverside, Illinois, "I just wanted to let you fellows know that W9QBH is finally on RTTY, although not on 80 & 40 yet due to transmitter modifications and lack of time." Bob sent in some copy of W2BDI, W5HZF, and W7CO for proof.

W2MYL, NYC, "Just back from a two week cruise to the Caribbean. Lots of sunshine and good food. Hope to see you on TT soon."

W2QCF, Fran Sherwood, 20 Miles Ave., Fairport, NY, "I have a model 21 and a 25 strip printer for sale. These can be had for what they cost me, \$25 plus shipping. Both are in good shape, the 25 has never been used."

W9BHV, Frankfort, Indiana, "I am trying to find a circuit for adding the frequency shift to a Johnson Viking VFO. Do you know where such dope can be found? I expect to have one of the new Johnson KW rigs on the air early in March and nothing would please me better than to use it for RTTY. I have three model 26 machines now and will trade a couple of them for other TT equipment. Am using the converter described by W2PAT for receiving. It doesn't seem to be ideal for TT. I wonder if you know something that a guy could build that would be better?"

W4RTJ, Doc, Jacksonville, "Radio teletype activity is not so busy down here right now. I am occupied at the present time with building a new office. A few fellows here in town are working teletype and there are a few in Gainesville, Florida."

VE2AGF, Tommy Lott of Montreal, has been spending some time up in Baffin Island and Labrador. He does some hamming there and can be heard at VE8UD or VE3AZG/V06 on 14190 Kc phone. Tommy left shortly after Hurricane Hazel, came back for Xmas and is returning to Baffin Island for another stay. This doesn't leave him much time at home to operate his triple-diversity, 1400 lb receiver.

W2PEE proved that it can be done! He built a panel overnight. Two days after receiving his printer he was on the air. One week later he was operating autostart.



**SYMBOL OF DEATH!**

SACRED SOUTH AMERICAN INDIAN SYMBOL, WHEN GAZED UPON, CAUSES DEATH WITHIN THE YEAR! Too bad if YOU looked.

6 W9GRW, Ray Morrison, discovered that most of the parts of the M-K tape transmitters are identical to the new Teletype Corp. Model 14 transmitter-distributor. He has been rebuilding the M-K jobs and adding the necessary motor and parts for several of the gang in the Chicago area.

The pity of the thing is that for years the M-K has been the despised variety among the various tape-heads available through the society. As a result of the little interest in purchasing these, many hundreds of them have been destroyed by the large companies because the society could not interest the amateurs in them. We hate to say "I told you so!"

Ray also is rebuilding Model 14 tape printers into typing reperforators (that print in ink on the tape they perforate) for the lads around Chicago. The recent availability of Model 14's in fair quantities through the society makes this interesting.

W9GRW offers to rebuild any M-K transmitter into a 14 T-D and any Model 14 printer into a typing reperforator. He can also furnish new parts in case you wish to tackle the job yourself. What a guy.

W2SDE: Regarding your list of Government Publications Relevant to Printer Telegraphy. Where can they be purchased and what are their prices. Am particularly interested in various printer mechanisms. --O. D. Glenn

Very few of those listed in Bulletin 34 are available to the general public. Those listed with a price may be obtained via ARTS or direct from the Government Printing Office, Washington 25, D. C. --c a c

W8QDW: Do not have much time to work with RTTY but am still interested. Had a lot of TTY experience in the Navy and still in active reserve so may be into it again some day, Hi.

--George Ben Forster

W3KFB: Typewriters (Model 10) are available in this area for \$3.00 (Cheswick, Pa.). I picked one up about 5 months ago but I haven't had a chance to do more than separate the top and bottom. Maybe some of these days we'll get here with TT. Hi.

--Raymond Nether

Seattle: I have been a devoted reader of the bulletin and I am sincerely grateful for many ideas I received from it for my new converter. . . I have built a previous converter but I hope this will far outrank any converter I have seen yet.

--Jay Landreth

#### BULLETIN OF THE AMATEUR RADIOTELETYPE SOCIETY

Clay Cool W2EBZ  
William M. Auld W2DXD  
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## CONCERNING TAPE TRANSMITTERS AND DISTRIBUTORS

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TELEPRINTER RECEIVERS ARE MADE IDLE AT THE END OF EACH CHARACTER IN ORDER THAT THE PULSES OF THE SUCCEEDING CHARACTER MAY BE "SCANNED" IN UNISON WITH THE DISTANT TRANSMITTING EQUIPMENT. IN A CODE CONSISTING OF SEVEN EQUAL-LENGTH PULSES OF 22 MILLI-SECONDS EACH (SUCH AS IS EMPLOYED BY WESTERN UNION AND SEVERAL OTHER COMMUNICATIONS SERVICES) THE RECEIVING PRINTER IS INTENDED TO BECOME IDLE BEGINNING WITH THE MIDDLE OF THE SEVENTH ("STOP") PULSE. IN THIS MANNER THE RECEIVING DISTRIBUTOR SPEED MAY VARY CONSIDERABLY AND THE SLIP IN THE RECEIVING CLUTCH (CAUSED BY THE FINITE TIME REQUIRED BEFORE THE RECEIVING CAM CYLINDER REACHES THE SPEED OF THE DRIVING SHAFT) MAY ALSO VARY WITH NO ERRORS IN THE RECEIVED COPY. THE ONLY EFFECT WILL BE A SLIGHTLY SHORTER OR LONGER PERIOD OF IDLING AT THE END OF EACH CHARACTER. THE EFFECT IS SOMEWHAT SIMILAR IN THEORY TO THE METHOD EMPLOYED IN TELEVISION TO "TRIGGER" THE SWEEPS.

IT HAS BEEN FOUND BENEFICIAL TO INCREASE THE LENGTH OF THE TRANSMITTED STOP PULSE WHILE KEEPING THE OTHER PULSES AT 22 MILLISECONDS. THE BELL SYSTEM STANDARD IS TO MAKE THE STOP PULSE 42 PERCENT LONGER WHEREAS MANY WESTERN UNION CIRCUITS TRANSMIT EITHER 7 EQUALLENGTH IMPULSES OR INCREASE THE STOP-PULSE LENGTH ABOUT 25 PERCENT. THE IMPORTANT THING TO REMEMBER IS THAT THIS MAKES NO DIFFERENCE IN THE CONSTRUCTION OF THE RECEIVING PRINTER. NO HARM WILL COME FROM INCREASING THE STOP-PULSE LENGTH OTHER THAN A REDUCTION OF THE NUMBER OF WORDS-PER-MINUTE THAT MAY BE TRANSMITTED. ON RADIO CIRCUITS REDUCTION OF THE STOP PULSE BELOW ABOUT 27 OR 28 MILLISECONDS (7.25 UNIT CODE) WILL RESULT IN POORER PERFORMANCE WHEN QRN, QSB AND QRM IS PRESENT. NO CHANGE IN THE LENGTHS OF THE OTHER PULSES IS PERMISSIBLE.

THE LENGTH OF THE STOP-PULSE IS DETERMINED BY THE STOP-START CAM (ON THE KEYBOARD SENDING CAM CYLINDER) AND BY THE STOP SEGMENT ON FACEPLATE-TYPE DISTRIBUTORS. IN ELECTRONIC DISTRIBUTORS FOR SENDING IT IS CUSTOMARY TO USE 7 UNIT, 7.5 UNIT AND 8 UNIT CODES FOR SIMPLICITY. 7 UNIT RESULTS IN A LOSS OF PRINTING MARGIN UNDER POOR CONDITIONS AND THE OTHER TWO REDUCE THE SPEED OF SENDING SLIGHTLY. A NUMBER OF CIRCUIT CONFIGURATIONS ARE AVAILABLE FOR ELECTRONIC DISTRIBUTORS TO PRODUCE AN ADJUSTABLE STOP PULSE (LENGTH ADJUSTABLE BETWEEN 22 AND 44 MILLISECONDS)

SEVEN UNIT CODE AT AMATEUR STANDARD SPEED PERMITS TRANSMISSION AT 390 CHARACTERS PER MINUTE. 7.25 UNIT CODE SENDS AT 375 CHARACTERS PER MINUTE WHILE 7.42 UNIT CODE ALLOWS TRANSMISSION AT 368 CHARACTERS. THE BENEFIT OF ELECTRONIC DISTRIBUTORS HAVING ADJUSTABLE STOP-PULSE LENGTHS IS SEEN WHEN IT IS REALIZED THAT ADVANTAGE CAN BE TAKEN OF FAVORABLE RADIO CONDITIONS TO TRANSMIT 390 CHARACTERS PER MINUTE AND, WHEN CONDITIONS ARE LESS SATISFACTORY, THE STOP-PULSE MAY BE ELONGATED AS DESIRED. THIS CAN NOT BE DONE WITH MECHANICAL DISTRIBUTORS. 7.25 UNIT CODE PERMITS DISTRIBUTORS TO BE DRIVEN BY A VERY SIMPLE GEARING SYSTEM (GEAR RATIO 5 TO 24) FROM AN 1800 R.P.M. SYNCHRONOUS MOTOR.

TELETYPE MEMBERS ARE CAUTIONED TO CHECK THE ARCS OF THEIR TAPE-SENDING DISTRIBUTORS. RUNNING THE BRUSHES AT 368 R.P.M. ON A FACEPLATE INTENDED FOR 375 R.P.M. SENDS PRINTABLE CODE BUT THE MARGINS ARE REDUCED BY THE START AND SELECTING PULSES BEING ELONGATED. FOR 368 O.P.M. THE PROPER ARC FOR THE START, FIRST, SECOND, THIRD, FOURTH AND FIFTH PULSE SEGMENTS IS APPROX. 48.5 DEGREES. AT 375 O.P.M. THEY ARE APPROX. 50 DEGREES. SEVEN UNIT CODE CAN BE DISTINGUISHED BY ALL SEVEN SEGMENTS APPEARING THE SAME LENGTH. UNDER PERFECT RADIO CONDITIONS THE SENDING SPEED, DUE TO INCORRECT ADJUSTMENT, MAY BE AS HIGH AS 420 CHARACTERS PER MINUTE BEFORE ERRORS APPEAR. (ASSUMING THE RECEIVING EQUIPMENT IS ADJUSTED FOR STANDARD SPEEDS).





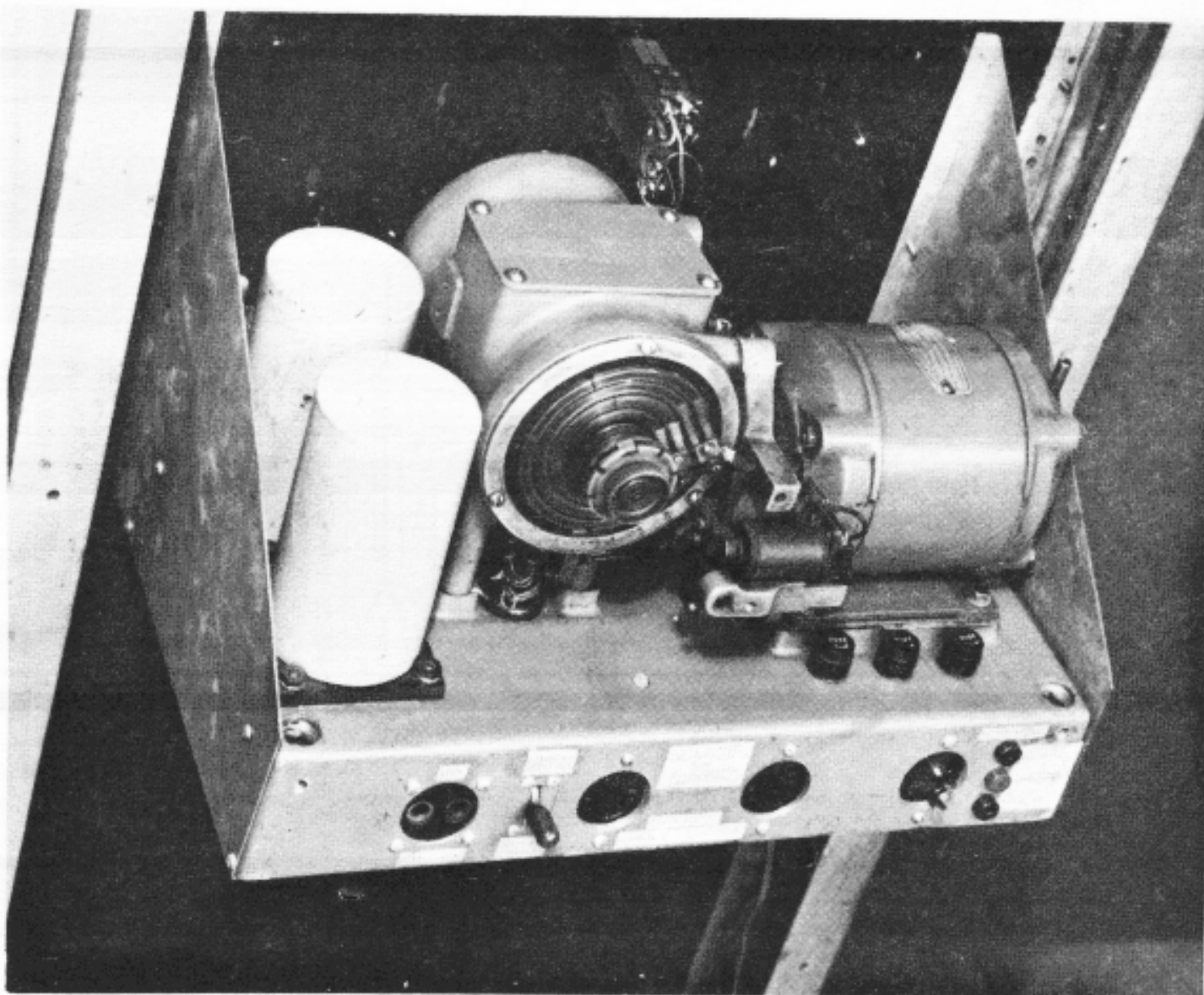
BE IN EACH OF THE TWO "BATTERY" FEED LINES. THE BRUSH THEN CONNECTS THROUGH A POLARIZED RELAY (WITH THE WINDINGS SERIES-AIDING) TO THE COMMON POINT OF THE POSITIVE AND NEGATIVE BATTERIES". THE THEORY OF OPERATION IS THAT UPON THE VERY FIRST (SPLIT MILLISECOND) BOUNCE THE POLAR RELAY (WHICH IS ADJUSTED TO REMAIN ON WHICHEVER CONTACT IT IS PROPELLED TO) TAKES ITS PROPER POSITION AND WILL NOT RELEASE DURING THE "CHATTER" SINCE POLARITY DOES NOT REVERSE DURING THIS TIME. THE JOB CAN BE DONE EVEN BETTER ELECTRONICALLY BY UTILIZING AN ECCLES-JORDAN FLIP-FLOP TO SENSE THE POLARITY OF THE FIRST "BOUNCE". MOST DISTRIBUTORS HAVE NO WIRE BROUGHT OUT FROM THE START SEGMENT SINCE THEY ARE NORMALLY USED WITH MAKE-BREAK CURRENTS. IT IS A SIMPLE MATTER TO REMOVE THE FACEPLATE AND ADD THIS WIRE.

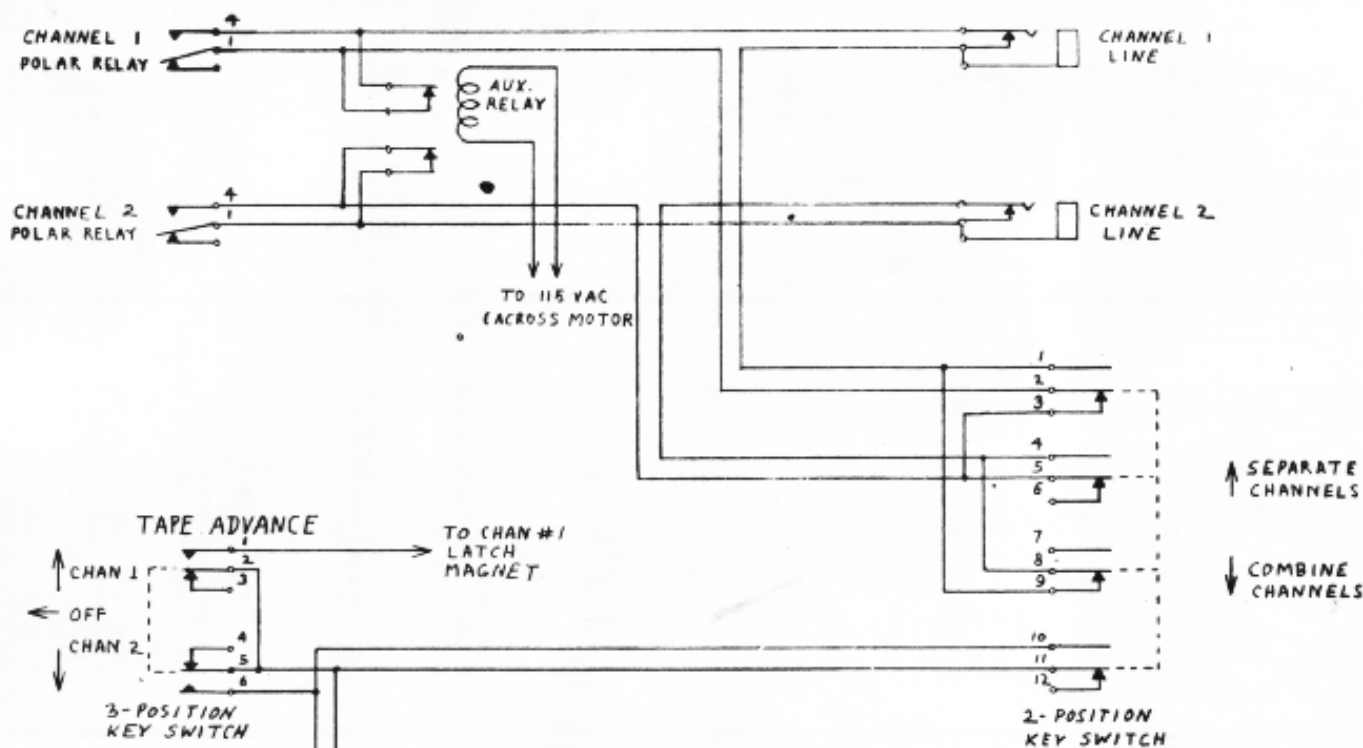
IF THE FIRST CHARACTER IS ALWAYS MUTILATED BUT THE BALANCE PERFECT A WEAK CLUTCH SPRING MAY BE SUSPECTED. THE SAME TROUBLE CAN BE CAUSED BY AN EXCESSIVELY HEAVY FRICTION IN THE CLUTCH (WHICH SLOWS THE MOTOR BELOW SYNCHRONOUS SPEED). IN THE FIRST EXAMPLE THE MUTILATION IS CAUSED BY THE BRUSH SLOWLY COMING UP TO SPEED AFTER THE LATCH IS WITHDRAWN. THE EARLIER PULSES IN THE FIRST CHARACTER ARE ELONGATED.

THE ONLY MEMBERS RECEIVING THE FREE TECHNICAL BULLETINS, WHICH ARE ISSUED AT RANDOM TIMES AND THE "FLASHES" ANNOUNCING THE AVAILABILITY OF NEW BATCHES OF PRINTER AND TAPE EQUIPMENT RELEASED AT COST, ARE THOSE KEEPING SEVERAL LARGE STAMPED, SELF-ADDRESSED ENVELOPES ON FILE AT W2BFD FOR THIS PURPOSE.

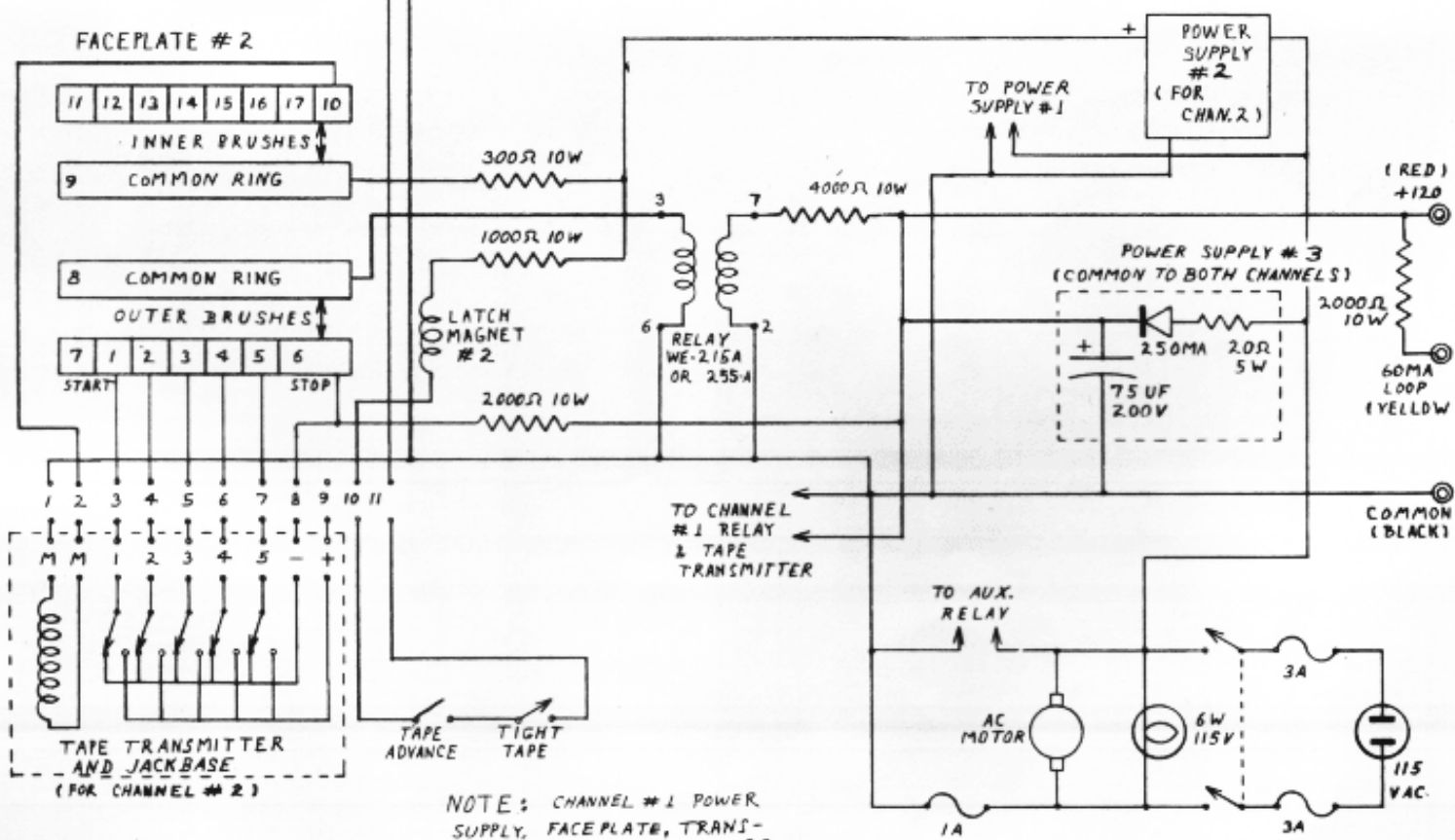
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73 DE W2BFD





ARTT 86 JW-407 2-11-55



NOTE: CHANNEL #1 POWER SUPPLY, FACEPLATE, TRANSMITTER, RELAY RESISTORS ARE SAME AS SHOWN FOR CHANNEL #2.

ARTT-85 JW-407 2-11-55

DESCRIPTION OF THE JW-407 TAPE TRANSMITTER-DISTRIBUTOR  
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OF THE VARIOUS TAPE MACHINES OBTAINABLE BY AMATEURS THROUGH V.H.F.T.S. AT COST FROM THE WIRE COMPANIES, THE DOUBLE SENDING FACEPLATE EQUIPPED DISTRIBUTORS HAVE NOT HAD THE POPULARITY THEY REALLY DESERVE. THE EXTRA SENDING DISC, AT FIRST GLANCE, APPEARS TO BE SUPERFLUOUS AND THESE UNITS ARE BYPASSED FOR THE MORE-EXPENSIVE SINGLE-TYPE MACHINES. IT IS OUR INTENTION TO DEMONSTRATE THAT, FAR FROM BEING A LIABILITY, IN CERTAIN RESPECTS THESE SENDING DEVICES ARE SUPERIOR TO OTHERS AVAILABLE, THROUGH THE SOCIETY, FOR RADIO AMATEUR TELETYPE OPERATION.

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SINCE THE DISCOVERY OF A SYSTEM WHEREBY STANDARD CONTINENTAL MORSE CODE CAN BE TRANSMITTED AT ANY SPEED FROM 5 TO 80 W.P.M. WITH COMMON TELETYPE MACHINES, WITHOUT AFFECTING THEIR USEFULNESS FOR PRINTER CODE OPERATION (SEE BULLETIN ARTT-2259), IT WAS APPARENT THAT THIS WOULD BE OF GREAT VALUE FOR THE IDENTIFICATION OF TELETYPE STATIONS WITHOUT RESORT TO HAND TELEGRAPHY. THE IDEAL SETUP, IF ONE WISHES TO STORE THE IDENTIFICATION SIGNALS IN TAPE, WOULD BE AN ARRANGEMENT OF TWO TAPE-TRANSMITTERS, ONE CONTAINING THE TELETYPE MESSAGES AND THE OTHER THE IDENTIFICATION. A CHANGEOVER SWITCH LABELED "MORSE-PRINTER" OR THE AUTOMATIC METHOD AVAILABLE WITH THIS SYSTEM WOULD CONTROL WHICHEVER TRANSMITTER WAS ACTIVATED.

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NOW, OF COURSE, YOU COULD PROVIDE SWITCHING TO PERMIT ONE DISTRIBUTOR FACEPLATE TO SERVE TWO TAPE TRANSMITTERS, BUT SUCH SWITCHING INVOLVES A LOT OF WIRES AND A TECHNICAL PROBLEM, REQUIRING ADDITIONAL WIRING, OF PREVENTING THE NON-OPERATED TRANSMITTER FROM STEPPING ITS TAPE AHEAD WHEN BEING SWITCHED OFF THE SINGLE FACEPLATE. WHEN WE FURNISH TWO FACEPLATES LIFE BECOMES SIMPLER. EACH TRANSMITTER IS WIRED TO ITS OWN FACEPLATE AND A SWITCH ON THE CONTROL PANEL SELECTS EITHER ONE BY MERELY CLOSING A SINGLE-WIRE CIRCUIT TO THE PARTICULAR LATCH-MAGNET RELEASING THE BRUSH-ARM ON THE FACEPLATE SELECTED.

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EITHER OR BOTH OF THE TRANSMITTERS MAY BE USED ON MORSE AND LIKEWISE EITHER OR BOTH MAY KEY WITH TELETYPE SIGNALS. AT W2BFD A TAPE CAN BE SENDING TRAFFIC VIA RTTY WHILE A SECOND RTTY TAPE IS BEING PUNCHED UP ON THE KEYBOARD-PERFORATOR AND FED INTO THE SECOND TRANSMITTER. WHEN THE FIRST TAPE REACHES ITS END, WITHOUT NOTICEABLE PAUSE THE SWITCH CAN CONNECT THE RESERVE TRANSMITTER AND THE TRAFFIC PROCEEDS WITHOUT INTERRUPTION.

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EACH FACEPLATE HAS ITS OWN POLAR RELAY AND THE OUTPUT (FROM THE CONTACTS OF THE RELAYS) GOES TO SEPARATE "LINE JACKS" ON THE REAR OF THE CHASSIS FOR PATCHING INTO TWO SEPARATE CONVERTERS AND KEYERS IF DESIRED. A TWO-POSITION TELEPHONE-TYPE KEY-SWITCH, MOUNTED NEAR THE LINE JACKS, IN THE NORMAL POSITION CONNECTS THE JACKS (WHICH ARE ARRANGED TO SHORT THEMSELVES WHEN PLUG IS REMOVED) IN SERIES WITH ONE ANOTHER SO THAT EITHER TRANSMITTER (BUT NOT BOTH AT ONCE) MAY KEY A SINGLE LINE PLUGGED INTO EITHER OF THE TWO JACKS. IN THE "SEPARATE" POSITION OF THE SWITCH THE LINE JACKS ARE DIVORCED FROM ONE ANOTHER AND THE TWO TRANSMITTERS MAY SEND SIMULTANEOUSLY TO TWO LINES WITH COMPLETELY DIFFERENT MESSAGES.

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THE FACT THAT THERE IS COMPLETE ISOLATION BETWEEN THE COILS AND CONTACTS OF THE POLAR RELAYS MAKES IT POSSIBLE TO "PACKAGE" THE POWER SUPPLY INTO THE SINGLE RACK-MOUNTED UNIT. POWER IS FURNISHED BY THREE INEXPENSIVE 250 MA TV RECTIFIER STACKS. A SINGLE RECTIFIER, FILTER CONDENSER AND ANTI-SURGE RESISTOR IS INCORPORATED INTO EACH OF THE THREE SUPPLIES. VERY LITTLE SPACE IS OCCUPIED BY THIS POWER SYSTEM. THE REASON BEHIND USING THREE SMALL SUPPLIES INSTEAD OF ONE LARGE ONE IS NOT MERELY BECAUSE THE ECONOMICS WORK OUT MORE FAVORABLY BUT ALSO TO IMPROVE REGULATION AND RELIABILITY. THE JITTERY VOLTAGE CAUSED BY KEYING ONE TRANSMITTER DOES NOT AFFECT THE OTHER CIRCUITS. ONE POWER SUPPLY FEEDS ONE TAPE TRANSMITTER PAPER-ADVANCE MAGNET AND THE LATCH-MAGNET THAT RELEASES THE CLUTCH ON THE ASSOCIATED FACEPLATE. THE SECOND POWER SUPPLY TAKES CARE OF THE OTHER TRANSMITTER AND LATCH-MAGNET. THE THIRD POWER UNIT SUPPLIES 30 MA FOR THE BIAS WINDINGS OF BOTH RELAYS AND 60 MA FOR THE KEYING WINDINGS. SINCE

THERE IS AN EXCESS OF DC AVAILABLE IN THIS SUPPLY IT IS BROUGHT OUT TO TIP JACKS TO FURNISH EXTERNAL TELETYPE EQUIPMENT WITH "LINE" VOLTAGE. ANOTHER TIP JACK FURNISHES 30 MA FOR BIASING AN EXTERNAL RELAY IF IT IS EVER NEEDED.

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THE UNATTRACTIVE CARRYING HANDLES OF THE DISTRIBUTOR ARE REMOVED AND THE ENTIRE CAST-ALUMINUM "CHASSIS" IS MOUNTED A LITTLE DISTANCE BEHIND A 10-1/2 BY 19 INCH RELAY RACK-PANEL, SUPPORTED FROM IT BY A PAIR OF SIDE BRACKETS, CONSISTING OF TRIANGLES OF GALVANIZED SHEET METAL, WITH A HALF-INCH LIP FOLDED UP ON TWO SIDES. A JACKBASE FOR A TAPE-TRANSMITTER IS MOUNTED ON THE FRONT EDGE OF THE CAST-ALUMINUM DISTRIBUTOR "CHASSIS" BY SMALL PIECES OF ANGLE-IRON AND ALLOWED TO PROJECT THROUGH A RECTANGULAR SLOT CUT IN BOTTOM EDGE OF THE RACK-PANEL. THE PANEL IS REMOVABLE FOR ACCESS WITHOUT DISTURBING THE TRANSMITTER. THE JACKBASE IS RECESSED SO THAT, WHEN THE TRANSMITTER IS PLUGGED IN, ITS INNER SURFACE ALMOST TOUCHES THE PANEL. THIS LOOKS BETTER THAN LEAVING THE TRANSMITTER PROJECT AN ADDITIONAL COUPLE OF INCHES OUT FROM THE PANEL AS IN PREVIOUS CONSTRUCTIONS. DIRECTLY OVER THE TAPE-TRANSMITTER UPPER SURFACE IS A PANEL-MOUNTED 110 VOLT LAMP WITH A 1-INCH OPAL BULLSEYE. IN ADDITION TO SERVING AS A PILOT LAMP IT ALSO PROVIDES GOOD ILLUMINATION FOR THE TAPE-GATE OF THE SENDING-HEAD FOR EASE OF INSERTION OF THE TAPE. BECAUSE NO ISOLATION TRANSFORMER IS USED IN THE POWER SYSTEM, A FUSE IS INSTALLED IN EACH SIDE OF THE AC LINE AND ANOTHER IN THE COMMON LINE TO THE NEGATIVES OF THE DC SUPPLIES. NO CONNECTION IS MADE TO THE "CHASSIS". A THREE-POSITION TELEPHONE KEY, ABOVE THE PILOT LAMP, IS "OFF" IN THE CENTER AND CONNECTS THE LATCH-MAGNET CIRCUIT OF THE NUMBER ONE TRANSMITTER IN THE "DOWN" POSITION AND THE LATCH-MAGNET CIRCUIT OF THE SECOND SENDING UNIT IN THE "UP" POSITION. (IN ADDITION, EACH TAPE TRANSMITTER HAS ITS OWN CONTROL SWITCH MOUNTED ON A BRACKET ALONGSIDE THE JACKBASE)

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ON THE REAR SKIRT OF THE DISTRIBUTOR BASE ARE THE TIP-JACKS, LINE-JACKS AND "SEPARATE CHANNELS" SWITCH PREVIOUSLY MENTIONED. BESIDES THESE THERE ARE TWO 11-PIN FEMALE AMPHENOL SOCKETS LABELED "CHAN 1 TRANSMITTER" AND "CHAN 2 TRANSMITTER". THE NUMBER ONE FACEPLATE CONNECTS TO BOTH THE PANEL-MOUNTED JACKBASE AND ONE OF THESE AMPHENOL SOCKETS. THE CHANNEL TWO FACEPLATE CONNECTS ONLY TO THE SECOND AMPHENOL OUTLET. AN OPTION IS HAD ON THE NUMBER ONE CHANNEL WHEREBY THE TRANSMITTER MAY BE USED PANEL-MOUNTED OR REMOTELY LOCATED ON A BASE ATTACHED TO THE DISTRIBUTOR THROUGH AN EXTENSION CABLE. THE NUMBER TWO TRANSMITTER IS ONLY USED REMOTELY. THE WIRING IS ARRANGED SO THAT THE PANEL SWITCH CAN CONTROL EITHER ONE OR THE OTHER OF THE TRANSMITTERS BUT, WHEN THE CHANNELS ARE SEPARATED AND OPERATED SIMULTANEOUSLY, THEY ARE CONTROLLED BY THEIR LOCAL SWITCHES WHICH, AS STATED, ARE MOUNTED ALONGSIDE EACH TRANSMITTER BASE. EACH TRANSMITTER MAY BE USED IN CONJUNCTION WITH A "TIGHT-TAPE SWITCH", CONSISTING OF A MICROSWITCH WITH AN EXTENSION ARM, THAT SHUTS DOWN THE TAPE-ADVANCE BY DE-ENERGIZING THE PROPER LATCH-MAGNET IF THE TAPE TIGHTENS UP OR TANGLES. THIS PREVENTS TEARING OF THE FEEDHOLES PUNCHED INTO THE TAPE.

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IN THE SERVICE FOR WHICH THE DISTRIBUTOR WAS ORIGINALLY DESIGNED, A SWITCHING ARRANGEMENT WAS PROVIDED TO ALLOW THE SENDING OF "AC" COMPOSED OF SQUARE-WAVE REVERSALS TO THE TELEGRAPH LINE. THIS WAS GENERATED BY THE INNER SEGMENTED COLLECTOR RINGS ON THE FACEPLATES WHICH ARE DIVIDED INTO EIGHT EQUAL SEGMENTS. WHEN SWITCHED TO NORMAL TRAFFIC POSITION ALL SEGMENTS WERE OPEN-CIRCUITED EXCEPT ONE WHICH WAS THEN EMPLOYED TO ENERGIZE THE TAPE-ADVANCE MAGNET IN THE TRANSMITTER AT THE PROPER POINT IN EACH ROTATION OF THE BRUSH-ARM. FOR AMATEUR SERVICE THE WIRING IS REMOVED FROM ALL SEGMENTS EXCEPT THE TAPE ADVANCE ONE (ON THE 8-SEGMENT RING) AND THAT WILL CLEAR OUT A LOT OF MESSY AND UNNECESSARY WIRING. IN CASE THERE IS ANY DOUBT AS TO WHICH SEGMENT IS THE CORRECT ONE MERELY CONNECT TO THE SEGMENT ON THE 8-SEGMENT RING WHICH IS CONTACTED BY ITS BRUSH WHEN THE ARM IS AGAINST THE RESTRAINING LATCH. AT THE SAME TIME THE OUTER BRUSH SHOULD BE CONTACTING THE "STOP" SEGMENT, WHICH IS LONGER THAN THE OTHER SIX ON THIS RING. TRIM OR ADJUST THE BRUSHES SO THAT THE TAPE ADVANCE MAGNET IS NOT ENERGIZED BEFORE THE CODE BRUSH REACHES THE "STOP" SEGMENT OR THE CODE WILL BE MUTILATED BY CLIPPING OF THE NUMBER 5 BAUD WHEN THIS PULSE IS INTENDED TO BE "MARKING". THE DRAWING SHOWS THE FACEPLATE AS IF CONTAINING STRAIGHT BARS. THIS IS MERELY FOR SIMPLICITY.

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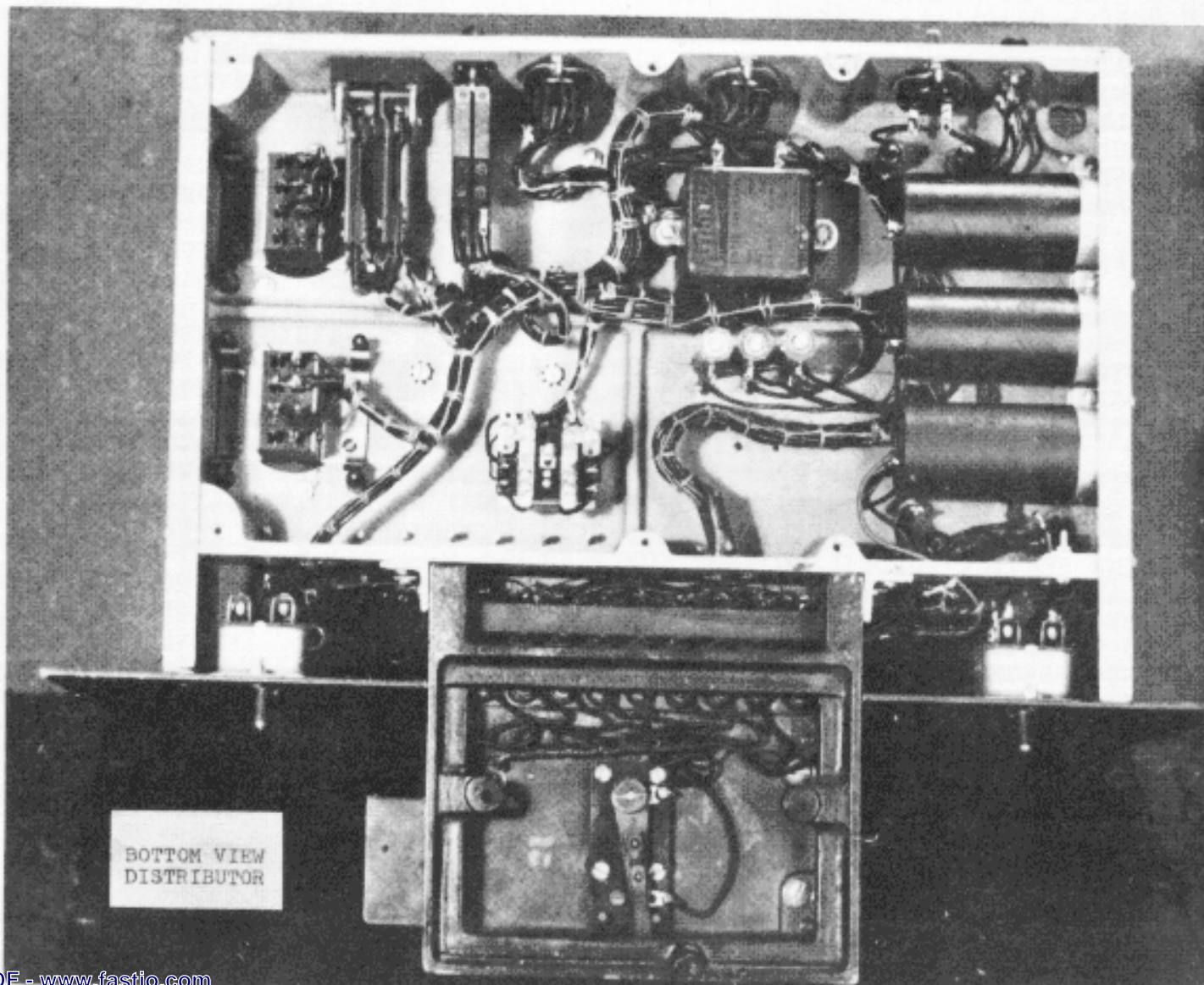
AN AUXILLIARY RELAY IS SHOWN IN ARTT-26. THE SOLE PURPOSE OF THIS RELAY IS TO MAINTAIN THE OUTGOING "LOOPS" IN A SHORT-CIRCUITED CONDITION, WHEN THE DC IS REMOVED FROM THE RELAYS, BY CLOSING DOWN THE DISTRIBUTOR. WHEN DC IS REMOVED IT IS POSSIBLE FOR THE POLAR RELAYS TO BE FLIPPED TO THE SPACING CONDITION WHICH WOULD LEAVE THE OUTGOING TELETYPE LINES OPEN (AND THE ASSOCIATED PRINTERS RUNNING WILD). POLAR RELAYS WITHOUT HOLDING CURRENT ALSO HAVE A HABIT OF TRANSFERRING WHEN SUBJECTED TO VIBRATION. AN AC AUXILLIARY IS SHOWN BUT IT COULD, JUST AS WELL, HAVE BEEN A LOW-DRAIN DC RELAY WITH ITS WINDING CONNECTED ACROSS THE NUMBER 3 POWER SUPPLY. THE THREE SELENIUM STACKS AND A BANK OF WIRE-WOUND RESISTORS ARE MOUNTED ON THE TOP SURFACE OF THE CHASSIS CASTING (JUST BEHIND THE FRONT PANEL. THIS ALLOWS VENTILATION WITHOUT DANGER OF SHOCK. A RECENT ADDITION IS AN AC CONVENIENCE OUTLET INTO WHICH AN AUTOMATIC TAPE-WINDER MAY BE PLUGGED. THIS RECEPTACLE IS CONTROLLED BY THE MAIN POWER SWITCH WHICH IS TO THE LEFT OF THE TAPE TRANSMITTER. THE SIMILAR SWITCH ON THE RIGHT SIDE IS A SPARE FOR ANY FUTURE "BRAINWAVE" AND TO BALANCE THE PANEL APPEARANCE.

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THE 11 WIRE CABLES RUNNING TO THE REMOTE TAPE TRANSMITTERS TERMINATE IN FEMALE 11 PIN PLUGS WHICH ARE INSERTED INTO 11-PIN MALES MOUNTED IN HOLES PUNCHED INTO THE REAR SKIRT OF THE PROTECTIVE COVER OVER THE TRANSMITTER JACKBASE CONNECTOR CLIPS. THIS PERMITS ADDITION OF EXTENTION CABLES IN CASE THE TRANSMITTER IS NEEDED FARTHER FROM THE DISTRIBUTOR (WHICH WILL PROBABLY BE LOCATED IN A RELAY RACK). MOREOVER IT PERMITS THE INSERTION OF THE POCKET-SIZED JW-906 MORSE ADAPTOR UNIT INTO THE LINE AT THIS POINT. THE ADAPTOR IS PLUGGED INTO THE JACKBASE AND THE CABLE IS PLUGGED INTO THE ADAPTOR AND, PRESTO!, YOU ARE SENDING CW ON THAT PARTICULAR TRANSMITTER. THE COMPONENTS FOR THE MORSE "TRANSLATION" MAY ALSO BE INCORPORATED RIGHT INTO THE TRANSMITTER-DISTRIBUTOR. THERE IS A CONSIDERABLE AMOUNT OF UNUSED SPACE BENEATH THE CHASSIS AND PLENTY OF VACANT SPACE ON THE RACK-PANEL TO ACCOMODATE ADDITIONAL SWITCHES FOR THIS PURPOSE. HOWEVER THE ADAPTOR UNIT IS SO SMALL AND CAN BE SO QUICKLY INSERTED AND REMOVED THAT IT WAS NOT THOUGHT NECESSARY TO BUILD IT INTO THE JW-407.

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THE "LINE-CURRENT" TIP-JACKS ARE VERY HANDY FOR OPERATING A PRINTER (FOR DEMONSTRATION PURPOSES OR AS A TYPEWRITER) FROM THE UNIT WITHOUT AN ELECTRONIC CONVERTER PANEL. A SERIES-CIRCUIT IS ESTABLISHED THROUGH ONE OF THE LINE JACKS, THROUGH THE PRINTER SELECTOR MAGNET OR RELAY AND BACK TO THE "60 MA" TIP-JACK.



# EDITORIALS

Wayne W2NSD has done a remarkable job by carrying the ball for amateur radioteletype since he mailed his first mimeographed bulletin from Ohio in 1951. We hope Wayne will still have some time from his job as editor of CQ to give us a helping hand.

Wayne began to realize last year that printing the bulletin was becoming a full-time job for one man. So to continue the work we have expanded to a large, unpaid staff.

Most important members are the newsgatherers, or reporters. We have 1,000 reporters, from W1AFN to VESAV. Our star reporters send in items at least every two months. Our line reporters include news items with their \$3.00 annual check. The cub reporters send their annual check, but are still busy writing the BIG news story and technical article.

My job, to edit. Send news to me at 163 W. 13 St, New York 11, New York. If I cannot answer any technical queries, I'll pass them along to our technical editor and

grandfather of ham TT, W2BFD.

We promise an attractive bulletin and aim to reach all U. S. and Canadian amateurs interested in radioprinter. We can increase the size and quality of the bulletin as circulation rises. Send your \$3.00 check directly to our able circulation manager, Andy Stravos, W2AKE, 116-32 132nd St, South Ozone Park, L. I., N. Y.

COMING next month we have an article on a simple system of duplexing TT with voice on FM systems. John W2BFD promises us an early story on his electronic distributor. The double transmitter discussed in this issue by John is used with his black box to send Morse from TT tape, to be covered soon in CQ.

Like all technical works from astronomy to zoology, our chronology begins with the picture of an atom. Historically, the battery and electromagnet are the inventions important to modern telegraphy. Our chronology will be continued next month into the 20th century.

*73, Clay Cool*

IlCCA: I have become interested in amateur radioteletype since reading your (W2BFD) article in the October 1948 issue of QST recently. I realize that it is quite some time since your article was printed, but I would appreciate any help and information you could send to me. . . It is quite difficult to obtain information on frequency shift keying circuits, etc here in Italy and I would greatly appreciate any schematics you could forward to me. Perhaps you could tell me of sources of information on this subject, either magazine articles or reference books that may be available. . . Thank you for any help and assistance you may be able to give. . . Yours Truly, Mario Durante, IlCCA

W2QGH is active in CD work via printer and reports a great awakening of interest in amateur TT in Westchester (NY) county. . . W2IRT has a printer (also Westchester) and is going in for CD.

## CONTEST RESULTS ANNOUNCED

The Southern California TT Society, sponsors of the RTTY Sweepstakes Contest, announced that Ed Clammer, W2BDI, was the winner of this years contest, working 59 stations in 24 Sections. In second place was Bob Osborne, W8ZM, and Frank White, W3PYW, was a close third. SoCal reports a total of 94 stations active in the contest.



## CHRONOLOGY OF PRINTING TELEGRAPHY

c420BC DEMOCRITUS, native of Abdera, Thrace, gave a good, early atomic theory, revived by Dalton in 1803.

1450 Johann GUTENBERG invents movable printing types.

1596 PORTA wrote: "I do not fear that with a long-absent friend, even though he is confined to prison walls, we can communicate with what we wish by means of two compass needles circumscribed with an alphabet.

But Sir Thomas BROWNE, an Englishman, found that no matter how many times he pointed the needle to a certain letter, it had no effect on a second compass.

1600 William GILBERT used the term "electric" to describe all the substances he found could be electrified by friction, published in his book "On the magnet, magnetic bodies also, and on the great magnet the earth; a new philosophy, demonstrated by many arguments and experiments.

1605 Sir Frances BACON developed a biliteral cipher as now used in the Baudot alphabet for printing telegraphy (2<sup>5</sup> or 32 permutations of two elements taken in groups of 5).

1746 LEYDEN jar (condenser) discovered by VON KLEIST, at Kammin, Germany, in 1745, but credit goes to Prof. MUSSCHENBROEK, of Leyden, Holland who independently made same discovery a year later.

1752 May 10, Thomas d'ALIBARD of Paris proved Franklin's theory that lightning was an electrical discharge. Later Franklin in America got around to prove his own theory with the kite. George William Richman, a Swedish professor at St Petersburg, was killed catching electricity from the sky.

1800 Alessandro Giuseppe Antonio Anastasio VOLTA (1755-1837) built "crown-of-cups" electric battery (voltaic pile).

1820 Hans Christian OERSTED discovered electromagnetism by movement of compass needle near wire carrying current.

1827 Georg S. OHM of Bavaria published his law in a pamphlet: Mathematical Theory of the Galvanic Circuit.

1830 France had 533 semaphore (sight telegraph) stations covering 3,000 miles of line. The system was conceived and built by Claude CHAPPE. During the wars following the French Revolution, the French realized fast communications helped win battles.

England had the first sight telegraph, but France built the first extensive system. Chappe had tried an electrical telegraph using Leyden jars and synchronized clocks with a second hand numbered 1 to 10. The system failed because insulation for the high voltage from his Leyden jars was good only for one mile.

1830 Henry lifted a ton with his U-shaped "intensity" magnet. He used fine wire insulated with silk from his wife's petticoat (dsc?) and a high-voltage battery.

1831 Joseph HENRY published article in Silliman's Journal showing all parts were available for the invention of the electromagnetic telegraph. At Albany (N. Y.) Academy he rigged one mile of wire and rang a bell with his electromagnet.

1831 FARADAY made first magnetic electrical generator, using a copper disc turning in a magnetic field with a brush to shaft and edge.

1832 Samuel F. B. MORSE, while returning by ship from Europe to the United States, conceived the idea of recording electrical impulses on a continuously moving strip of paper by using an electromagnet. Before reaching New York he had made plans for a telegraph recording instrument and laid the principles for his dot-dash-space code.

1833 Gausst WEBER Proposed 5-unit code for telegraphy.

(Continued next month)



# MARS

## IN EUROPE

La Rochelle, France

Dear Joe (W2GFV)

I usually operate from F7BM which is at the same QTH as F7CZ; but am expecting my French call any day.

My job here is NCOIC of a radioteletype net here in France. Our equipment is available for hamming or MARS after about 8pm at night (2000Z). The French do not allow operation of RTT on ham bands, but we have carried out a sked with VE3JGL up in Toronto and with DL4LA up in Germany with good results.

Just recently, AE1 USA, the NCS of MARS for Europe started taking opinions about our starting a MARS RTT net in Europe---and we of course gave our blessing. But the NCS is waiting for proper crystals before attempting to make a sked.

When I saw "RADIOTELETYPE" on your QSL card I got the big bright idea of a possible sked with you on RTT. Perhaps, even, you may be a MARS station yourself. But even if not we'd be willing to attempt a sked on any freq just for the kicks. If you happen to be MARS that would be a fine business outlet for us on stateside traffic,

and of course we could take anything for APO's in Europe.

We have regular skeds with NCS on CW, will have on RTT, and besides can contact DL4's any nite to get them to QSY to the MARS freq on 80 meter band to pass tfc. Also have our own little F7 net with F7 DB and F7DZ in Paris, and with F7 CX and F7 DH. F7 DH can also QSY to MARS for French tfc. So we're really all set on this end if we can get a stateside sked. But regardless, would like to try it anyway, even if not only for traffic.

So, Joe, will be very happy to receive any comments on the above. Besides after 2000Z any evening, also am available on RTT from 1100Z Saturdays to any old hour, and positively all day Sunday. Might even suggest a little cross band operation between 75 and 80 meters. We can operate up close to 75 and you get as close as possible to 80---just an idea. We do it quite a lot on phone in the early morning hours and works out as good as phone patch quality sometimes.

I'll be kicking around F 7 land for quite some time yet. I am not due to leave here until August of next year, but plan to sign for six more years in the army signal corps, so may be here as late as 56 or 57, who knows?

73.

Al K 2 J C S

Communications Mgr. ARRL,  
38 La Salle Rd., West Hartford, Conn.

I'm indicating my favorite band and operating interest, also awards and secondary hobbies, for your survey.

Favorite band(s)..... Hrs operation per month.....  
 Pwr.Input to final..... Emergency Pwred Home Stn.....  
 Mobile.....Special interest (1st & 2nd) **RTTY**.....  
 (Tfc, DX, ragchew, construction, rtty, ssb, vhf)  
 Favorite Major Contest.....  
 CP and Awards held.....  
 Other Hobbies.....

REMARKS:

Call & Appt. (if any)

QST QST QST de A.R.T.S Have you answered the recent ARRL survey on favorite band and operating interest? If not, please complete above form (copy on a postcard) and mail to F. E. Handy W1BDI. Also, on the first of each month send STATION ACTIVITY REPORT (Form 1) to your SCM (listed 17 on page 6 of QST, and show RTTY activity.



## Modification of Model 10

### BULLETIN PRINTER

by John M. Mulligan, W2RTW

The Model 10 bulletin printer uses 6-inch paper. I made this by setting up a regular 8-inch roll in a lathe and mounting a hack-saw blade in the tool post to make a nice cut. The 2 inches left I gave to my wife W2QBJ for her adding machine.

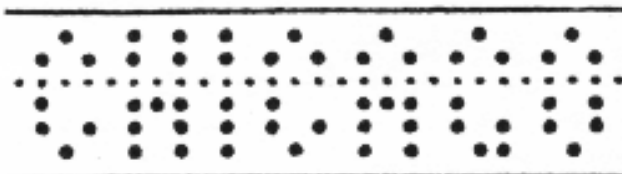
This unit uses a 6th pulse for upper - lower case shift. After removing this mechanism and slowing the machine down to standard, the unit printed very nicely, except for figures and characters upper case.

After much head-scratching and watching to see what happened when "fig" and "ltrs" code came along, I found it was a simple matter to arrange 2 lever and stop cams on the end of the selector shaft (right side of machine facing front) to give shift action (See sketch). It worked beautifully.

The upper-case characters were mixed up from standard so that the machine printed only gibberish on upper case. Next came the un-gibberishing of "fig" characters. After marking the position with red pencil, I removed the rubber wheel. I inked it and rolled it along a piece of paper to compare the thing with regular characters. Since the letters and spaces were OK, a guide was had for re-locating the numbers and punctuations. A printer friend set up a block of type same spacing but like the regular code. This was used by a rubber

stamp man to cast a matrix in hard rubber, whereupon the type was returned to the printer.

After the matrix was obtained, a rubber stamp was made. This gave some trouble. Normal rubber stamps are not particular as to thickness, but in this case the pressure applied must be several times greater than normal, and must be equal along the strip. After several failures, all my work was rewarded at a total cost of \$2.50.

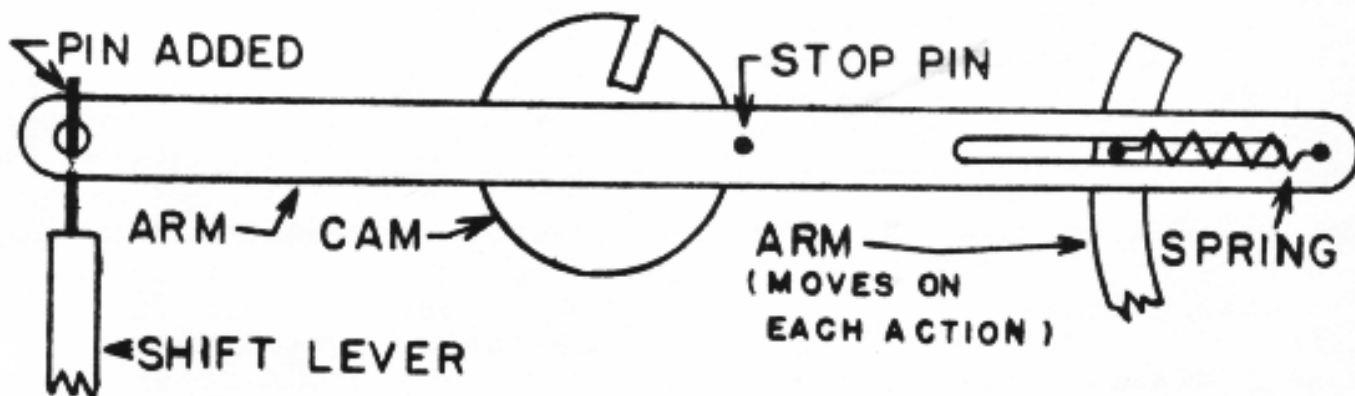


There is getting to be quite a bit of activity on 2 meters in the Chicago area. The frequency is 147.7 mc, using wide-band (20 kc) FM. Polarization is vertical. All of the equipment is Motorola stuff, available for very reasonable prices.

Three more Model 26's went out to fellows in the area this week. They are already on the 147.5 mc FM net for this area. Just takes a change of crystal to get on the printer frequency.

No local RTTY club in this area as yet. Distances between stations are so great that getting a central location for a personal meeting is tough. A lot of the boys live upon the "North Shore," which is the strip of towns up the lake. Several live far south as well. It looks like any "Society" will have to be an over-the-air one. It's no trouble to work on 2 meters with 30 watts or so.

—George M. Boyd, W9SPT



## TECHNICAL LITERATURE

### ARTICLE ABSTRACTS

Modulation equipment design for modern single-sideband transmitters, A. E. Kerwien, Proc I R E, Vol 40, pp797-803, July 1952.

Deals of the considerations that go into design of modulation equipment for SSB radiotelephones using filters for sideband suppression. Discusses balance requirements, frequency stability, choice of IF, and methods of avoiding spurious emissions.

Military carrier telegraph equipment, Boughtwood and Cramer, Electronics, Oct 1954, p196.

Describes Telegraph Terminal AN/FGC-29 to be produced by Western Union Telegraph Co. It provides 16 FSK carrier channels spaced 170 c apart from 425 to 2,975 cps for speeds to 100 wpm. Each channel uses dual receiver for two-path radio diversity, either space or frequency, or both. Diversity signals are combined by a new method, called ratio squaring. This method provides 3-db improvement in S/N in addition to the normal diversity improvement factor.

Under adverse conditions, two dual channels may be combined (4 paths) reducing telegraph circuits to 8. Or two 3-kc voice bands may be used, leaving 8 tg channels.

Balanced Polar Mercury Contact Relay, J. T. L. Brown and C. E. Pollard. Bell System Tech. J. Vol 32, pp1393-1411, Nov 1953

New type relay uses solid contacts maintained continuously wet with mercury. Symmetrical polar structure gives improved sensitivity and speed compared with neutral structure and similar contacts. Two magnets are used for polarization. The relay is adjusted after assembly to the desired sensitivity in forward and reverse directions by adjustment of magnet strengths.

Radio transmission beyond the horizon in the 40- to 4,000-mc band, K. Bullington, Proc I R E Vol 41, pp132-135, Jan 1953.

Reliable signals have been received at distances of several hundred miles. Median signal levels are 50 to 90 db below calculated free-space field, but are hundreds of db stronger than theoretical smooth, spherical earth-standard atmosphere predictions. No long delayed echoes have been found. Results are compared with other available data.

Intermodulation interference in radio systems, Wallace C. Babcock, BSTJ, Vol 32, pp63-173, Jan 1953

Intermodulation interference becomes serious when consecutive channels are used for a given type of radio service in a confined area. Formulas show potentially interfering 3rd and 5th order intermodulation products that can be formed in a band of  $n$  consecutive channels. Number of interference-free channels that can be obtained by careful selection is derived.

## NEW EQUIPMENT

425c Frequency Standard: Transistorized and miniaturized frequency standard has .02% accuracy from -65 to +85° C (Type 2007T). The octal-based units weigh 7 oz, and are 4 1/2" long by 1 1/2" in diameter. Input is to 35v dc at about 5 ma. Output is 5 v, sine wave. Frequencies from 400 to 500 cycles are available. Request complete information from American Time Products, Inc, 580 Fifth Ave, New York 36, N. Y.

Fast Switch: Miniscule contacts of dry-reed switch operate in 1 millisecc at rates up to 400 cps. Contact resistance is .05 ohms maximum. Contacts are rated .5 amp at 115 v 60 cps. Switch is operated by magnetic force of a nearby permanent or electromagnet. Write for bulletin from Revere Corporation of America, Wallingford, Conn.

*Amateur Radio Teletype Society*

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