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Memorandum M-2583

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Date: 2/1/55

Division 6 - Lincoln Laboratory
Massachusetts Institute of Technology
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SUBJECT: BIWEEKLY PROGRESS REPORT FOR JAN/FEB 7, December 12, 1955
To: J. W. Forrester, R. R. Everett, Division 6 Group Leaders
From: A. P. Kromer, P. J. Gray

General

In an effort to formalize further the release for design and construction of XD-1, the MIT Systems Office is cooperating with the Project High Engineering Design Office to prepare a procedure to cover the steps to be undertaken in connection with concurrence between these two offices for completion of engineering work. The procedure for MIT sign-off on the release for completion of design, and an additional release for actual construction for the prototypes will also be covered. Specific release by MIT for major procurement actions by IBM will also be provided. These procedures will be issued in an MIT memorandum in the near future.

Agreement has been reached with IBM on certain portions of the program which should receive top priority in the next few weeks. These are, in order of priority:

1. Formal release letter on the order code.
2. Concurrence and release of instruction frame.
3. Specifications on inputs, particularly manual inputs and inputs from display consoles.
4. Review of mapper and radar data inputs.
5. Release on input logic.
6. Formal specifications for display.
7. Release for display.
8. Logical release of output system and SDV output drivers.

Arithmetic Element and Control

IBM has forwarded a large number of drawings concerning the instruction frame to MIT for review and concurrence. This review is currently being undertaken.

Work is proceeding toward the start of construction of the instruction control frame. Orders have been placed for construction of nine modules with an outside vendor. All electrical components for two hundred 6 and 9 tube pluggable units to be used in this frame have been ordered.

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Internal Memory

Ordering and planning for the construction of the high-speed memory is getting underway at IBM. An order for 240,000 cores has been placed with General Ceramics. A large quantity of these cores has already been received. A requisition for 400,000 additional cores is now in the hands of the IBM purchasing department. Tooling for the fabrication of the memory frame assembly is nearing completion. An area for the core testing room has been assigned, and is in the process of being set up at IBM Plant 2.

Inputs

At a joint meeting between IBM and MIT last week the change in philosophy with regard to the input system was evolved. In order to reduce the number of vacuum tubes, consideration is being given to having some of the input material coming in at a slow rate handled on 128 toggle-switch registers instead of having this data placed on the input buffer drum. Significant equipment savings seem possible at the expense of a very small amount of program time. This question is being considered for decision at present.

MIT has been advised by the Bell Telephone Laboratories that they would furnish a report covering the characteristics of transmission circuits for use in connection with SDV data transmission. This report should be available about January 1. The study made by Bell Laboratories indicated, however, that very little, if any, data exists in their organization regarding delay characteristics of various lines and transmission systems, and that it would be necessary for them to make some field measurements to obtain this type of information. Although the Bell Labs plan to take these measurements as early as possible, it was felt that some decisions regarding development of SDV must be made prior to the time that these measurements can be completed. Therefore, MIT requested the Bell Labs to consider assigning a resident representative at MIT to be available for consultation by various people involved. Bell Labs indicated that this probably could be arranged.

Display

Considerations arising from the display system development have led to a new arrangement of overlap format for expansion of the tactical display picture. Display selection switching at a main frame rather than in each console is currently being considered, since it is felt that some saving in equipment and use of more reliable types of switching apparatus may thus become possible.

A Charactron tube has been modified to incorporate a second pair of electrostatic plates to provide compensation for deflection. The preliminary operations indicate this has considerable promise, and may offer a saving in the time required for deflection and display of the various characters desired. It may also permit the same matrix to be used in both the DID and the tactical display tube. The saving in

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Display (Continued)

time may permit a reduction in the 2.9 second display cycle presently required for display of 17 characters, a point and a vector.

Preliminary operation of the Typotron tube, which is a combination of the Hughes direct view storage surface and the Charactron matrix, looks very promising for DID application. Circuitry to enable use of this tube with the MTC computer is currently being developed, and it is expected that operation of this tube with MTC will be possible in approximately one month. An additional quantity of these tubes are to be ordered and placed on life test by Group 65.

A summary report covering the display system design specifications will be prepared at MIT in order that this report may be circulated for comments and approval and thus to provide a firm basis for the design of this portion of the system.

Outputs

It is planned to have Division 2 and IBM set up a program to cover the development of equipment for transmitting output data from the Combat Information Central. In order to coordinate and direct this activity during the next six months, it is planned to establish a working group with representatives of IBM Project High, Division 6 and Division 2.

A proposal has been presented and is currently being circulated for comments covering the output capacity to be provided for the various weapons which will be under guidance by the FSQ-7.

Power Equipment

As previously indicated, action is being taken to simplify the power system and to have the power transformers and the motor generator sets operate independently with manual switching. Further study has indicated that this will reduce the physical size of the control equipment by about one-half, with a corresponding reduction in the cost of the equipment. IBM now plans to design and build the control and sequencing equipment for the various D.C. voltages. They will purchase the D.C. supplies which will have magnetic amplifiers from the General Electric Company.

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Pluggable Units Construction

Orders for mechanical parts for 8,000 - 6 and 9 tube pluggable units for use in XD-1 and XD-2 have been placed. Parts for the 5 and 7 tube pluggable units are in the process of release. Tooling for the fabrication of the pluggable units is approximately 80% complete.

Signed: *A. P. Kromer*
A. P. Kromer

Signed: *F. J. Gray*
F. J. Gray

Approved: *N. H. Taylor*
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