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SUBJECT: PROPOSED DRUM WRITE CIRCUIT

To: N. H. Taylor

From: H. Henegar

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Abstract: This note describes a proposed high-speed magnetic drum field switch using "square-loop" metal or ferrite cores.

This scheme uses 2 saturable cores of "square loop" material for each drum write head, one for writing "ones" and one for "zeros". To write either a "zero" or "one", the proper core is switched twice, but a series diode in a secondary winding lets current flow through the drum head only during one of the switch-overs. Two primary windings are wound in opposite directions on each core and are used to switch the core. (See Figure 1.) Obviously, the head may be driven either on the first switch-over or the second.

Figure 3 shows a possible circuit for writing on the drum. Originally the cores may be considered as at point A on the hysteresis loop. If you want to write a "one" on the drum, a current pulse of sufficient amplitude to switch the core to point B is applied to the "one" winding. No current will flow in the secondary because of the diode. Then a power pulse is applied through winding #3 which switches the core back to point A on the hysteresis loop. The voltage induced in the secondary this time causes current to flow through the diode and the write winding. The procedure for writing a "zero" is similar. Again, this cycle could be reversed and the drum head driven on the first switch-over of the core.

There is rather close coupling between the 2 windings on the drum head. When a pulse is sent through one winding, the induced voltage across the other winding causes a current flow in the direction of low resistance of the series rectifier. This current will have a demagnetizing effect on the head. If a common resistance is added as shown in Figure 3, the voltage developed in the resistance due to the current pulse in one winding is opposite to the voltage induced in the other winding. Therefore, very little induced current can flow in the other winding to cause any trouble.

Figure 4 shows one scheme for using such a circuit where the writing is done on the first switch-over of the cores. Assume that the Drum Write Register and the Field Selector Register are set up. Each drum field represents one horizontal line. In order to write into a particular field, it is necessary first to supply bias current to all of the horizontal lines except the selected one. Then currents flowing in half of the

vertical lines would switch half of the cores on the selected horizontal line, writing onto the drum. These cores may then be cleared by putting bias current on the selected line.

In the above system, the contents of the flip-flop registers must be left undisturbed until the writing operation is completed. If the writing is done on the second switchover of the cores, it is possible to use the cores themselves as temporary storage, thereby freeing the flip-flop registers much sooner. This could be done by reversing the diodes (see Figure 3) and adding a fourth winding which would link all of the cores in the array. Current in this winding would switch the cores which had been previously "set up" by the vertical and horizontal currents.

SIGNED



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APPROVED


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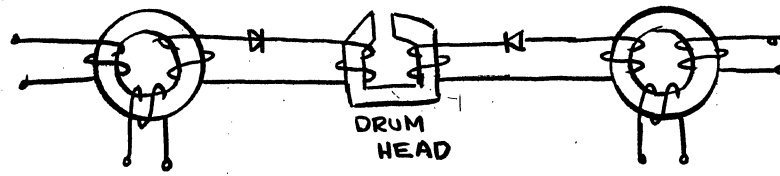
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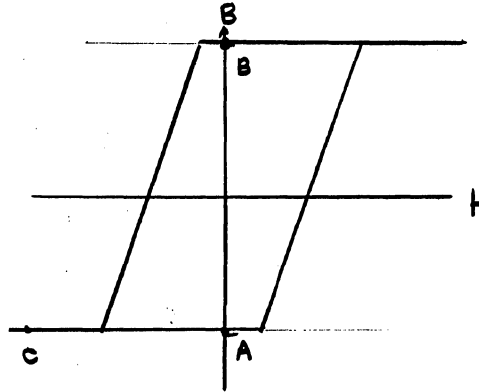
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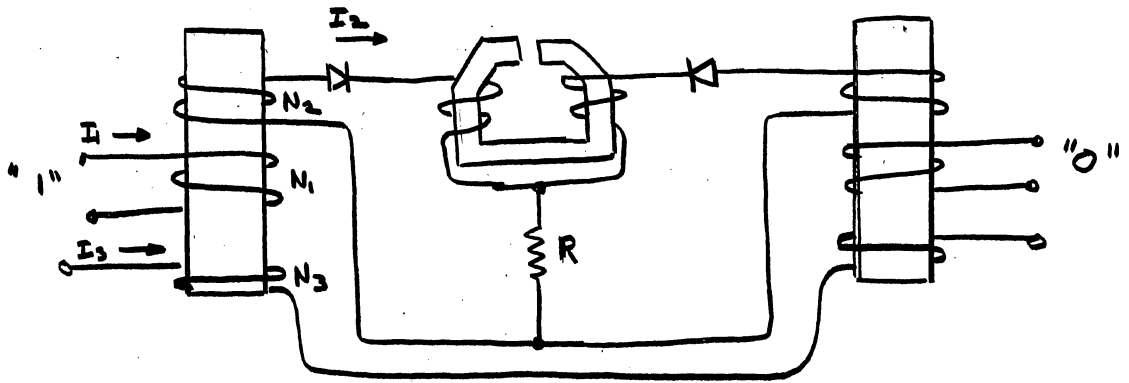
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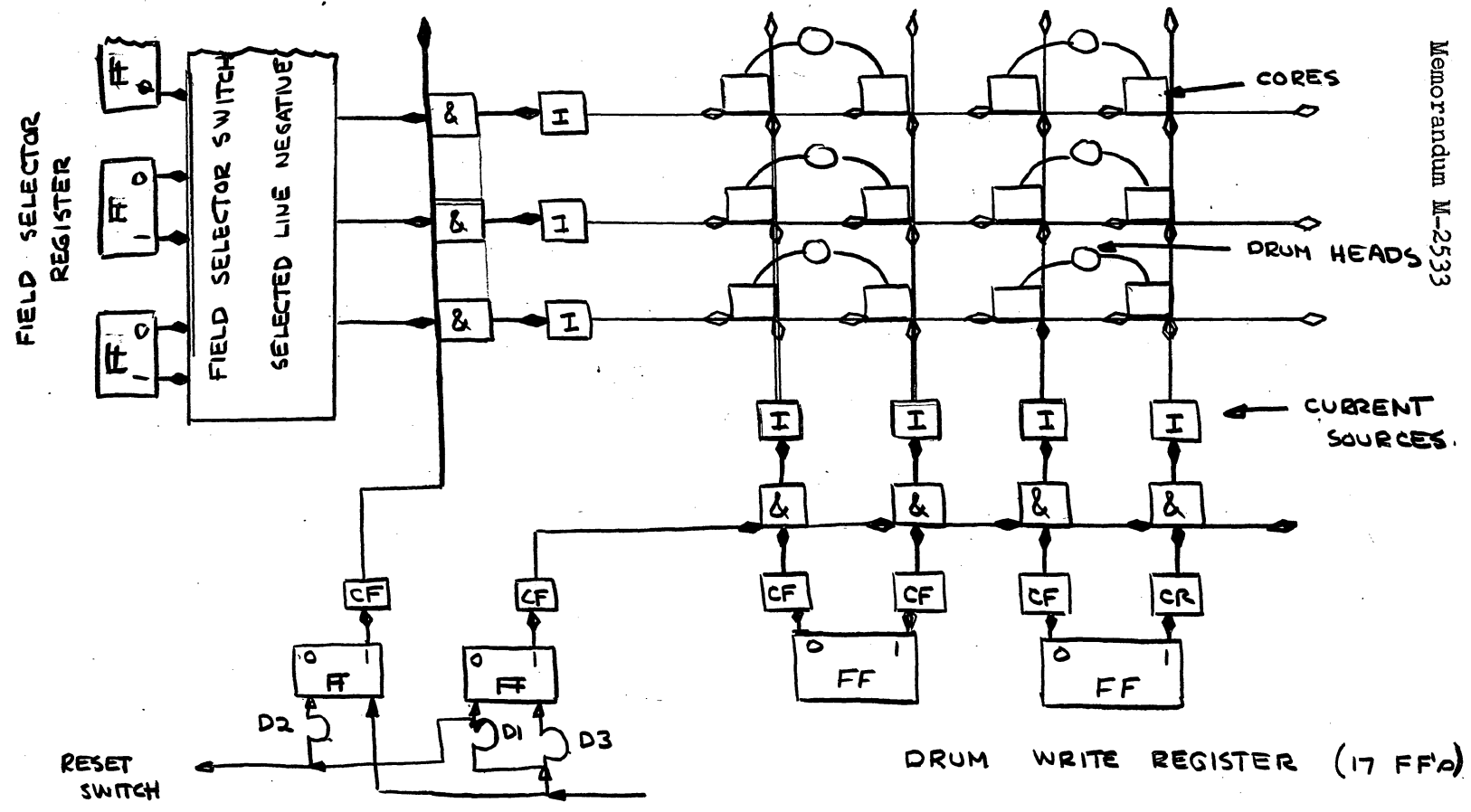
- FIGURE 1 -



- FIGURE 2 -



- FIGURE 3 -



D1 ~ 3.0 μ SEC. DURATION OF SWITCH CURRENT
 D2 ~ ALLOWS TIME FOR RESETTING SWITCH AND CLEARING CORES.
 D3 ~ .1 μ SEC. INSURES BIAS CURRENTS COMING ON FIRST.

- FIGURE 4 -