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Engineering Note E-540

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Digital Computer Laboratory  
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SUBJECT: A FAST CORE-TUBE REGISTER

To: Norman H. Taylor

From: Kenneth H. Olsen, R. Pfaff

Date: April 27, 1953

These drawings should be attached to  
your copy of Engineering Note E-540.

The circuit to be described was developed for use in MTC, but was not used for lack of time. Its purpose is to serve as temporary storage thus taking the place of a flip-flop and two gate tubes.

A circuit diagram is given in Figure 1. The core of  $T_1$  is a square-looped material.  $V_1$  is used to write information into the core when hit by a "write" pulse.  $V_2$  is used to read the information contained in the core. If a "1" is contained in the core a positive pulse appears at the output. If the core contains a zero, a small negative pulse appears at the output. Without the compensating network,  $R_1$  and  $L_1$ , a positive output pulse is obtained for a "1" and a negative output pulse for a "0". However, the compensating network is used to subtract a small pulse from both the "1" and "0" output pulses. The "1" output is slightly reduced but "0" output is completely cancelled out. In fact, the "0" output may be slightly negative.

Figure 2 gives experimental results for the circuit shown in Figure 1. The output was photographed while "1" and "0" were applied alternately. The photograph was taken on the oscilloscope. Many extensions and variations of this basic circuit are possible.

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KHO/RP:jrt

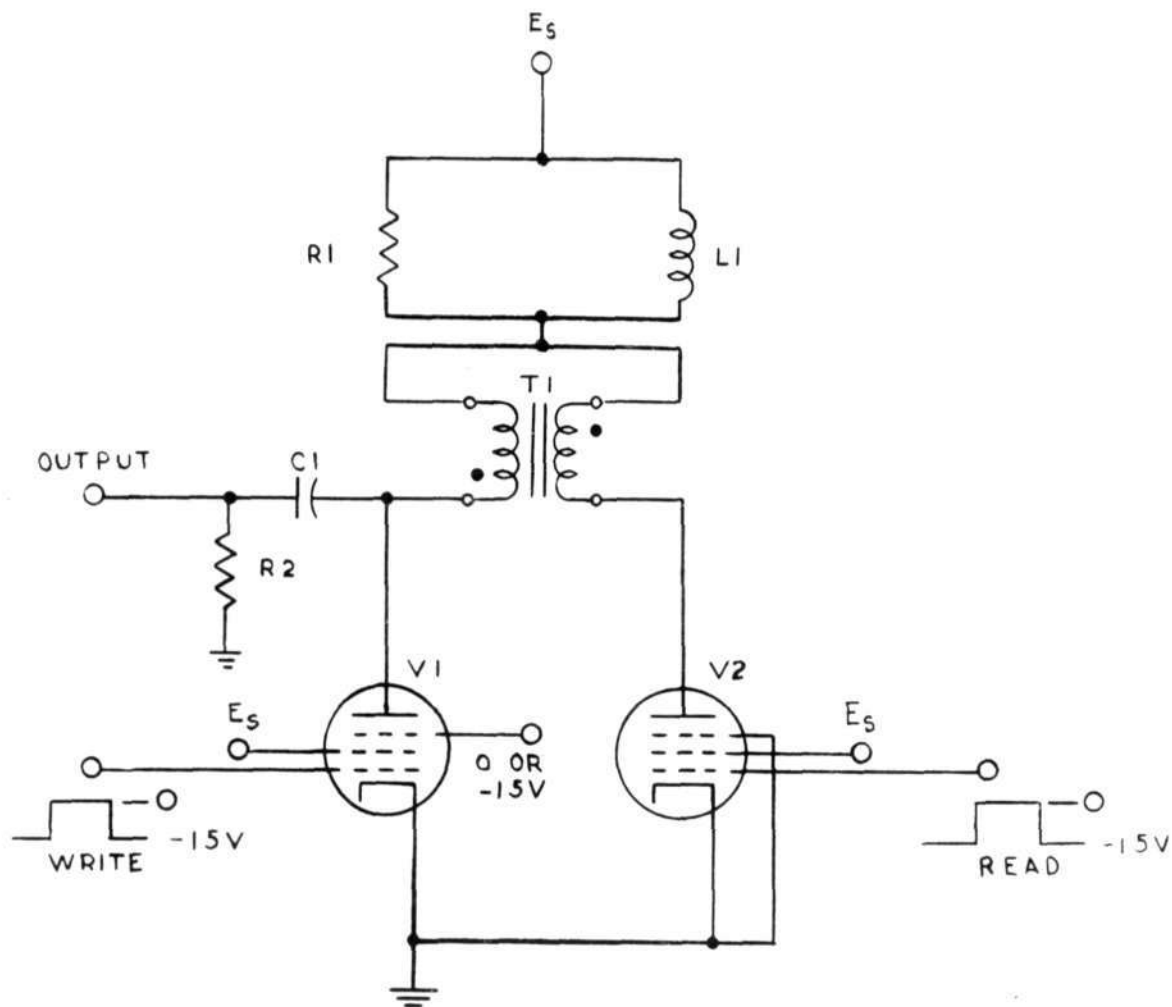
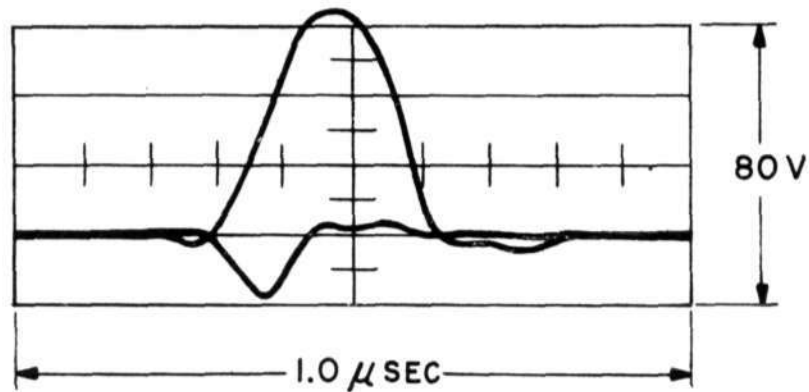


FIG. 1  
A FAST CORE-TUBE REGISTER

A-54763



$V_1, V_2 = 7AK7$

$T_1 = \frac{1}{4}$  MIL, MO-PERMALLOY, 40 WRAP TOROID;

$\frac{1}{8}$ " BOBBIN, EACH WINDING 30 TURNS.

$R_1 = 1000 \Omega$

$R_2 = 100 K$

$L_1 = 56 \mu H$

$C_1 = 56 MMFD$

$E_s = 250 V$

READ AND WRITE PULSES 15V, 0.4  $\mu$  SEC WIDE.

FIGURE 2  
EXPERIMENTAL RESULTS