

**Digital Computer Laboratory
Massachusetts Institute of Technology
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SUBJECT: AUXILIARY DRUM TESTING - SUMMARY #3

To: W. W. Butler, Engineering Research Associates Division of
Remington Rand Inc., St. Paul, Minnesota

From: K. E. McVicar

Date: April 28, 1953

Abstract: The auxiliary drum system has been operated on a 24-hour-a-day basis for over a month. Operating margins on the variable voltage lines are good, and work is in progress to include drum testing with the routine computer marginal checking. The output signal from some of the drum tracks has decreased significantly from the values set by ERA's representative two months ago. In addition we had some heads run onto the drum surface when the drum overheated. Replacement crystals for the read-gates have arrived and are being installed. Operation of the drum with the computer has been very satisfactory from the programmers' viewpoint. No complaints have been received of transient errors in drum readout.

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2.0 TEMPERATURE EFFECTS
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1.0 MARGINAL CHECKING

The variable voltage line to V01 on the #11 chassis was changed to 90d and line 90g used for the amplifier screens on the #12 chassis. This permits us to marginal check the circuits on the #12 chassis, which were formerly unchecked, with no increase in the number of marginal checking circuits.

We have now installed all marginal checking lines and have several programs for use in marginal checking procedures. Work is currently in progress on incorporating the drum checking with the regular computer marginal checking schedule.

Operating margins taken before and after the switchover to computer power indicate no significant difference between the two sources as far as these parameters are concerned. We had some question as to whether computer power would have noise or transients which would affect the drum circuits, but these fears have not crystalized.

2.0 TEMPERATURE EFFECTS

When ERA's representative was here the first of March he reset all drum heads to give uniform output. A check of all tracks on 3-9-53 revealed variation as much as 25% in signal output. This situation continued to grow worse and by the middle of April some tracks were producing signals one quarter, or less, the amplitude of others. Since the drum was being operated with the computer, and since none of the margins on the supply voltages were as yet affected, we decided to wait until a computer maintenance period to make a track check. This check was scheduled for April 23, but unfortunately could not be performed because of trouble with the computer which prevented turning on the power until after 4 P.M.

During the evening of April 23 the blower which supplies cooling air to the drum stopped because of a wiring error which caused the overload relay to trip. This resulted in overheating of the drum which was not noticed until the drum temperature reached 50°C. The overheating caused several heads to run onto the drum surface ruining two heads completely. In addition, three other heads scored the track badly enough to reduce their read-back signal to an unsatisfactory level. These heads were set into other tracks. Marginal checking revealed two other tracks with low margins and these were reset. In addition, the movement of cables involved in the aforementioned work revealed one head cable on which the shielding was shorting out the signal.

During the past month there have been extensive changes made in the power wiring for Barta Building. This has necessitated turning off building power, thus stopping the drum, on several occasions. The resultant drum temperature variations may or may not have been the cause of the signal-output variations noted above.

The majority of the heads on the drum have been relatively stable; only about two dozen of the total of 192 heads on the drum are radically different in output signal from the others.

3.0 READ-GATE CRYSTALS

Replacement crystals for the read-gates have been received from ERA and are currently being installed on the crystal board. This is proceeding rather slowly because of the desire not to interrupt operation of the drum system with the computer, and partially because of lack of manpower.

4.0 OPERATION WITH THE COMPUTER

The drum has been operating with the computer on a 24-hour-a-day basis for over a month. To date there has been no trouble with the drum except for the instance when it was allowed to overheat.

Programmers who have used the drum have been well satisfied with its accuracy.

SIGNED



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APPROVED



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