

Twelve Hours Being Top Dog

BY FRANK WHITE

Ever drive to work and have some "character" cut you off and wish you had a big steam roller instead of a new Plymouth? Or, have you wished you had fifteen KW and rhombic antennas at a rare dx site? If you haven't dreamed of either of these, you just ain't a human being, or a ham radio operator!

I've never had the steam roller to drive to work, but I have operated a fifteen KW rig with all the rhombics. It happened out at NSS when the military QSOed the hams on rtty on Armed Forces Day.

NSS is the communications station for the Navy Washington Headquarters. The transmitters are located near the Naval Academy in Annapolis. There is a selection of rigs running from 15 KC to microwaves. So when it came time to pick a transmitter for talking to the hams on Armed Forces Day, fifteen KW seemed appropriate. Although rhombics are available at the NSS transmitter site, the rig was left on a dipole during the entire exercise.

Receivers for NSS are located near Cheltenham, Maryland, about five miles southeast of Washington. On this Maryland flat land a veritable forest of antennas has been erected to permit the Navy to "dig" for signals from the fleet.

For the Armed Forces Day two-way contacts the Navy sets aside a small room at the Cheltenham receiver site.

A number of operating positions were moved into this room to permit simultaneous phone and CW operation on the various ham bands. A Collins KWS-1 is the only transmitter usually used at the Cheltenham receiver site (other than microwave links) and is provided for the Navy station K3NSS as well as for the military side of the single side-band transmissions on Armed Forces Day.

A model 19 (page printer, keyboard and transmitter/distributor) was hooked to the control line for the 15 KW rig on 6970KC at Annapolis. The 19 provided a log of all outgoing rtty transmissions and permitted independent operation of the transmitter and rtty receiving positions. Two Navy 51 Js and my own 75S3 were set up for receiving amateur rtty transmissions. Military AN/URA8A and a URA8 teletype converters were tied to the 51Js, each driving a 15 printer. My 75A3 fed my converter, which drove a 28 printer (wish it was mine—it isn't). A receiver antenna patch panel was located at the rtty operating position. It provided plug-in selection of various rhombic antennas as well as dipoles and broadband antennas.

Last year I held down the operating position myself but this year I was fortunate enough to have the able assistance of Phil Catona (W2JAV). Phil and I have been rtty buddies for about eight years. We started by working afsk on two meters—140 miles from

Hammonton, New Jersey to Silver Springs, Maryland ain't hay but we did it—regularly.

The ideal setup at NSS would have been to have had two transmitters so that separate operating positions could have been established. Since Phil and I had to share the one transmitter we had to have real coordinated effort. I can imagine what it sounded like from the ham end of the circuit. Phil would turn it over to his contact and I would begin with mine. Or NSS would be calling CQ (I would stuff the tape in the TD) and Phil would be in the middle of a QSO. Oh well, you boys figured it out pretty quickly.

Operating NSS was one of those things you all dream about. We called CQ (15 KW has quite a "voice" you know) and bedlam broke loose on the ham rtty frequencies. Since the fellows were all tuned to NSS they didn't know they were zero beat with each other and effectively jamming each other lots of the time. NSS kept asking the fellows to "spread out." The good old Collins mechanical filter (1200 CPS version) in my 75A3 did a fine job of "slicing" the unwanted ones off—but only part of the time.

About an hour after the two-way contacts started, a big thunderstorm settled on Cheltenham. Eighty went dead as a herring (so far as we could tell) and 40 was about as bad. Phil fought his way through the 40 meter QRM and I moved my listening attention up to 20 meters. We started working the west coast about 3 a.m. their time. With the transmitter on 6970 KC this only shows to go you what power will do to push a signal across country. We used the 270° rhombic for listening to the west coast gang. It is about 1000' long and had lots of gain. Ever plug in a rhombic on a weak signal? It's a real thrill,

let me tell you. VE7KX was pouring in QSA5 plus with the rhombic and was a mere QSA2-3 with a measly dipole 90' high in the clear. I would like to have heard Jim on my home receiving antenna. The MOSCOW station near 7140 was wiped out nicely by the westward looking rhombic. It was the first time that I could recall hearing the west coast gang on 7140 KC without having to "eat Moscow pie" simultaneously.

After 12 hours and 75 contacts, Phil and I dragged ourselves away from NSS and went home rather pleased with having been "Top Dog" for 12 hours. A couple of fellows have written me to thank me for getting on NSS. Fellows, if there is any thanks due, it is to all of you for being so patient with Phil and me at NSS. It was a real thrill to see such a fine turn out. See you next year, maybe we can talk the Navy out of two 40 KW jobs? Better start making real good friends with the new skipper out there, eh?

—Frank White

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For Information Regarding the
Society Contact the Following:

W6CLW—Ed Simmons
W6AEE—Merrill Swan
W6SCQ—Lewis Rogerson

For Traffic Net Information:
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Midwest Amateur Radio Teletypers Society, Inc.

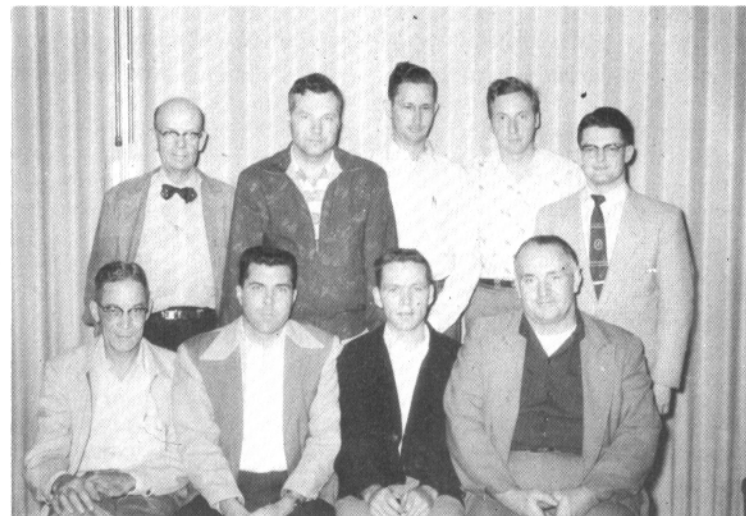
BY D. L. (MAC) McMULLEN, WØATM

Here are a couple of photos which I will attempt to tell you all about. First of all we had a rather "poor" showing at the meeting in which we took the photo, as it represents about one half of the members. Front row from left to right is: Joe Hiss, WØHBD a member of the Board of Directors, and also a very good TELETYPE repairman. Robert (Bob) Atkeisson, WØIQC, the Secy-Treas. of the Society, Myself, WØATM Pres. of the Society, Ralph Hazel, WØITX the Vice-Pres. of the Society. Back row left to right is Bob Smith, WØLD; Ellis Thatcher, KØDHT; Garth Flournoy, WØTMJ from Odessa, Mo.; Tom Johns, WØBKV from Columbia, Mo.; and J. L. (Jim) McCoy, WØLQV, the last but not least member of the Board of Directors of the Society.

The second photo is one from the ham "Shack" of Bob's WØIQC. As you can tell, he has an "Iron Horse" Perf, a 14 AE tape transmitter, a Model 26, his converter is mounted in the rack, and his two meter gear (ARC-5) equipment is on top of the operating table. The rest is easily identified by most hams as a BC-610 and a Collins 75A3.

I am happy to report that we have almost doubled the initial membership, and as the word got out that there is such a club available, we are getting a lot of good prospects from many towns outside the Greater K.C. area and feel with a little more talk we will have a very good membership within a year.

I am also happy to report that we are making a little progress to have the unused equipment from Southwestern Bell guided our way. We feel this will help fill the gap here as we will have something to offer the members. Will let you know when the final arrangements are made. I have found all the "dope" you have sent me very helpful and have used it time and time again. I talked to a friend of yours the other day, Mr. Harold Wade from Seattle, seems to be a very fine fellow and am looking forward to meeting both of you guys in person, for without all the help I have received from all of you, the club would still be only in the planning stages, and for that reason I will never be able to thank all of you enough.



Automatic Carriage Return and Line Feed for a Model 26 Teletype Printer

by ELWIN J. O'BRIEN — W6LDG

The line feed and carriage return on the teleprinter are normally controlled at the sending station. When the function pulses are missed the carriage remains at the end of the line and continues to overprint until new pulses are received.

A project to avoid the loss of a full line resulted in the automatic line feed and carriage return for the Model 26 Teletype printer.

The mechanization finally selected operates by physically tripping a microswitch at the 72nd letter on the line. The method used is not ideal, since a blank line may result if normal functions are also received at the end of the line. It does, however, provide for normal operation at the machine and minimum printer modification. All the new hardware is attached in existing holes with the exception of one non-critical adjustment hole for locking the microswitch bracket.

The photograph shows the Cannon No. 4673 28 volt solenoid assembled in the unit. The solenoid is operated by the discharge current from the 100 mfd electrolytic capacitor which is charged from the power line to 150 volts peak. At this voltage and pulse type operation the average current through the solenoid is normal for intermittent service. The initial high voltage, which drops rapidly, provides a rapid acting solenoid circuit. The resistor in the power line circuit limits the peak line charge current to less than 175 ma, which is within rating for the 100 ma selenium rectifier and microswitch contact. Because of the characteristics of the RLC discharge circuit, the microswitch is closed on the discharge cycle

at zero current with no contact sparking at the initial closure. Also the discharge of the capacitor is limited by the time constant to one oscillation cycle and is therefore discharged before the microswitch contact is broken by the returning carriage. Safe and reliable operation of the circuit is thereby obtained.

The solenoid when used on 28 volts dc is rated at three pounds minimum pull for a $\frac{3}{8}$ inch stroke. The calculated peak discharge current of 1.75 amp in the RLC circuit provides more than adequate pull for the line feed bail and for tripping the carriage return level. In fact the action had to be slowed down by the addition of the 15 ohm resistor in series with the solenoid to prevent two lines from being pulled up when the machine was set for only one line space.

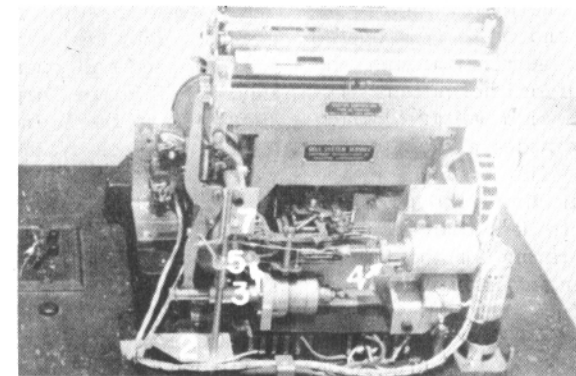
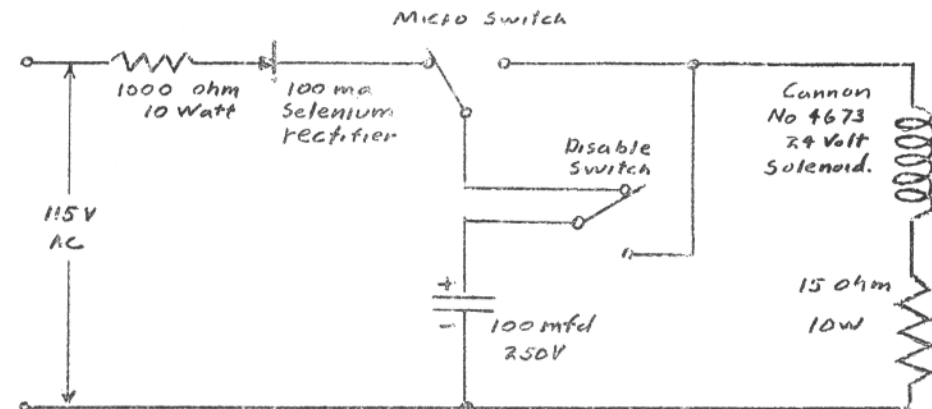
The photograph also shows the details mounted in position and can be used as an assembly guide. Select the hardware and follow notes on the parts list, using the picture as a reference, assemble the details and attach to the printer. The detail 3 is connected to the bail operating lever by removing the nut under the line feed bail operating level (see figure 39 Teletype Corporation Bulletin 159) and slip the $\frac{1}{4}$ inch hole in detail 3 over the lock washer, add the flat washer below detail 3 and replace the nut. The detail 5 linkage should now operate the line feed smoothly. Attach a bronze flexible cable between the spade lug on detail 5 and the hex nut on the solenoid. Two nuts on the spade lug are used to make the final length adjustment of the cable.

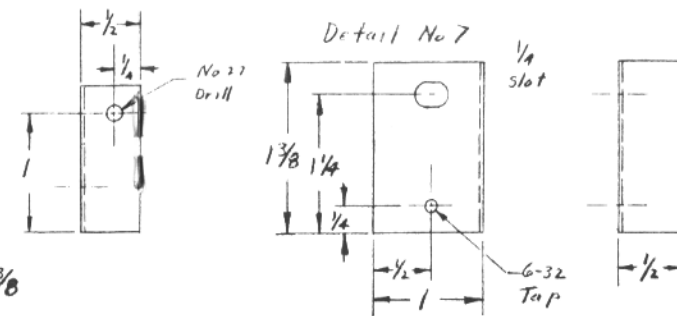
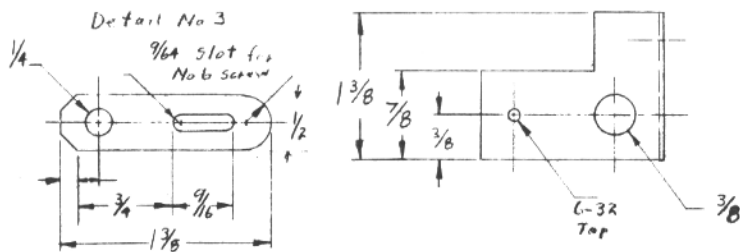
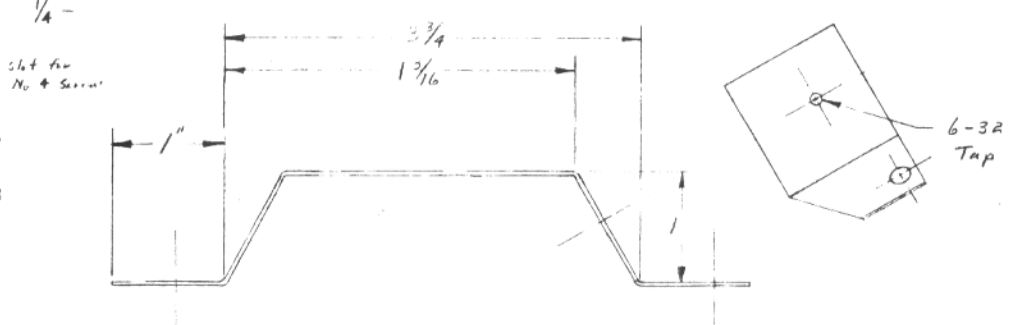
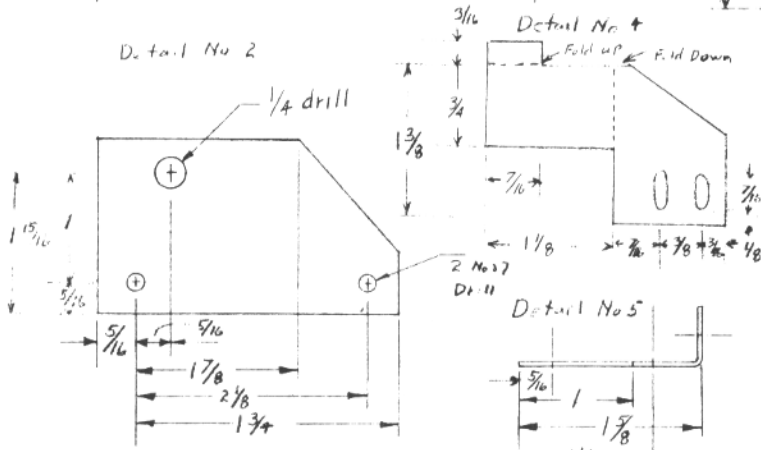
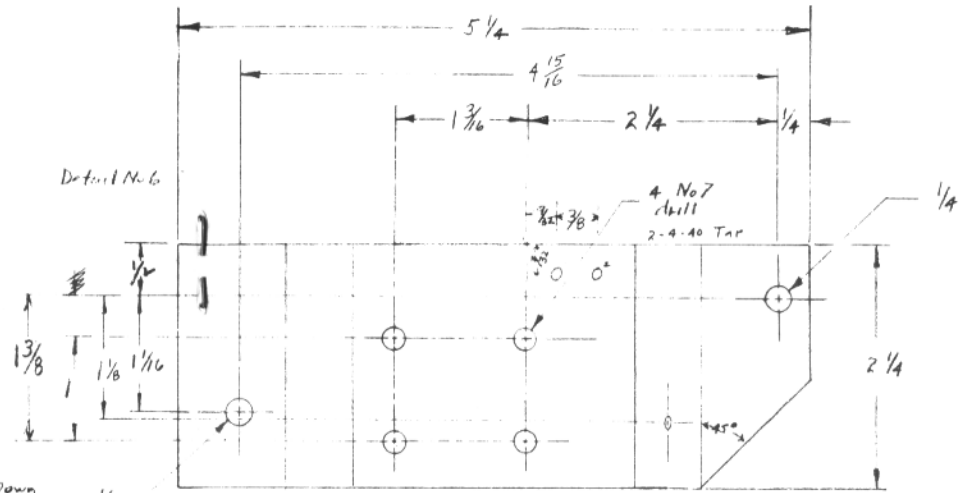
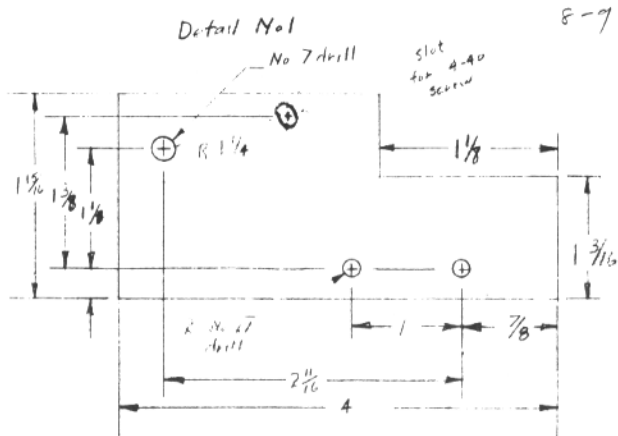
A microswitch actuating detail can be constructed from a $\frac{1}{32}$ inch flat piece of aluminum about $\frac{3}{8}$ inch wide and $1\frac{1}{2}$ inches long. Drill two holes to fit over the screws of the bell margin adjuster (see page 10 of the Teletype Bulletin B1074) and lock in place with two 4-40 nuts. It may not be necessary to remove the bell margin adjuster for this operation if the original screws are long enough to add the actuator detail. Adjust the length to trip the microswitch at the 72nd letter on the line. The elongated hole in detail 1 provides a final microswitch position adjustment.

After the wiring of the unit is com-

plete, the length of the carriage return trip spring and the adjustment of the cable length with the spade terminal can be determined by trial and error for simultaneous operation of the line feed and carriage return. These adjustments although critical are not difficult to make.

Some difficulty may be experienced with the solenoid cable stretching, therefore, a strong cable that will stand several pounds pull without stretching must be selected. Readjustment to allow for cable stretch may be necessary after the machine is operated.





Solenoid Assembly
Detail Drawing

E.J.O
11-1-56

PARTS LIST

Quantity	Description	Notes
1	100 ma selenium rectifier	Mount on detail 6
1	Cannon solenoid #4673	Mount on detail 6
1	10-32 Acorn nut	Drill hole in nut to hold bronze pull cable on Solenoid shaft.
6 in.	Flexible bronze wire cable (non-stretch)	For solenoid pull cable
1	10-32 Nut	Lock for acorn nut
4	10-32 x 3/8 screws	To mount solenoid on detail 6
1	4-40 x 1/4 filister head with safety lock hole	Carriage return spring mounting on solenoid. Drill and tap hole in flat of solenoid plunger for this screw.
1	6-32 x 1 screw	For mounting Solenium rectifier on detail 6
2	4-40 x 1/4 screws	For mounting detail 4 on detail 6
3	1/4-20 x 5/8 socket head cap screws	For mounting detail 6 and 7 to TTY Frame
2	6-32 x 2 screws	For mounting microswitch on detail 1 (position on screws with nuts to align with microswitch actuating detail mounted on bell margin adjustor screws)
6	6-32 Hex nuts	Mount on detail 1
1	Microswitch single pole double throw	For mounting detail 2
2	5-40 x 3/8 screws	Brass, steel or aluminum
1	1/4 x 7 1/8 shaft	Mount on detail 5
1	1/4 shaft panel bearing	To position detail 5 on shaft
1	1/4 x 1/4 shaft coupling	Mount on detail 5
1	6-32 spade terminal (long type)	To lock shaft to detail 5
1	Cable clamp	To hold cable clamp to detail 5
1	6-32 x 3/8 screw	Use insulation to isolate from TTY base. (one side is 115V line—will be hot unless line is polarized)
1	100 mfd 250V (or larger) electrolytic capacitor	
1	Capacitor mounting bracket	Connect from solenoid to capacitor
1	10W 15 ohm resistor	To lock detail 1
1	4-40 x 1/4 screw	Mount slotted end of detail 3 between two washers to detail 5, allow free slide action and lock with 6-32 nut
1	6-32 x 1/2 screw	Mount on TTY base plate with 5-40
2	Washers to clear 6-32 screw	Screw and mounting washers (can use 6-32 by retapping hole)
1	6-32 nut	To lock microswitch actuating detail to bell margin adjustor
1	10W 1000 ohm resistor	
1	5-40 x 2 1/4 screw	
2	Resistor mounting washers	
2	4-40 x 1/4 nuts	
1	Spring (made from 0.0185 inch steel music wire—15 turns close space and wound tight on 1/8 inch diameter rod, leave 1 1/2 inch leads for hook on each end and mount in safety lock hole in 4-40 screw in flat surface on solenoid plunger and hook other end over carriage return lever, adjust length to allow almost full travel of plunger before spring is stretched.	

CHI-RITTY No. 3

BY GEORGE BOYD, W9SPT

Aug. 30-31, Sept. 1st, 1957

The Third CHI-RTTY meeting was held this year at the Palmer House Hotel, Chicago, in conjunction with the Ninth National ARRL Convention. The meeting ran for three days this time in the private dining room which was assigned for the exclusive use of the Teletype gang.

other adjusted to print on the second 11 millisecond code pulse. This system is in use on wire lines where stable circuits can be obtained.

Bob Weitbrecht, W9TCJ, again demonstrated his low-frequency autostart system. The "Wizard of Wisconsin" brought two complete stations which



LEFT TO RIGHT, GOING AROUND TABLE:

WOYKZ/5, ?, W2JAV, W2BDI, ?, W6CQK, W3CRO and W9GLR

Equipment was on display from Friday afternoon until Sunday evening. Ray Morrison, W9GRW, brought two model 28's, a model 14 typing reper, 14 TD and a model 26 to show. Ray's 14 TD actually is a "diplex" unit, and he demonstrated how two entirely separate messages may be sent down one pair of wires to two receiving machines. This is done by splitting the five code pulses and using half of the normal 22 millisecond interval for each channel. One machine is then ranged to print on the message transmitted in the first 11 millisecond interval, and the

were set up across the room from each other. Many interesting QSO's took place over this circuit during the show.

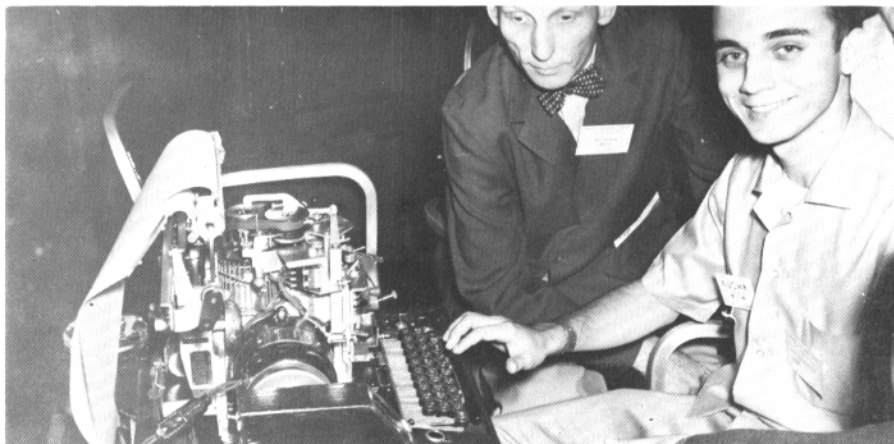
Loren Godwin, W9LKK, displayed a model 26 printer with automatic carriage return and line feed feature added. Loren advises that he has kits of the necessary parts available for model 26 owners who would like to add the feature to their machines.

George Boyd, W9SPT, and Bob Paculat, displayed terminal units and machines driven from an audio tape recorder which explained the operation of two meter autostart.

There was also displayed a polar relay adjuster by Si Roth, WØLFH, and the beautifully constructed heterodyne FSK exciter made by Jack Pitts, W6CQK/2. Jack declined giving a technical talk on his unit as it has appeared in print but its signals on the bands have for months been an eloquent testimonial.

The Saturday afternoon technical session was opened by George Boyd, who welcomed the gang and introduced Boyd "BeeP" Phelps, WØBP, the master of ceremonies and head of the tech-

BeeP then filled in on a number of subjects such as narrow shift, filter band widths, band pass filters, etc., with stress on the importance of "the nut on the knob," that is, getting on the air and using the gear to become familiar with adjustments best for limiting, AVC, selective fading and noise balance under various band conditions. His remarks on types of diversity reception were later followed by mimeographed sheets prepared by W9TCJ wherein Bob combines the DC pulses out of two receivers and terminal units at a point



K6CHR, IN AN EYE-TO-EYE QSO ON W9TCJ EQUIPMENT

nical paper procurement department.

First speaker was Byron Kretzman, W2JTP, who spoke briefly about the new RTTY handbook, of which he is co-publisher.

Dave Chapman, W9DPY, spoke on oscillators and stabilization of "drifters." Dave tends toward the high-C Colpitts circuit, and explained the advantages of this oscillator. He talked about temperature compensation to limit warm-up drift, component selection and construction practices.

between the four diodes and the flip-flop.

Bob Springer, WØYKZ/5, explained how the owners of KWS-1 transmitters can easily get on RTTY. Just feed in two audio tones, and out comes FSK. In the discussion following Bob's talk, it was brought out that this method of obtaining FSK should be used only with filter type SSB transmitters, and that the phasing type of sideband generator would probably produce excessive unwanted sideband energy and a slip from

the monitoring stations. Anyone contemplating this method of FSK were cautioned to check unwanted sideband energy.

Phil Catona, W2JAV, stole the show with his demonstration and display of transistorized RTTY gear. "Phil the Cat," tired of hauling pounds of iron around, has transistorized a terminal unit, audio oscillator, frequency meter, and other RTTY gear. The terminal unit is built into a WE255 polar relay can, employs seven transistors and four diodes and is capable of driving a 20 milliamper loop with a 7½ volt "C"

only, space only or both mark and space tones. Interference on either frequency could readily be removed and the printer would operate on the remaining tone.

The Technical session adjourned at 1800. The Saturday evening banquet was attended by 45 of the gang and after the meal the meeting was continued in the RTTY room.

Byron Kretzman opened the evening meeting with some words on the equipment procurement situation. Newcomers to the RTTY field were warned to investigate fully before buying equip-



JACK PITTS, W6CQK AND BOYD PHELPS, WØBP

battery. The audio oscillator can be frequency shifted for AFSK and its output is used to carrier shift Phil's 80 milliwatt transistor transmitter. Phil has worked several stations on 40 meters using this transmitter. Circuit diagrams of these units were passed out and the supply was quickly exhausted.

Another of Phil's devices was his adjustable notch filter for RTTY tones. He demonstrated in suppressing interferences by nulling out the undesired signal. Phil's terminal units on display were capable of operation on mark

ment and the active gang asked to lend their experience to the uninitiated.

Reports from representatives of various parts of the country were received. Activity seems to hold up on the low frequencies, but the two meter nets seem to be relatively dormant, except on the west coast. Byron and Phil told of their experiences with true FSK on two meters, using both standard 850 cycle and narrow shift.

The narrow shift question was again brought up and its advantages in combating QRM and QSB discussed. Narrow shift of 170 cycles has been used on spe-

cial occasions but the 850 cycle shift remains as the usual standard.

Everyone was urged to be on the air as much as possible. Several of the fellows mentioned lack of activity and consequent disinterest in the RTTY field.

Following the meeting, a drawing was held and four polar relays, a tape head and a working model 26 machine were given as attendance awards.

For his work in design of electronic output terminal units, Bob Weitbrecht received a "toasted" POLAR PARTY. The awards committee had considerable

14 typing reperfs, which will be put to good use in giving DX RTTY contacts to the gang.

Bruce expressed his thanks to the donors of the machine, and told of his experiences in getting a RTTY station on the air in New Zealand; and expressed his gratitude, for the assistance, and encouragement so freely given to him, by Merrill, W6aee (Merrill shipped the model 26 to Bruce, which enabled RTTY signals to be transmitted from "down Under") Bob, W9TCJ, (who sent Bruce toroids, and xtals.) and "Ole



DICK URABAIN, W3CRO,
DISCUSSES A POINT ON MODEL 26 MAINTENANCE

trouble in getting him to accept the reward, however. BeeP was awarded a thimble full of chads for his sterling and outstanding efforts in arranging the technical talks. Since each chad was not autographed by the donor, he regretfully declined the award.

Last award was to the RTTY man from the furthest distance. There was no competition in this contest; Bruce Rowlings, ZL1WB, easily qualified as the winner. Bruce was awarded a model

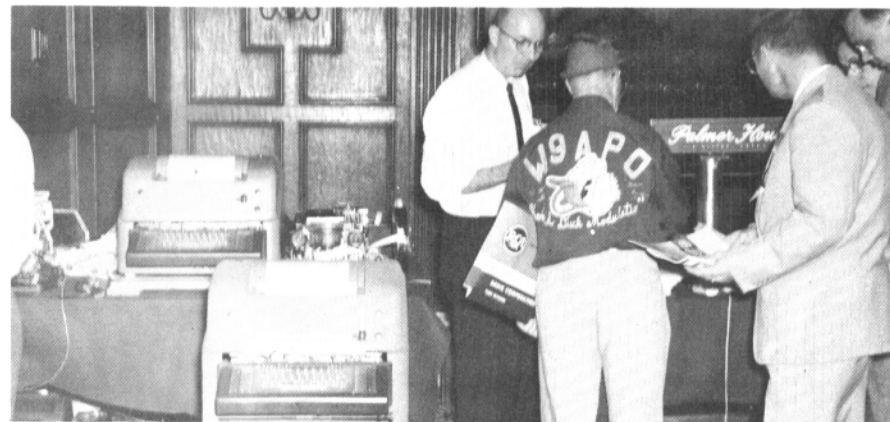
"BeeP". Also, the many others who had in some way, made towards the success of his RttY operations.

Further technical sessions were scheduled for Sunday afternoon, but by this time most of the fellows had had enough of the RTTY room and took in other convention activities. The room remained open for demonstrations and display of equipment. Dick Urian, W3CRO, reassembled a model 26 that he had taken apart for maintenance,

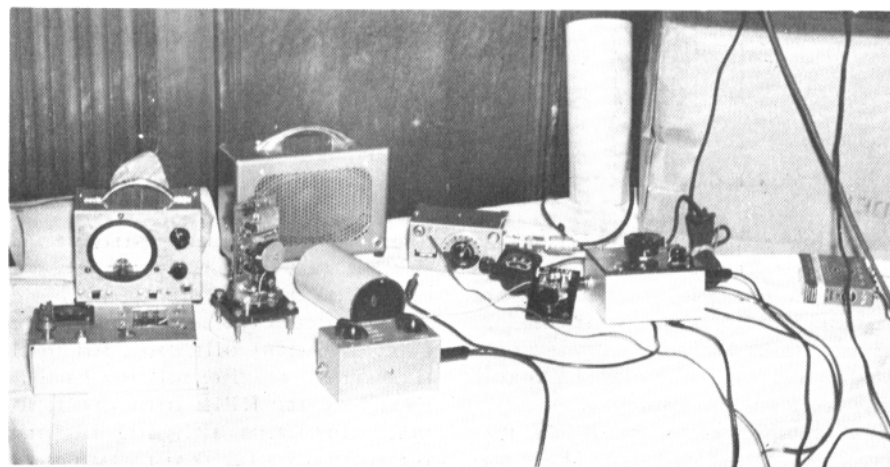
and pointed out results of incorrect adjustment and improper lubrication of the machine. Dick recommends SAE #10 non-detergent oil for lubrication of all parts of the model 26, except for the selector mechanism, where a sperm oil, such as Nye's Watch Oil, should be used. The gears should be lubricated with a non-fibrous grease.

The 1958 CHI-RTTY meeting will probably be held in October, the Sunday before the National Electronics Conference. Further information will be released in mid-August, 1958.

Attendance at the technical session Saturday afternoon was about 70, slightly more than the seating capacity of the room.



GENERAL VIEW OF TWO MODEL 28's AND A 14 REPERF ON DISPLAY



PHIL CATONA'S TRANSISTORIZED EQUIPMENT DISPLAY.
NOTE THE COMPLETE TU BUILT INSIDE A POLAR RELAY ASSEMBLY.