THE MODEL 28 TELETYPEWRITER

The Model 28 Teletypewriter which has been under development for almost 10 years is gradually nearing completion. During this period, various and sundry mechanical contrivances have been assembled and given lengthy operating tests only to be abandoned for some further improvements. One machine which came about as a result of this developmental work, however, is the Model 31 Tape Printer which is now used in Naval aircraft and is described in the February 1947 Electron.

The Teletype Corporation has been thoroughly schooled by the Navy in regard to the great need for reduction of weight and space for shipboard equipment. Very little has been or can be done to reduce the size of a teletypewriter due to several pertinent requirements; namely, the width of standard paper, adequate key spacing, and proper keyboard height for operation. It is readily admitted that if these requirements could be overlooked the entire machine could be reduced to a box approximately six inches square. Nevertheless, the overall dimensions have been reduced 3" in depth and height, and the necessary features still retained.

Weight reduction has fared somewhat better. Aluminum has replaced much of the steel and cast iron parts previously used except where hard surfaces are required, and several hundred parts have been eliminated. These changes bring the total weight of the Model 28 including the console to approximately 40 per cent of the weight of the standard Model 15 previously provided to ships.

The development of the Model 28 has not been easy and, as pointed out in the first paragraph, was not accomplished overnight. The new printer is an entirely different machine with no parts or adjustments common to the Model 15. (Teletype technicians take note!) About the only features of the two machines which are similar are that they use the same teletype code, the same size paper, they both have a keyboard, and both are motor driven.

It is not the intent of this article to go into the technical details of the Model 28, but it is believed that a brief description of the principal differences will be of interest to individuals concerned with teletypewriter equipment.

The most radical change in the Model 28 Teletypewriter is the method of typing. Instead of a bulky type basket weighing 5¾ pounds with code bars, pull bars, type bars, bell cranks, etc., the Model 28 has a simple little type box weighing approximately 2 ounces and measuring about 1" x 2".

The type box contains 51 pallets, is divided into two sections, letters and figures, and for each section there is a neutral position.

For purposes of explaining the movement of the type box, assume that the hammer is fixed for its hammering action.

In figure 1, the type box is shown in the "letters neutral" position. When any particular letter character is selected, the type box is positioned horizontally and vertically so that the selected pallet is directly behind the hammer. This action takes place on the first half of the operating cycle. On the second half of the cycle,

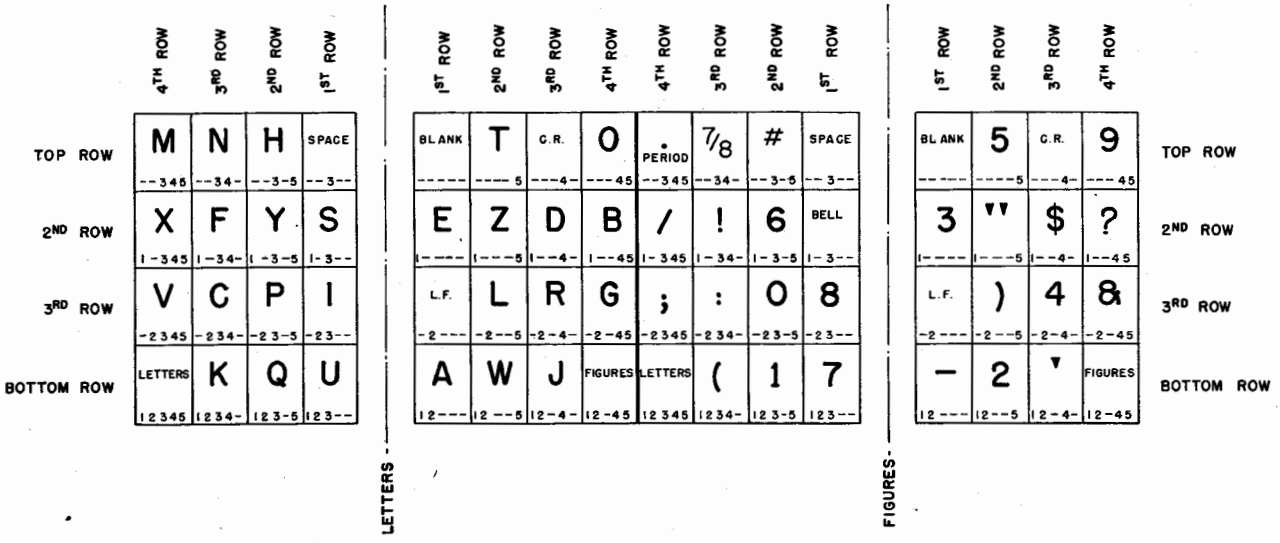


FIGURE 1—*Type box of Model 28 Teletypewriter, in the "letters neutral" posttion.*

the hammer hits the pallet and the type box is returned to the neutral position. There are two good reasons for having the type box return to the neutral position after each character is printed. First, it allows the operator to see what is being printed, and second, it eliminates the necessity for the type box to move more than four spaces horizontally during the positioning cycle or more than nine spaces during the shifting cycle.

When the figures code combination is received by the selector mechanism (note that #3 impulse determines whether the type box moves to the left or right) the type box moves nine spaces to the left or to the "figures neutral" position. This action is equivalent in length to the positioning of the type box, printing a character and return to neutral position. In addition to the movement described above, the type box and hammer simultaneously move across the platen, space by space, as characters are printed. The spacing cycle is concurrent with the return of the type box to a neutral position.

The printer is designed to operate at a normal speed of 100 words per minute with provisions, by a change of gears, for 60 words per minute and eventually up to 150 words per minute. At 100 words per minute, printing action appears to be effortless. Power required for operation of the motor is approximately one third of that required for the Model 15 resulting in the motor being greatly reduced in size. The speed of the motors, both synchronous and a-c governed, has been increased to 3600 r.p.m. thus allowing the same gears to be used for both types.

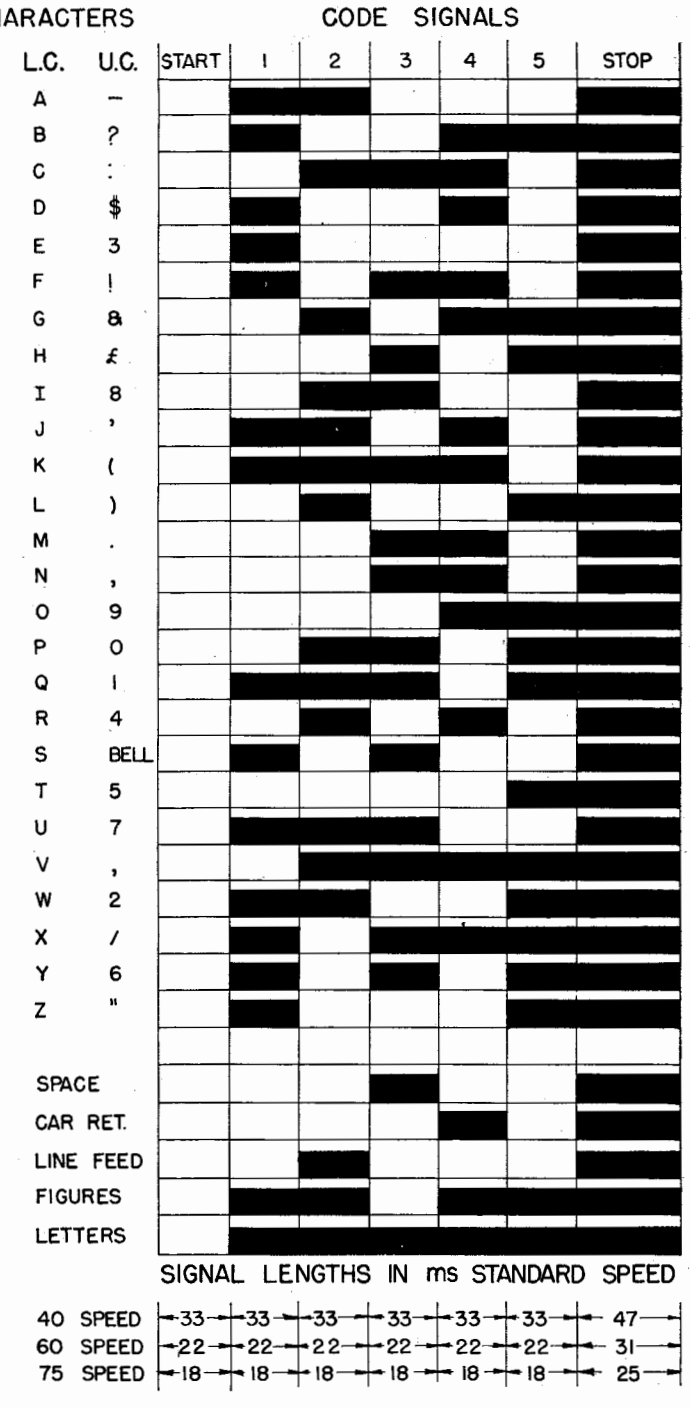
The keyboard unit has also been completely redesigned. In the Model 15, when a key is depressed, the selector bars are positioned which control the transmitting contacts through a series of levers. In the Model 28, the function of the key lever is somewhat different. It starts the transmitting mechanism operating similar to the universal bar in the Model 15 and acts as a stop for the selector bars which are mechanically driven. One desirable feature of this system is that as soon as the mechanism starts operating for one character, another key may be depressed and the code combination stored until the next cycle of operation. This system allows more flexibility on the part of the operator, as typing need not be as rhythmical as for the Model 15. Also, less key pressure is required which, since the number of selector bars has been increased, is most desirable.

In lieu of the six pairs of contacts as in the Model 15, five for the code combination and one for start-stop, the Model 28 has only two sets. One set is required for neutral operation but both sets are required for polar. Inasmuch as all shipboard radioteletype equipment is wired for neutral operation, one pair of contacts of the Model 28 replaces the six in the Model 15 thus effecting a considerable saving of parts.

This brief article would become a lengthy volume if each of the remaining changes or "different" features were described in detail but it is believed that the following list of a few of the advantages over the Model 15 will prove interesting:

1—A "paper feed-out" key instead of a platen crank or handwheel.

2—Provisions for many additional functions by means of a stunt box in place of individual function levers.



The standard Teletypewriter Code, used by the Model 28 Teletypewriter.

3—Much less maintenance is expected because of less driving torque required, several hundred less moving parts, fewer adjustments, improved hardening of wearing surfaces and replacement of many sleeve bearings with ball bearings.

4—Improved shock resistance through the use of additional mounts of a new design.

5—Operation is unaffected by inclination. It will operate satisfactorily in any position and even inverted. (We hope this last condition will not occur frequently in ships.)

6—Easily replaceable type sets—the type box may be removed and replaced in a matter of seconds in case of battered type or for other reasons.

7—Each printer is equipped for both friction and sprocket feed of paper without the need for making any changes or adjustments.

8—The selector magnets are designed to operate on 20 ma with provisions for 60-ma operation.

9—Higher operating speed, up to 150 words per minute.

10—A simplified new console cabinet reduced noise to approximately 25 per cent of that of the Model 15. The angle of the view glass is such that there is no reflection from overhead lighting.

11—Identical speeds for both synchronous and governed motors.

12—Lighter weight—78 pounds compared with 199 pounds for the Model 15.

13—Smaller size—20″w x 19″d x 40″h against the 20″w x 22″d x 43″h for the Model 15.

As stated above, development of the Model 28 has been going on for about 10 years and is now rapidly nearing completion. After this, approximately 20 months will be required for tooling up and removing the bugs from the preproduction models before full-scale production can begin. It appears now, therefore, that installation of the Model 28 teletypewriter in ships cannot be expected before June 1950.

RADIAC.....

It was intended that this issue of BuShips Electron carry a comprehensive story on the Navy's new radiac equipment and a good deal of background material on the story of the atomic bomb and the subject of nuclear physics in general.

Editorial schedules, however, and certain difficulties encountered beyond the control of the Bureau, have made it impossible to carry out the original plan. Moreover, a great clamor has arisen from many persons and activities who have learned of the story and who want extra copies of "that issue of the magazine." These things make it desirable to publish the story as a separate unit.

Accordingly, instead of including the story in this issue of Electron as planned, the Bureau now intends to bring out the story as a special issue. The title is, The ET Looks at Radiac; the short title is NavShips 900,146.

When this issue of Electron is available it will get wide initial distribution. Most activities now receiving Electron will receive at least one copy. Other activities may obtain copies by writing to the nearest Publications Distribution Center.