

Division 6 - Lincoln Laboratory
Massachusetts Institute of Technology
Lexington 73, Massachusetts

INTEROFFICE MEMORANDUM

SUBJECT: MAGNETIC DRUM SYSTEM, WWI

Date: 30 June 1958 (Corrected)

The Mechanics of Disabling and Enabling the Write Function

At times it is desirable to disable the write function on one or more groups of the auxiliary drum so that the information recorded on that group is permanent. This is now being done on group 11 which contains the input program. The following paragraphs describe the method used to disable the write function and explains how to enable writing if the information must be changed on a disabled group.

As mentioned in the section on write group selection, we use two methods of write switching the auxiliary drum. Therefore, we must perform two tasks to disable the write function in a group or to enable writing once the group has been locked in read.

The drum bays in Room 156 are numbered from north to south. The auxiliary system comprises bays 1 through 3 with the drum itself being located in bay 3. The jacks in which are mounted the plug-in units are numbered from top to bottom and from right to left. A jack layout of each bay is mounted inside the bay door. The tubes on each plug-in chassis are numbered from top to bottom. The left side of the unit contains tubes 01 through 08, the right side of the chassis contains tubes 21 through 29. (These numbers refer to tube positions, and there may be some empty positions on certain chassis.)

In order to disable a group, we must remove two type 03 chassis which contain the gate writer amplifiers for each digit of the group to be disabled, and we must remove two additional tubes which comprise the writer for the parity digit for that group.

The writers for the individual digits for each group are contained in two type O3 chassis located in bay 1, jacks O1 through 24. There are thirty two writers to a group, a one writer which is assigned the odd socket, and a zero writer assigned the even socket. For each digit, the tube layout and identifying numbers, which permit you to select the tubes to be removed or inserted to disable or enable the write function for a particular group, are shown in figure 1.

The writers for the parity digits are located in Bay 1. The chassis containing the writers are mounted in J26 and J27. Each chassis contains eight writers. The writers for groups 0-7 are on the chassis in J26. The writers for groups 8-11 are on the chassis in J27. There are four spare writers. To disable or enable a parity digit for one group, two tubes must be removed or inserted. The tube layout and identifying numbers for the parity digits are shown in figure 2.

To summarize:

1. If you wish to disable a group so that it is no longer possible to write in it:
 - a. turn off the voltages to the drum system by pushing the drum stop button, pulling down the bar switch and then pushing the drum start button, in Bay 3.
 - b. pull out the two type O3 chassis for the group to be disabled.
 - c. pull out the two tubes for the parity digit for the group to be disabled.
 - d. turn on the voltages to the drum system by pushing the drum stop button, pushing up the bar switch and then pushing the drum start button, in Bay 3.
2. If you wish to enable a previously disabled group so that information can be recorded on it.
 - a. turn off the voltages to the drum system by pushing the drum stop button, pulling down the bar switch and then pushing the drum start button, in Bay 3.

- b. put in the two type 03 chassis for the group to be enabled.
- c. put in the two tubes for the parity digit for the group to be enabled.
- d. Turn on the voltages to the drum system by pushing the drum stop button, pushing up the bar switch and then pushing the drum start button, in Bay 3.

It is very important that the positive voltages are turned off to the drum system whenever inserting or removing tubes. Failure to turn off the control switch may result in writing between the slots which requires erasure of the drum tracks.

Attached: Figure 1.
Figure 2.

/jad

RAY I
WRITERS FOR ALL GROUPS

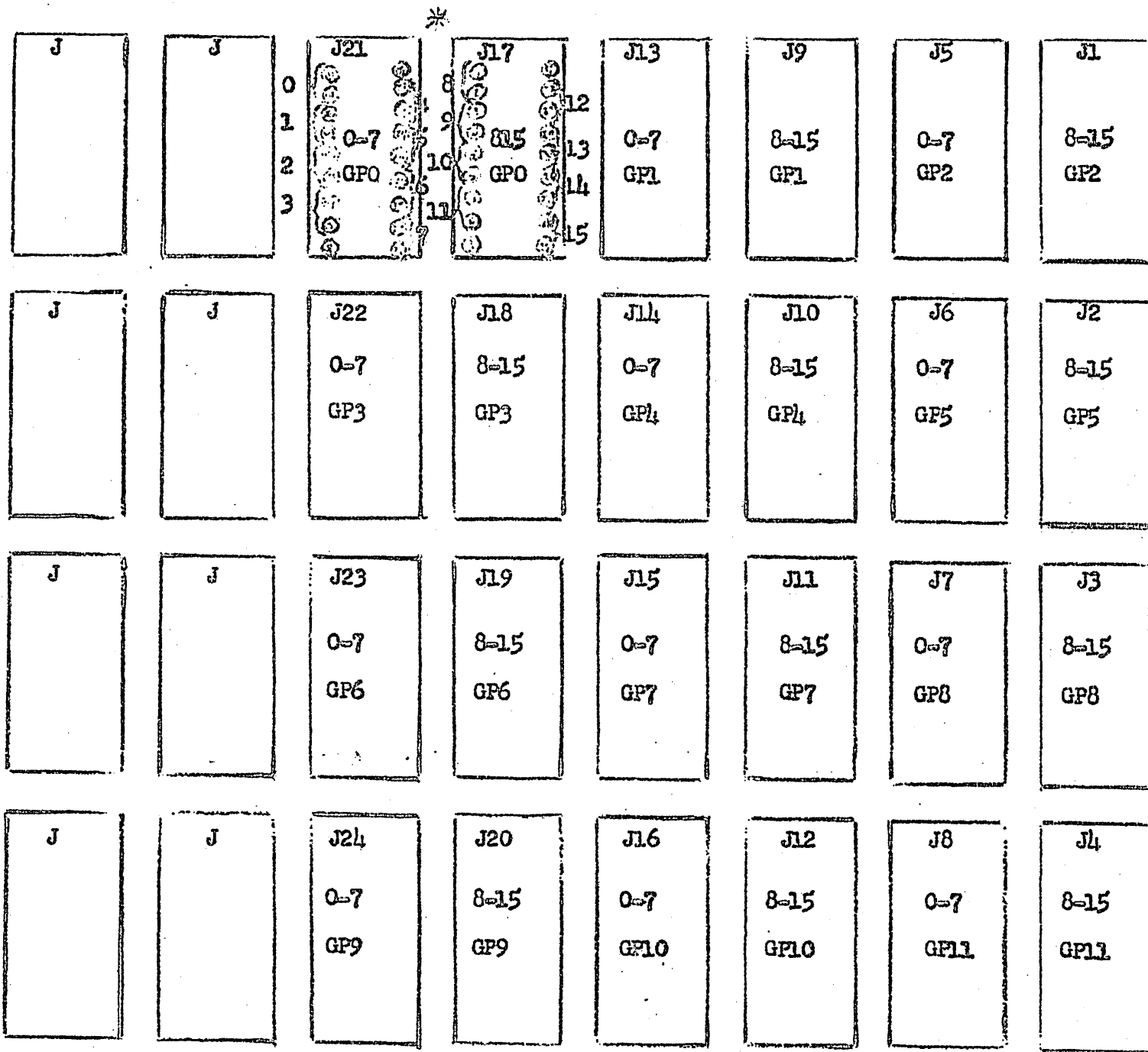


FIGURE I.

Note: All tubes 7AK7

* See Figure 1 A

TYPICAL WRITER LINE UP

GROUP ZERO

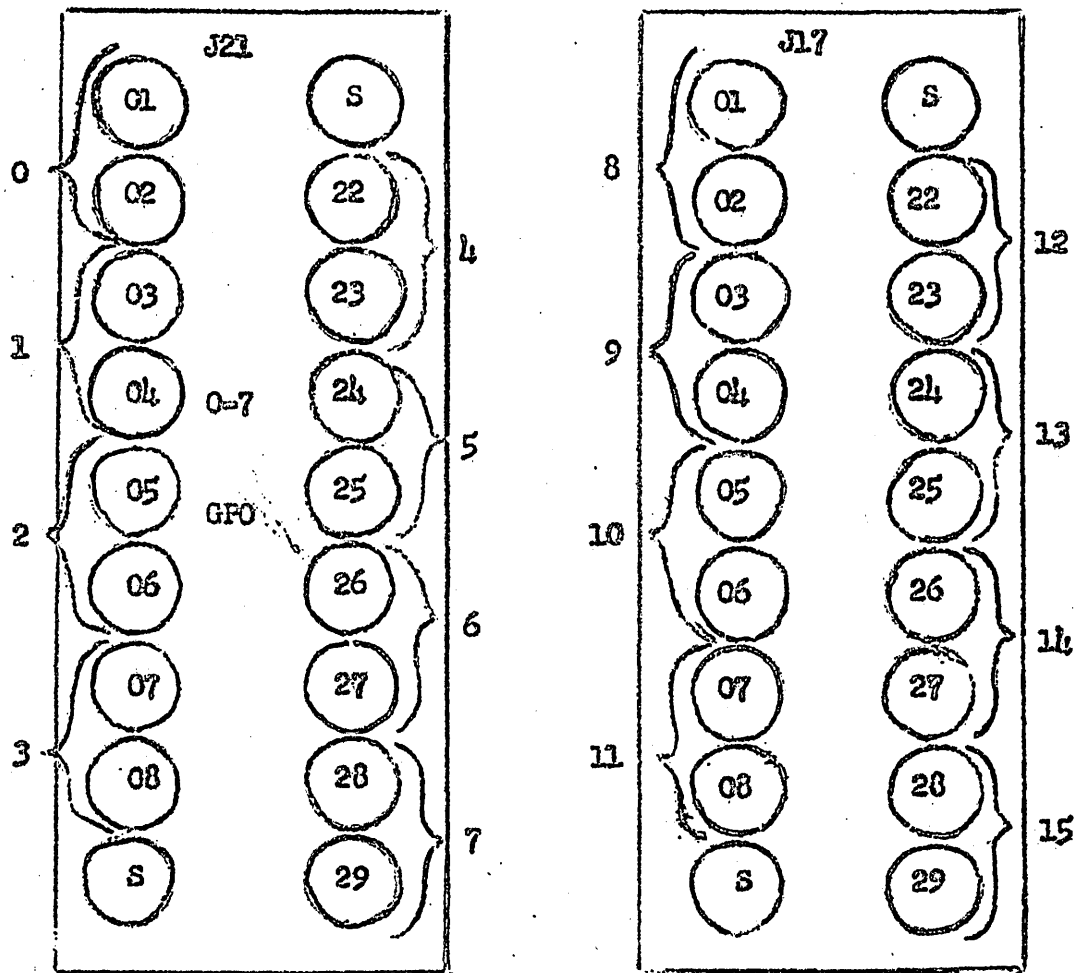
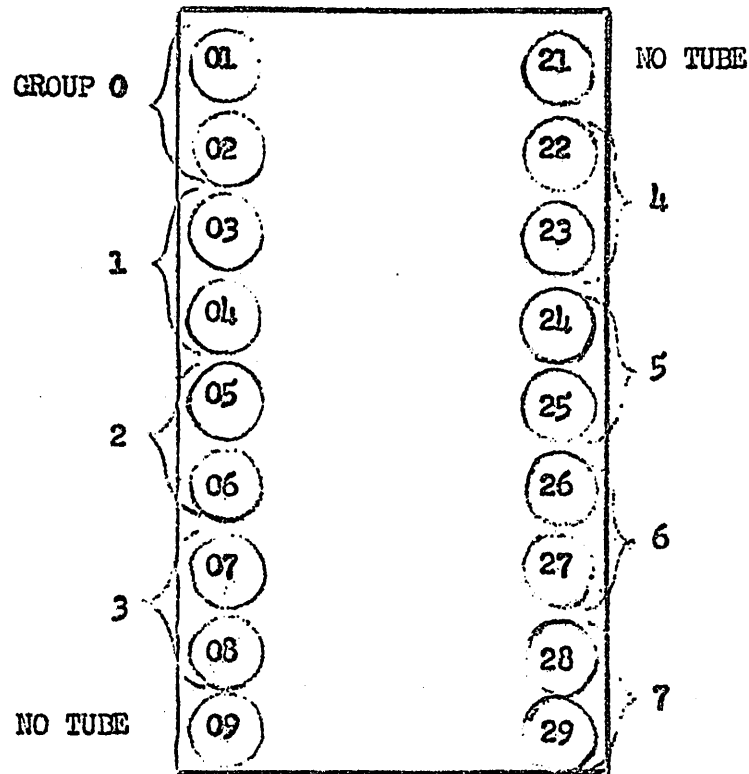


FIGURE 1. A

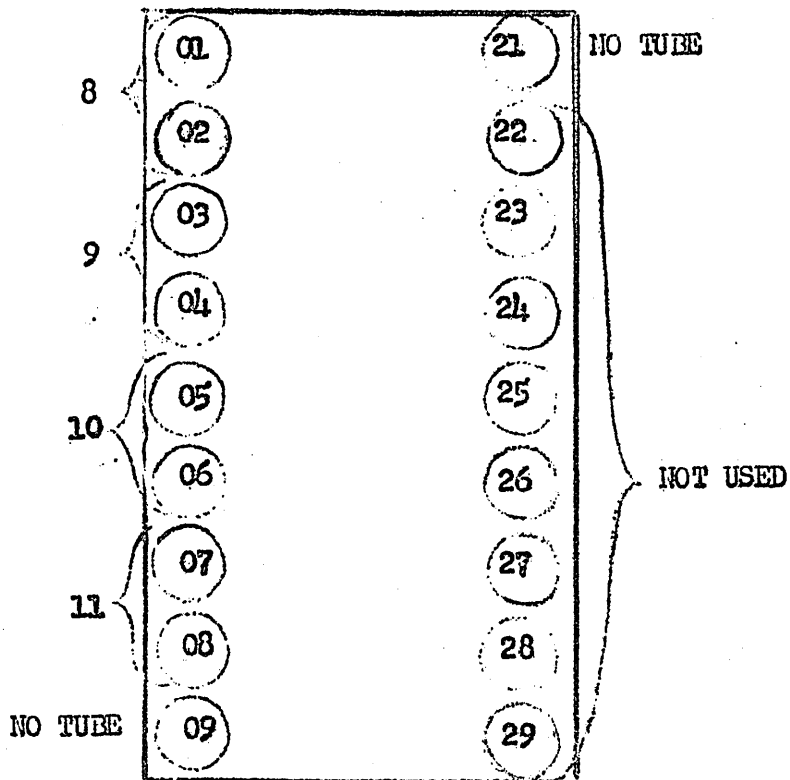
Note: All tubes 7AK7

BAY I

WRITERS FOR PARITY DIGITS



J 26



J 27

FIGURE 2.

Note: All tubes 7AK7

Division 6 - Lincoln Laboratory
Massachusetts Institute of Technology
Lexington 73, Massachusetts

INTEROFFICE MEMORANDUM

SUBJECT: MAGNETIC DRUM SYSTEM, WWI
ERASING THE DRUM TRACKS

Date: 18 June 1958 (Corrected)

1. Determining the Need for Erasure

In case of a drum parity alarm the register at fault should be examined. This is done by the use of the drum-monitor scope in TC-2. A visual check of all the tracks in a group which has been giving trouble will frequently reveal writing between the slots. If the register at fault is not known, a check should be made with the scope sweep on 17 milliseconds. This will give a picture of the complete track because 17 milliseconds is the time required for one drum revolution.

The writing between the slots may be one of two general types. Both of these defects show up as irregularities in the envelope of the readout signal which appears on the scope in TC-2. A small section of this waveform is shown in Figure 1a as it should appear when a series of ones or zeroes have been stored on the drum surface. Long time variations in amplitude are not important, but sudden changes in signal amplitude may indicate writing between the slots. If the writing is only between one or two slots, the waveform may approximate that shown in Figure 1b. Writing between many slots usually shows up as a decaying exponential as shown in Figure 1c.

If the register at fault is known, then an expanded sweep should be used. The scope should be synchronized on "sync coincidence", and intensification should also be on "sync coincidence". The push button switches at the side of the scope are used to select scope sync and intensification. The register which is at fault should be set in the toggle switches at the top of the scope in TC2. This is the register which will be intensified on the scope. Examination of the individual digits is made by selecting the proper push button directly below the register selectors. The waveform which would appear in a "one" were stored in the selected register (with

zeros on either side of it) is shown in Figure 2a. The dark spot represents the scope intensification. If there is writing between the slots, this spot will appear somewhere near the scope center line (see Figure 2b).

If writing between the slots is determined to have occurred by either of these methods, then the track at fault must be erased. If one digit of the information tracks shows a bad track waveform, check all other digits in the same group. If one digit of the parity tracks has writing between the slots, check all other parity digits for the other groups.

2. The Mechanics of Erasing

If the spurious writing is not serious, it may be possible to reduce its effect by running Tape 3614. Suppress the drum parity until the program has cycled through all groups at least twice. Then try to run the program with the drum parity check in and a -60V margin on line 299. If this runs, the drum should operate satisfactorily. Should this procedure fail, more elaborate steps must be taken.

When we erase the drum surface, we establish, as nearly as possible, a neutral surface. This is done by applying a 60 cycle voltage to the head and varying the voltage from zero up to a value which will give us about 1 ampere of current through the head, and then reducing the voltage back to zero. During the erase operation the power to the drum should be turned off to prevent the recording of a standing wave on the drum surface due to an undesirable relation between the drum speed and line frequency.

The drum erase circuit is on a chassis which is usually located on the air-conditioning ducts between the two drum bays. The steps to be followed in erasing are enumerated below:

1. Remove the head cable from the track to be erased. (See next section for method of determining location of track once digit and group are known.)
2. Connect the head cable from the drum-erase chassis.
3. Push the STOP button on the drum motor control switch.
4. Push the button on the front of the drum erase chassis and wait for a complete cycle or until the motor stops.
5. Push the START button on the drum motor control switch.
6. Disconnect the head cable from the drum-erase chassis and connect the original head cable. (Be careful to line keyway up properly.)
7. Go to the next track if there is one.

The selected tracks are now erased. Run the drum check program T-3614 through one cycle. If there are any alarms, repeat until the program will go through a complete cycle without alarm.

3. Identifying the Drum Tracks

The tracks on the drum are arranged in a spiral around the cover. THE FIRST SPIRAL CONTAINS CONTROL TRACKS AND SHOULD NEVER BE ERASED. The information heads start on the second spiral. Each turn of the spiral contains the heads for one group.

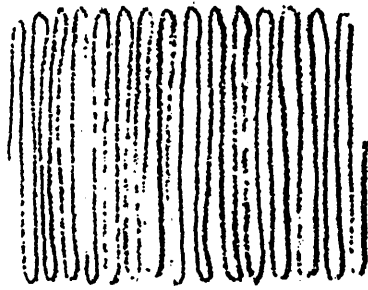
A map of the drum tracks is given in Figure 3. The digits are numbered in order around the spiral. The digit 7 of group 5 is track 90. Once the digits which have spurious writing on the track have been located by means of the monitor scope in TC-2, they can be located on the drum by use of the diagram in Figure 3.

ALL TRACKS MARKED IN RED ON FIGURE 3. SHOULD NEVER BE ERASED UNLESS PROPER

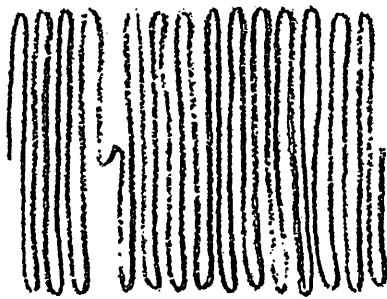
AUTHORIZATION HAS BEEN GRANTED.

Attached: Figure 1.
 Figure 2.
 Figure 3.

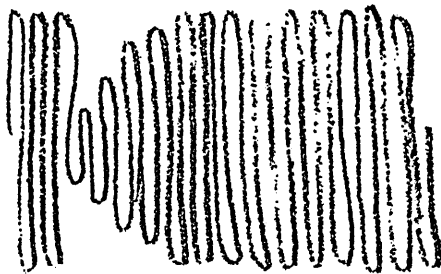
/dbh



(a.)

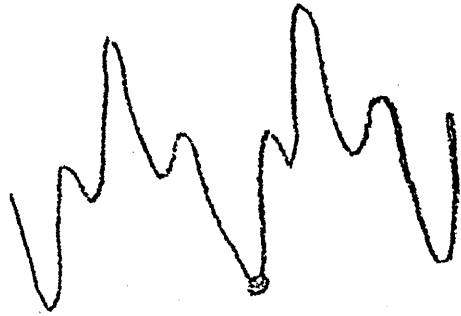


(b.)

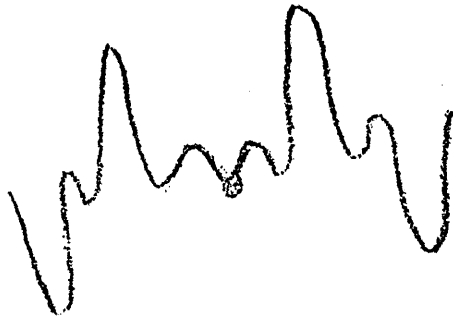


(c.)

FIGURE 1.



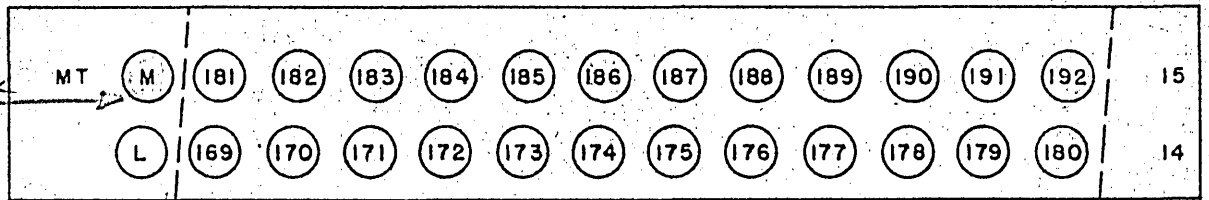
(a.)



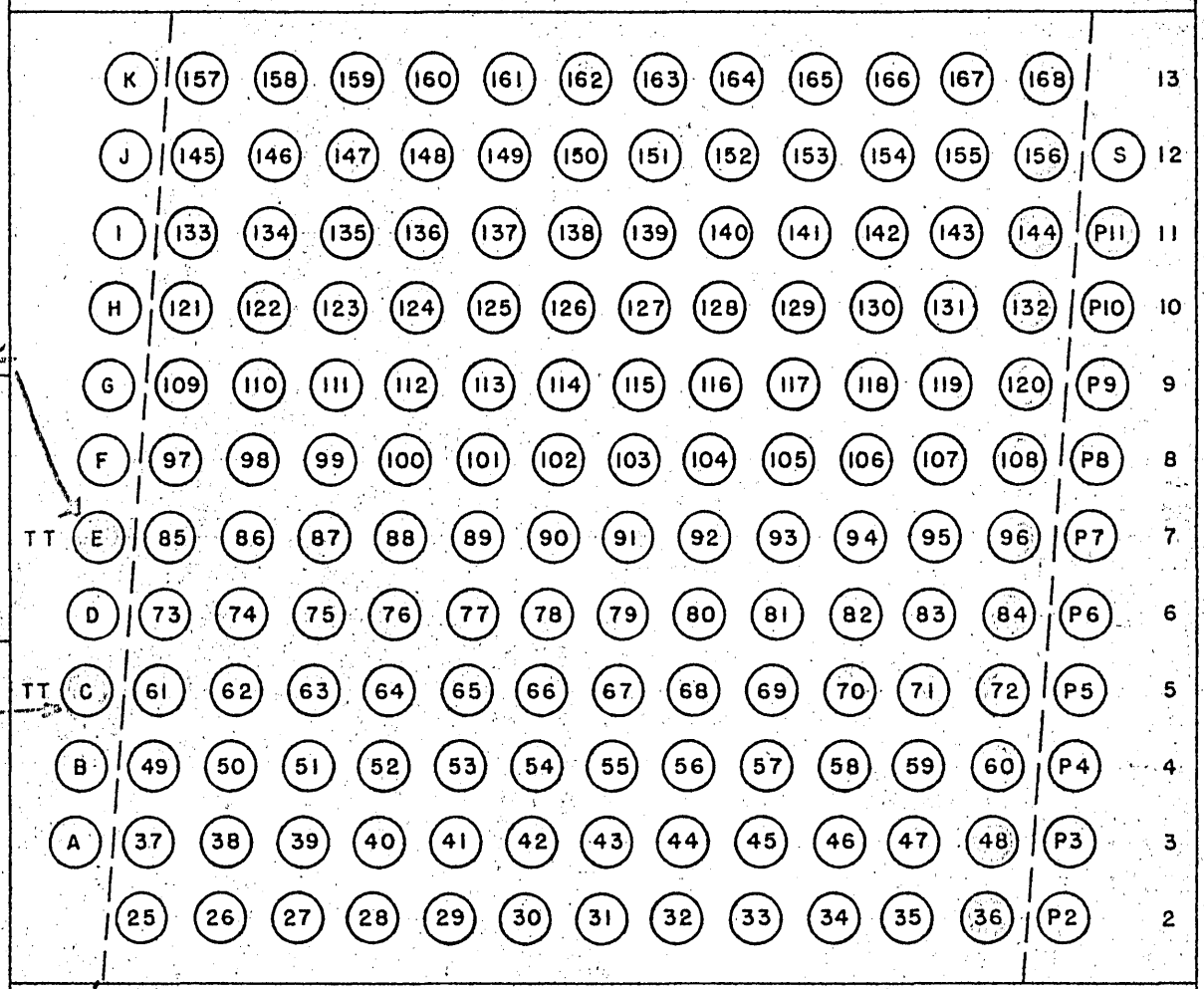
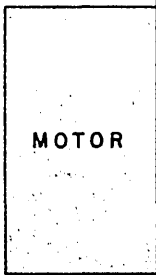
(b.)

FIGURE 2.

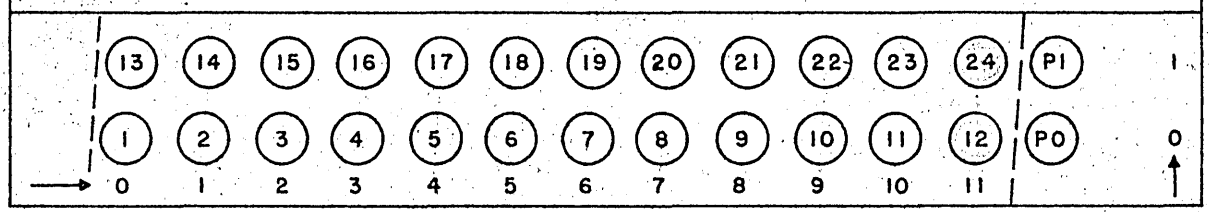
MAJOR TRACK



SPARE TIMING TRACK



TIMING TRACK



DIGIT

AUXILIARY DRUM TRACK LAYOUT

A-57708-1