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

SUBJECT: Group 62 Section Leaders Meeting, October 25, 1954

To: Group 62 and 64 Staff Members, Division 6 Group Leaders

From: A. P. Kromer

Date: October 27, 1954

Approved: N H Taylor
N. H. Taylor

Abstract: Reorganization is placing magnetic memory work in Group 63. Questions regarding XD-1 operation are leading to consideration of change of delivery date. MRI specifications to be completed in approximately 2 weeks. Procedure for coordinating engineering design changes between XD-1 and production systems has become an urgent matter. Detailed planning for operation of XD-1 and production systems after installation has been started. Engineering for the central display system production equipment by IBM, Vestal is being reconsidered.

1. Reorganization Group 62

Bill Papian and the people working in his section are to be transferred to Group 63 to work on advanced development activities in this organization under Dave Brown. On return from Poughkeepsie, Ken Olsen will also work in this area.

2. Digital Data Transmission (DDR-DDT)

At a recent conference between MIT and BTL the various technical problems associated with standardizing a system for data transmission over the telephone plant equipment were discussed. General agreement of long range objectives regarding the method for data transmission was reached. Representatives from various organizations present were to consider several specific questions and plan to attend another meeting on Friday, October 30, 1954, at which time these questions would be discussed in more detail and a method of implementing the agreed upon plan would be discussed. At this time also, the matter of whether or not an interim plan will be necessaey in order to permit IBM schedules' to be met, will be resolved.

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.

3. Systems

Activity in testing the system at Poughkeepsie make it appear that it would be desirable to consider the possibility of delaying delivery of XD-1 from Poughkeepsie to Lexington by about four to six weeks. Technical problems have arisen in connection with the drum system and other portions of the electronic equipment which might be resolved more rapidly if the operating portions of the equipment were left installed at the Poughkeepsie plant for this additional period of time. No decision has been reached on this matter to date, however.

4. Memory

The XD-1 memory at Poughkeepsie is now running at a 6 micro-second cycle time. Continued operation at this rate or better is regarded as a requirement for the system.

5. Miscellaneous Radar Inputs

The planning group working on this equipment expect to finish the specifications in about two weeks. Study of the masking problem has led to the conclusion that the use of cathode ray tube type units which require accuracy in the order of 1% are not practical because of maintenance difficulties. The study of this matter is to consider, among other things, the use of relatively crude (5%) tubes plus some programmed computer time for handling accurate data.

Assignment of a time tag for radar input information is also being studied. This is required because of the indeterminate lag before the data is fed on to a telephone line.

6. Design Changes

In view of the high level of activity in planning and construction of XD-1 now paralleled by planning for production systems, it appears desirable to arrange a system which will provide a sign-off from both of these programs for design changes. For example, a sign-off for engineering requirements might include Jacobs and/or O'Brien along with Hal Ross for the XD-1 system and Dodd or Morriss along with Astrahan for the production system. Following this, it will be necessary to bring in the IBM production engineering and manufacturing departments.

It is felt highly desirable to have both the above organizations sign-off on design changes so that XD-1 will remain similar to the duplex in order to allow it to be used to test circuits and other techniques to be used in the duplex and to study operational and other problems in the duplex equipment. If the design of XD-1 drifts apart from the duplex central many of the advantages of the prototype installation will be lost.

7. Outputs

The previous decision to use interleaved words for output messages has been restudied to determine if there would be any advantages to a non-interleaved system. It appears, however, that there is need for storage at the far end of the lines in order to perform parity checks and to accommodate data rate changes. Therefore, there is very little if any advantage, to the use of non-interleaved system. Further, the non-interleaved system might result in an increase in the amount of electronics at the Direction Center.

For test purposes, an output loop consisting of a ground-to-ground phone line to a GE data link transmitter at Prospect Hill and a ground-to-air link to a receiver situated at the laboratory in Lexington has been established and is now operating from the MTC computer.

8. Block Schematics

The logical planning group are continuing their study of the combination of schematics for various portions of the system. They are presently studying the mapper and input frame schematics, the drum system schematics and the instruction frame. Daily meetings are continuing for the study of the logic of the central machine. These meetings are attended by the Systems Evaluation Committee and certain of the Group 64 personnel.

9. Systems Test Planning

A study is now being made to plan the operation, the installation of data lines for input and output, the de-bugging and operation of programs, etc., on the XD-1 system. This will cover about 1 years time following the installation of the equipment in Lexington, Building F. The Systems Office is coordinating this activity. John Newitt, formally in Group 61, will be working with the Systems Office in connection with the preparation and follow-up of the schedules arrived at for this work.

Similar planning for the installation and test period (presently considered to be 8 months) for the initial duplex units will be started by a conference to be held in Poughkeepsie on Wednesday, October 27, 1954. Present at this meeting will be IBM, WE and MIT.

10. Switching of Phone Lines

It appears that further study will be required to determine the extent to which rapid automatic detection and switching must be built into the FSQ-7 equipment to have it compatible with the restoration time to be built into the telephone line network in accord with the requested specifications received from ADC. Included is the matter of detection of error rates and determination of the adequatacy of transmission over any specific phone circuits.

11. Basic Circuits

The following circuits have been released for the XD-1 prototype system:

A. Output Storage Element Thyratron Core Driver
B. Manual Input Shift Register, Thyratron Driver
C. Teletype Relay Driver

The following circuits have been concurred on for the production systems:

A. Thyratron Relay Driver
B. Model B, Level Setter
C. Level Originator, Model A and Model B

During recent work in connection with the central display system, difficulty was encountered in the Model C, Flip Flop circuit. This has been traced to poor recovery time of the Type Y diode used in this circuit. This matter is being investigated further by the circuit and components groups.

12. Central Display System

The logical drawings are about completed and pluggable units are now in drafting and layout. Signal wiring layout for one of these frames is also being laid out at present. Back panel wiring work will start very shortly.

IBM have reconsidered the matter of having the Vestal Laboratories group handle the engineering for the production systems Central Display Frames and may decide that this work should not be placed in the Vestal Laboratories. Further, the production engineering for consoles may also be removed from this organization (Ralph Mork's group) and instead Mork's activities will continue in the new development field for such items as projection type displays.

Photographic recording from data displayed on a charactron tube is practical, using a P-11 screen and high speed film. This study also reveals that the projection of slides having white characters on a black background offers better legibility than black characters on a light background in rooms having a reduced light level intensity. The question of rapid photography from a charactron for situation display projection purposes is not yet resolved.

SIGNED A. P. Kromer

A. P. Kromer

APK:ero
cc: R. P. Crago - IBM
C. Lynch - IBM
B. Houseman -