

Memorandum 6M-3742

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

SUBJECT: BIWEEKLY PROGRESS REPORT ON FSQ-7 MEMORIES

To: N. H. Taylor and those listed

From: W. J. Canty and D. Shansky

Date: 11 July 1955

Approved: *J. A. O'Brien*
 J. A. O'Brien

Abstract: Points of agreement between IBM and MIT personnel present at a meeting held at IBM for the purpose of discussing FSQ-7 core memory are enumerated. Proposed future development work is described.

A meeting was held at the IBM Research Lab in Poughkeepsie to discuss proposed modifications to the FSQ-7 memories as well as to exchange information regarding the current status of changes that had already been initiated. In attendance were Messrs. Counihan, Beesley, Applequist, Gordon, and Smith representing the IBM Basic Circuits group, Messrs. Hadley and Weber representing the IBM Memory Section, and H. Hoffman representing the FSQ-7 production memories. M.I.T. personnel included; R. L. Best, W. J. Canty, R. C. Zopatti and D. Shansky.

An agenda for the meeting was adopted which organized the discussion so that it proceeded according to the following schedule:

- A. A discussion of the present modifications to the ID-1 Memory Circuits.
- B. Advanced Development of:
 - a. Sense Amplifiers
 - b. Digit Plane Driver
 - c. M.A.R. Cathode Followers
 - d. M.B.R. Cathode Followers
 - e. Matrix Output Amplifiers
- C. Productions Memories

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The research reported in this document was supported jointly by the Department of the Army, the Department of the Navy, and the Department of the Air Force under Air Force Contract No. AF 19(122)-458.

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During the course of discussion of Item "A" on the agenda, the following was agreed upon:

- A. Changes in M.A.R. I and M.A.R. II cathode followers: In the M.A.R. I, a spare cathode was paralleled with the input cathode and the cathode resistor reduced to 10k. It was further agreed that the existing change in M.A.R. I and M.A.R. II (bridging a 2.2k resistor with a 1000 pf capacitor outrigger fashion) was not desirable from the mechanical strength point of view. F. Hadley agreed to assume the responsibility of eventually replacing the existing card with a newly designed one.
- B. Decoupling capacitors are to be installed in the C.M.D. panels as proposed by F. Hadley.
- C. The M.G.G. -300v decoupling resistor to be reduced to as small a value as possible. F. Hadley agreed to investigate the magnitude of the resulting surge current in the decoupling capacitor when power is applied.
- D. Changes to the grounding system would be carried out immediately. It is desirable to have the cage at dc ground. F. Hadley will investigate the effect of different impedances between cage and ground. It was also agreed that the decoupling circuits would be returned to frame ground via pin #27 on the CMD panel plug.
- E. It was agreed that the 6072 in the input stage of the sense amplifier would be replaced with a Z2177, provided Hofler's noisy Z2177's operate satisfactorily in ID-1. Peaking chokes to increase the band width of the fourth stage of the sense amplifier would also be included. An engineering change would be initiated at Poughkeepsie to correct a mistake on the detail assembly cards with regard to the cross-coupling capacitors. W. J. Cauty agreed to investigate the effect of increased time constants in the sense amplifier at M.I.T.
- F. F. Hadley reported the results of a test that he had run on CMD pulse transformer. It was agreed that further investigation should include the taking of data on transformer regulation and uniformity. The general feeling was that there was no guarantee of transformer interchangeability in the field. It was agreed the further investigation of the specification governing the core material was in order, in an effort to increase the uniformity of the production transformers. Agreement was also reached on the necessity of limiting the marginal checking excursion on the +250 marginal check line to the C.M.D. plates, and that W. Cauty would investigate adding a parallel R-C circuit between the M.O.A. and the C.M.D. to prevent damage to the M.O.A. when the C.M.D. margins are taken.

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The next item on the agenda was advanced development of several circuits.

- A. Some photographs depicting the response of the IBM sense amplifier were shown. The amplifier uses a transformer to couple the sense winding into the amplifier. With respect to gain and minimal delay, the amplifier seemed adequate. It was agreed that more data concerning the amplifier's response to a burst of unidirectional signal pulses and its response to noise pulses was necessary. The amplifier uses a total of 6 cathodes and full wave rectification is done at a 300 millivolt level.
- B. The new digit plane driver circuit is ready for packaging in an XD1 P.U. The new DFD does not have a post write disturb input, and IBM will seek concurrence on abandoning the post write pulse as part of the memory cycle.
- C. It was agreed that work on the new memory gate generator should be halted in as much as there would be no net gain in so far as the "6 microsecond" improvement program is concerned.
- D. MAR C.F. was discussed. A new circuit is desirable from the esthetic viewpoint. Since a new circuit would save only tubes and not affect system operation, it was agreed that the existing M.A.R. C.F. would be kept provided that no laws are violated by the proposed modification.

With regard to the production machines, H. Hoffman agreed to look after securing approved components and techniques for all of the proposed changes that have been agreed upon.

DS/er

Signed:

David Shansky
David Shansky

Distribution

<u>IBM</u>	<u>MIT</u>
R. G. Counihan	R. L. Best
J. P. Beesley	W. J. Canty
J. F. Applequist	R. C. Zopatti
C. R. Gordon	D. Shansky
W. Smith	J. A. O'Brien
F. P. Hadley	
R. E. Weber	
H. Hoffman	
H. Hemple	
R. Bottomley	
R. Butler	

Signed:

W. J. Canty
W. J. Canty