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Memorandum M-2538

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SUBJECT: BIWEEKLY PROGRESS REPORT FOR AN/FSC-7 November 20, 1953  
To: J. W. Forrester, R. R. Everett, Division 6 Group Leaders  
From: A. P. Kromer, P. J. Gray

Arithmetic Element and Control

Work is progressing toward the completion of the arithmetic element pilot model. Wiring layouts for 12 pluggable units have been completed, and layouts for the module power panel have been started. Construction and wiring of pluggable units are underway.

Six layouts for pluggable units for the program element have been completed, and are now being checked. Block schematics of individual pluggable units were revised to show marginal checking lines and ground lines for the pulse circuits. These drawings will be used to aid in the layout of the remaining pluggable unit types.

Redesign of the diode circuits in the instruction control element associated with the class-cycle matrix, variation matrix and instruction matrix using the 5998 power cathode follower is underway. It is estimated that a saving of 300 cathodes will result from the use of this circuit.

Magnetic Cores

The core testing program has been speeded up at IBM. The testing work is now being conducted on a two-shift basis. An additional 140,000 cores have been received by IBM from General Ceramics.

Drums

The drum group is continuing to assume an 8  $\mu$ sec maximum memory cycle in its design work. If the memory cycle should turn out to be longer, it will be possible to add equipment in the spare space provided for routine emergencies to take care of the situation.

It has been definitely decided that read and write switching of drum heads will be used. This, plus a new organization of the display system described in IBM Report H-70, plus the combination of all drums with the possible exception of the input buffer into one frame appears to offer savings of about 8000 cathodes. The use of large-diameter drums offers only about 500 to 700 additional tubes saved. It has therefore been decided that XD-1 and XD-2 will continue to be designed around the use of the presently available drum.

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Drums (Continued)

The feasibility of the use of larger drums will undergo further investigation, and if such drums become available, a new drum system to be incorporated in production machines will be designed. This eliminates the necessity of designing the drum system of XD-1 and XD-2 to provide for both drum sizes.

Input Equipment

The video mapping program is rapidly approaching the end of the first phase of the subcontract with Bendix. Most of the circuitry is essentially complete, and transfer of responsibility to Bendix is expected to go smoothly. A model of the mapper is nearly complete at High Street, and will be turned over to Bendix to serve as a guide in their design work. The contract for the magnetic core part of the input counters has gone out to Raytheon. IBM engineers are planning a trip to discuss diode specifications and core testing specifications with Raytheon engineers.

Consideration is being given to the use of the two dimensional magnetic core array as temporary storage for the signals from light guns until they can be accepted by the input buffer drum. A study of the input system will be undertaken to see if this device can be used in other places where a matching of high speed inputs to the slower speed of the drum is needed.

Display

As mentioned in the last biweekly, a decision was made that Charactron tubes would be used in the FSQ-7 display system. This decision was based upon the superior character quality obtained and the fact that distribution system requirements are less stringent than a dual deflection system in which characters are formed by a serial display of dots. The present disadvantages of the Charactron are the longer display time required, a slight mis-registration between characters as they move over the tube face, and the requirement of post-matrix acceleration.

The display time is longer for Charactron tubes because for each character selected a correction signal must be applied through the magnetic yoke. It is felt that a small angle electrostatic deflection system might be installed in the yoke region. This system would be for character compensation, character position, and for making the vector. The time required per character would be halved by using this arrangement.

After some minor equipment changes, a Charactron console will be left connected to MTC pending additional display tests with the high speed memory and magnetic drum. A second Charactron setup is being assembled in the Barta Building for demonstration and further tests.

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Output Equipment

A first review of the output system was presented to a combined Division 6, Division 2--IBM Group. A schedule of output plans has been issued by R. C. Hopkins in MIT Report M-2491.

A proposal for the specifications (M-2525) for the output buffer drum has been presented, and a two week period will be allowed for any revisions prior to freezing the specifications on December 1.

Power Equipment

The Group 62 Sections Leaders' Meeting of November 9 recommended that the proposal to use 120-208 volts on both sides of the M-G sets be revised. It was felt that the use of 277-480 volts on the motor side would permit savings of \$15,000 to \$20,000 or more. On the generator side, however, the savings would be smaller and the safety hazard in distributing high voltages through relays, etc. was undesirable. Therefore, it was the opinion of the group that the higher voltage should be used only on the input side of the M-G sets.

To provide for possible bypass of the M-G sets, the transformers which reduce the incoming 4160 volts should be tapped for both 120-208 and 277-480. Then in the event of failure of two M-G sets, the transformers could be rewired to provide 120-208 directly for the power supplies.

The current delivery schedule for the power equipment for XD-1 and XD-2 is as follows:

<u>Item</u>	<u>Vendor</u>	<u>Delivery</u>
Transformers (500 KVA)	Westinghouse	May
M-G Sets (200 KW)	General Electric	January (XD-2) April (XD-1)
Power Switchgear	Westinghouse	Feb. 15 (XD-2) April (XD-1)
D-C Supplies	General Electric	Feb-Mar. (XD-2) July 1 (XD-1)

Marginal Checking

The marginal checking control system was revised to reduce the amount of control equipment required and to emphasize program control of this type of machine checking. This revision requires changes in the control consoles and in the various control circuits. The control panel for marginal checking is being integrated with the other controls on the maintenance console.

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