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Memorandum M-2468

Division 6 - Lincoln Laboratory
Massachusetts Institute of Technology
Cambridge 39, Massachusetts

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SUBJECT: Group 62 Section Leaders Meeting -- October 19, 1953
AN/FSQ-7 Equipment Design Program

To: Division 6 Group Leaders, Group 62 Staff Members

From: A. P. Kromer, P. J. Gray

Date: October 20, 1953

Abstract: A study of possibilities for reducing tube count has been underway during the past week. This has led to an examination of cathode followers and the drum system. Additional decisions have been reached about the maintenance console.

1. Reduction of Tube Count

During the past week considerable emphasis has been placed on the reduction of the tube count for the machine. Several possibilities have presented themselves for accomplishing this. The question of cathode followers has been reopened, and the possibility of using the 7AK7 as a cathode follower of medium current capacity is being considered. Investigation of this tube as a follower for the flip-flop will be undertaken by Best, with the objective of using fewer cathode follower tubes. Jacobs suggested also the use of the 5998 as a high-power cathode follower, and indicated that the use of this tube might save as much as 200 tubes in the control element. Another method presented for tube saving is the possibility of mounting both memories for the machine in the same frame. It is estimated that this might save 500 to 700 cathodes.

Two additional possibilities for tube reduction are the use of one large drum instead of the presently proposed six, and the possibility of increasing the information density on the drum by the use of non-return-to-zero techniques. It appears that several thousand tubes could be saved if this method proves feasible. There are problems involved, however, one of which is the fact that the non-return-to-zero technique requires the use of direct current for writing, and hence some additional equipment. For example, it would not be possible to use pulse transformers. IBM engineers have proposed to save tubes by improving read and write switching techniques rather than changing the number or size of the drums. Taylor will discuss this problem at length in Poughkeepsie later this week, as it appears that the large savings in tubes may be well worth the difficulties involved.

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2. Display

Corderman stated that this week we should receive from Convair two Charactrons with an 8 x 8 array of characters for experimental work here. Next week a circuit engineer from Convair will bring coils for use on 19" tubes. On Wednesday of this week Ralph Mork and a mechanical design engineer will be here to discuss the layout of the console with personnel from Group 38. It is planned to build up a second console which will be used for experiments conducted with MTC, and which can later be installed in the Barta Building for purposes of demonstrating the Charactron to interested parties. A study of the problems of mis-registration of characters has shown that this problem can be easily taken care of by simple adjustments, and that in general things look quite hopeful for the use of the Charactron tube.

3. Arithmetic Element and Control

It is planned to rebuild the 4-digit accumulator model at IBM to attempt to get an accurate measurement of margins. The present model has not functioned satisfactorily due to the fact that it did not contain complete up-to-date basic circuits.

Jacobs stated that he felt not enough attention was being given to the problem of addition of possible new computer instructions, and stated that he will take this up with IBM engineers at Poughkeepsie this week.

4. Maintenance Console

At a meeting last Wednesday, several additional decisions were made concerning the maintenance console. It was decided that only one light per flip-flop would be included on the console, and that there will be no display scope included on the console proper. It is expected that some audible signal will be provided to aid in testing and maintenance. Larry Walters of IBM is writing a memorandum covering these decisions in detail. It was also suggested that the second light for each digit be placed in a box for ease in photographing the lights, inasmuch as no one felt that lights would be of any value on the back of each flip-flop pluggable unit.

5. Memory and Memory Cores

At a discussion last Tuesday on the memory cycle, IBM engineers proposed the addition of a .7 μ second safety factor to the memory cycle to allow for possible changes in the characteristic of delay lines. There is considerable doubt as to whether this is necessary, and it will be discussed further in Poughkeepsie this week.

Papian stated that the work on the MTC II memory is progressing satisfactorily, and the probable completion date still appears to be December 1. He stated that cores and planes are keeping pace nicely, and that excellent cooperation from the laboratory shops was aiding the program considerably.

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Memory and Memory Cores (Continued)

Dave Brown stated that at Poughkeepsie last Tuesday the core testing program was studied, and plans made to allow for the completion of testing of cores for XD-1 by January 1 as called for on the time schedule. Due to the limited testing facilities at IBM, MIT will perform the testing of two-thirds of the cores for the first 4096 register memory for XD-1 and IBM will test one-third. The performance of this service by MIT will require the use of our core testing facilities at current load for three additional months, and will allow for no extra cores for WWI or MTC. Since this program still provides for only one-quarter of the ultimate core requirements for XD-1 and XD-2, it is felt that an early expansion of IBM facilities for core testing is quite important. Taylor will discuss this problem with IBM later this week.

6. Shifting Registers

Some time this week or next Papien and Brown will visit Raytheon to discuss with them their capabilities for producing wound ribbon cores for use in the shifting registers which Raytheon will probably construct under subcontract from IBM.

7. Outputs


On Tuesday of next week the output study group will meet at MIT for a first general discussion of the results of the output study to date.

8. Basic Circuits

Taylor stressed the necessity of anticipating now as many of the changes that will be required in basic circuits due to the fact that production pressures will make changes extremely difficult at a later date.

Signed: 

M. P. Kromer

Signed: 

P. W. Gray

APK/PJG:nmt

CC: J. W. Forrester
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