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PROJECT 105

MONTHLY PROGRESS REPORT

1 May 1967

Report No. 13

Declass Review by NIMA/DOD

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Prepared by:

Approved by:

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[redacted]

Monthly Progress Report
1 May 1967
Report No. 13

INTRODUCTION

This report covers the work accomplished on the Chip Format Printer for April.

GENERAL

Testing and debugging of the digital area is continuing. The interface between the magazine and main console has begun.

A cost estimate of customer requested changes in the chip holder, holder magazine and insert mechanism is presently in progress.

WORK ACCOMPLISHED

Phase 620 - Print Handling and Storage

Interface of the Print Magazine with the Print Console electronics and plumbing has begun. Some difficulty is still being experienced with the raw chip drop mechanism.

Phase 630 - Character Generator

This area is complete and awaiting completion of debugging of the digital circuits of the character generator.

Phase 640 - Print Console and Positioning

Trimming of the Y, θ and upper X drives has been completed. The two masks, drain tray, drain plumbing and auxiliary lighting have been installed.

Phase 650 - Electronics Console

The digital servo comparator has been debugged and has been operated closed loop with all three positioning axes. Information has been read in from the

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Phase 650 - continued

teletype to the memory and has been returned, however, considerable difficulty has been experienced during debugging because of repeated teletype malfunctions.

PLANS FOR NEXT PERIOD

Program effort for the next reporting period will be directed toward completing system debugging and beginning complete system test and calibration.

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PROJECT 105

MONTHLY PROGRESS REPORT

1 March 1967

Report No. 12

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Prepared and
Approved by:

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[redacted]

Monthly Progress Report
1 March 1967
Report No. 12

INTRODUCTION

This report covers the work accomplished on the Chip Format Printer for March.

GENERAL

All individual subassembly debugging has been completed. Systems debugging is well underway. The Teletype, Electronics Console and the main console have been mated.

Testing and evaluation of the digital logic in this group is nearing completion. The servos are being set for stability.

WORK ACCOMPLISHED

Phase 620 - Print Handling and Storage

Final dynamic testing on all magazine functions is nearing completion. The magazine is being made ready to interface with the remainder of the system.

Phase 630 - Character Generator

This area is complete and awaiting interface with the control logic when the magazine is interfaced with the remainder of the system.

Phase 640 - Print Console and Positioning

This unit has been mated with the electronics console and the teletype. Trimming of various components to produce servo stability in the X, Y and Ø axis is underway.

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Phase 650 - Electronics Console

The control logic is now being set and checked for correct operation with the Print Console and Teletype. All controls have been buzzed and are in operation with the Main Console. Some delays have been experienced with the teletype due to faulty operation.

PLANS FOR NEXT PERIOD

To complete the basic system debugging less magazine. To interface the magazine with the remainder of the system and to apply digital logic inputs to those functions within the magazine.

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PROJECT 105

MONTHLY PROGRESS REPORT

1 February 1967

Report No. 11

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Prepared by:

Approved by:

STATOTHR

Monthly Progress Report
1 February 1967
Report No. 11

INTRODUCTION

This report covers the work accomplished on the Chip Format Printer for February.

GENERAL

During this period major debugging was underway on all areas of the Chip Format Printer. All wiring in the electronic console is completed and functionally checked with the exception of the last digital drawer. Wiring on the major console is now completed. Debugging in the magazine is progressing and is better than 70% complete at this moment. All covers and panels have been fitted, painted and are ready for final assembly.

WORK ACCOMPLISHED

Phase 620 - Print Handling and Storage

Final wiring of the magazines subassemblies, turret housing, chip insert mechanisms and character generator is now complete. Debugging has been completed on all turret functioning, chip eject mechanism and the dark slide doors. Debugging is now underway on the chip drop mechanism, and process insertion mechanism.

Phase 630 - Character Generator

Final wiring of the control circuitry for the character generator is now completed. All static debugging has been completed.

Phase 640 - Print Console and Positioning

Final wiring in this unit is now complete. Liquid, air tubing and connections have been assembled and are completed. The format mask assembly is now out for final engraving and debugging is now underway on the entire package.

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Monthly Progress Report
1 February 1967
Report No. 11

Phase 650 - Electronics Console

All wiring in electronic console in now complete. All electronic drawers have been debugged with the exception of one which is now well underway. Phases 640 and 650 have now been mated together and debugging in this area is starting.

PLANS FOR NEXT PERIOD

System debugging of the Print Console and the Electronic Console is now underway. Debugging of the X, Y and $\emptyset$ servos has been started and should be completed with positional accuracy of each tested. All controls should be buzzed out, debugged and mated with the main console.

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PROJECT 105

MONTHLY PROGRESS REPORT

January & February 1967

Report No. 10

STATOTHR

Prepared by:

Approved by:

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Monthly Progress Report
January & February 1967
Report No. 10

INTRODUCTION

This report covers the work accomplished on the Chip Format Printer for December and January.

GENERAL

During this period all subassemblies were completed and hardwiring on same completed. Wiring on the major console was 80% completed. Debugging was underway on all mechanical subassemblies. Major assembly neared completion on the main console, electronics console and the magazine. The entire program was reviewed from a schedule point of view.

WORK ACCOMPLISHED

Phase 620 - Print Handling and Storage

The print magazine was fitted to the print console and the two units aligned so that the chip format and azimuth center coincide for both the 80 and 55 mm format sizes. Final hardwiring of the magazine subassemblies i.e., turret housing, chip insert mechanisms and character generator was begun. Debugging of entire unit is now underway.

Phase 630 - Character Generator

The character generator font wheels were received, inspected, mounted and tested. A test of the integrated electromechanical portion of the character generator was completed and all static debugging completed. Final wiring of the control circuit was underway.

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Phase 640 - Print Console and Positioning

The x, y, and θ axis drives were cut into the interconnecting cable. All control skins and control panel housings were fitted. Wiring on 3 of the 4 control panels was completed. Final wiring of unit was completed. Liquid, air tubing and connections are being assembled.

Phase 650 - Electronics Console

Interconnecting cabling between all drawers was completed. Wiring of all electronic drawers was completed. Debugging has started on all drawers.

PLANS FOR NEXT PERIOD

A complete new plan to completion has been drafted and is now underway. Debugging of all servos will be attempted. Test equipment for final testing will be manufactured. The electronics console and the main console will be mated for debugging.

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PROJECT 105

MONTHLY PROGRESS REPORT

1 December 1966

Report No. 9

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Prepared by:

Approved by:

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[redacted]

Monthly Progress Report
1 December 1966
Report No. 9

INTRODUCTION

This report covers the work accomplished on the Chip Format Printer until 1 December 1966.

GENERAL

Major subassembly and subassembly wiring is drawing to a close. Electrical debugging and interconnecting wiring is underway. A slippage of approximately 3 to 4 weeks is still anticipated.

WORK ACCOMPLISHED

Phase 620 - Print Handling and Storage

In addition to the turret housing and chip drop mechanism, the eject, transport and two insert mechanisms have been fitted to the 1137-224 base. All of the above mechanisms have been debugged as a unit; i.e., chips have been carried from drop through four stations to insertion into the developing magazine. The relay control panel has been fitted and has been removed for wiring and logic correction.

Phase 630 - Character Generator

STATOTHR The [redacted] carriage and indexing mechanisms have been fitted to the base. The indexing mechanism has satisfactorily been used to index the

STATOTHR [redacted] ten character widths per second as required.

Phase 640 - Print Console and Positioning

Wiring of the X, Y and θ drives is complete and ready for cutting into the main interconnecting cabling.

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[redacted]

Monthly Progress Report
1 December 1966
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Phase 650 - Electronic Console

The cabinet has been returned from painting. The electronic drawers have been refitted and the main interconnecting cabling has begun.

PLANS FOR NEXT PERIOD

The assembly effort will shift from mechanisms to plumbing, central panels, skin fitting, connector fitting and mechanical cleanup. The major portion of program effort will be on wiring and debugging.

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PROJECT 105

MONTHLY PROGRESS REPORT

PHASE II

1 October 1966

Report No. 7

STATOTHR

Prepared by:

Approved by:

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[redacted]

Monthly Progress Report
Phase II 1 October 1966
Report No. 7

Introduction

This report covers the work accomplished on the Chip Format Printer until 1 October 1966.

General

Assembly, wiring and debugging are continuing. Manufactured and purchased parts continue to be received. As a result of reported failure of vendors to meet delivery commitments, considerable effort is being spent on expediting.

Print Handling and Storage

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STATOTHR Debugging of the Chip Drop mechanism is complete. The [redacted] Housing assemblies are complete and have to be married STATOTHR to the [redacted] Drive Assembly, Chip Drop mechanism and chip cassette. Assembly of the electronic turret sequencing panel is complete.

Character Generator

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Assembly of the character generator has begun. The [redacted] carriage indexing mechanism is complete and is presently being tested.

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Print Console and Positioning

The Y and Azimuth Drive assemblies are complete. The machined base has been received and the sheet metal skins have been fitted.

Electronic Console

Detail wiring diagrams are continuing. Assembly of components into the electronic drawers and wiring of the electronic drawers is continuing. The electronic cabinet has been received and cooling ducts and electronic drawers are being fitted.

Plans for Next Period

The bulk of program effort during the next reporting period will continue to be applied to factory and vendor liaison, expediting, assembly and wiring. Testing and marriage of large purchased electronic packages (i.e., core memory, encoder electronics) and large electrical subcircuits will continue.

Minutes of Meeting of 22 September 1966

The following items concerning the Chip Format Printer were covered in a meeting between the customer and

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1) In the interest of improving resolution and more faithful contrast reproductions by reducing back reflections, STATOTHR suggested that anti halation backing be used on film chips in the Chip Format Printer.

2) Three to five thousand raw film chips of each type to be used in the Printer were requested by STATOTHR for testing and customer training at STATOTHR

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STATOTHR 3) A resolution target suitable for testing and training was also requested by [redacted]

STATOTHR 4) [redacted] raised the question as to whether a gate liquid of 85% Telrachloroethylene 15% Freon 113 might be used instead of an 80% Toluene-20% Freon 113 mixture, since the photographic and scratch removal ability of both are the same and since the tetrachlorethylene mixture is not flamable and will not cause film curl. The customer indicated that toxicity is an important factor and would check to find out if the toxicity level of the tetrachlorethylene mixture is acceptable.

STATOTHR 5) [redacted] requested the addition of an Item Separator (57) in the input tape between the Number of Prints and the Start of Message Words. This change of tape format was requested to simplify the logic of the digital control circuitry.

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MONTHLY PROGRESS REPORT

PHASE II

1 September 1966

Report No. 6

STATOTHR

Prepared by:

Approved by:

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Monthly Progress Report
Phase II 1 September 1966
Report No. 6

INTRODUCTION

This report covers the work accomplished on the Chip Format Printer until 1 September 1966.

GENERAL

Detailing is in excess of ninety-five percent complete in all phases of the program. Assembly, wiring and debugging is continuing. Manufactured and purchased parts continue to be received. The bulk of program effort is being expended on assembly, fabrication, wiring and particularly expediting.

PRINT HANDLING AND STORAGE

The Print Magazine base casting is presently being machined. All other major castings in this phase are finish machined. The chip cassette and chip drop mechanism are complete and married. Debugging of the drop mechanism is underway. The turret drive housing subassembly is complete. The difficulty with bubbles in the liquid gate has been eliminated by applying a pitch of approximately 1 degree to the Print Magazine base and turret.

CHARACTER GENERATOR

A vendor for the font wheel has been selected. All parts are out for fabrication. Testing of the font wheel circuitry and the hammer drive circuitry has been completed and found satisfactory.

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PRINT CONSOLE AND POSITIONING

With the exception of the base weldment and the X housing castings, all major castings and weldments in this area are finish machined. The base machining is underway. The X carriage housing castings have been initially machined and assembled with the X support weldments and bushings for final boring. Assembly of the Y drive components on the Y platform is underway.

ELECTRONICS CONSOLE

Detail wiring diagrams and wiring are continuing. Assembly of the components into the electronic drawers is underway. The electronic cabinet will be received shortly.

PLANS FOR NEXT PERIOD

The bulk of program effort during the next reporting period will be applied to factory and vendor liaison, expediting, assembly and wiring. Detailing and manufacturing releases are for all practical purposes complete. Initial cutback of drafting personnel has been made and will continue through the next reporting period.

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PROJECT 105

MONTHLY PROGRESS REPORT

PHASE II

1 July 1966

Report No. 4

STATOTHR

Prepared by:

Approved by

FAIRCHILD SPACE AND DEFENSE SYSTEMS

Monthly Progress Report
Phase II 1 July 1966
Report No. 4

Introduction

This report covers the work accomplished on the Chip Format Printer until 1 July 1966.

General

Design in all phases is drawing to a close and detailing is continuing in all areas. Drafting releases and purchase requests are proceeding as anticipated. Purchase parts and some manufactured parts are being received. Wiring and basic assembly in the digital area are underway.

Print Handling and Storage

All castings and weldments in this phase have been released. Detailing is continuing and is approximately 75 percent complete. Manufacturing releases and purchase requests will continue throughout the next reporting period. Manufactured and purchased parts are being received and subassembly work on this phase will begin shortly.

Photographic tests were performed to determine necessary platen pressure to achieve specified resolution, and to determine photographic quality using the liquid gate. Results were satisfactory. Further tests of the liquid gate will be performed in the next reporting period in an effort to produce Newton Rings and determine their cause.

Character Generator

Basic character generator design is complete and detailing has begun. The hammer breadboard has been completed and tested and has been found to be satisfactory. Initial electrical components for the character generator have been ordered and received and the remainder will be ordered shortly.

Print Console and Positioning

Design in this area is phasing out, and detailing is continuing and is approximately seventy-five percent complete. Manufacturing releases will continue through the next reporting period. All major castings and weldments have

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been released and all purchased parts have been ordered. The bulk of the long lead mechanical purchased items have been received.

Electronics Console

Detail wiring diagrams and running lists are still in progress and will continue through the next reporting period. Assembly and wiring of the initial electronic drawers is underway. Basic debugging of the digital wiring is in progress. Design and detailing of the Console is more than sixty percent complete.

Current Status of Work and Projected Work for Next Period

Design and detailing is in the final stage in all major areas. A portion of the drafting personnel will be phased out during the next reporting period. Purchased and manufactured parts are being received and some minor assembly has begun. Wiring and basic debugging has begun in the digital area and will continue through the next reporting period.

The program is on schedule and there are no indications that it will not remain so.

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PROJECT 105

MONTHLY PROGRESS REPORT

PHASE II

1 June 1966

Report No. 3

STATOTHR

Prepared by:

Approved by:

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Monthly Progress Report
Phase II 1 June 1966
Report No. 3

Introduction

This report covers the work accomplished on the Chip Format Printer until 1 June 1966.

General

The design phase of the program is in its final stages and detailing is progressing in all areas. Manufacturing releases and purchase requests are proceeding as anticipated in all areas. Initial long lead items are being received.

Mechanical and electrical design and detailing based on the latest magazine and chip holder information has been resumed in the chip ejection area of the magazine.

Print Handling and Storage

Initial manufacturing releases for this area, including the chip cassette, have been made. Sixty percent of castings for this area have been released and the remainder will be released during the first week in June. Manufacturing releases and detailing will continue throughout the next reporting period. The electrical schematic for this section is 95% complete and purchase requests for short lead electrical items are now being placed. Initial long lead mechanical components have been received. Design and detailing has resumed in the area of the chip ejection interface on the basis of information that the chip holders and chip holder magazine now in our hands are the ones to be used in the final chip format printer.

Character Generator

Initial character generator design has been completed and the free flight hammer section of its design has been fabricated and will be tested during the first week in June before fabrication of the final unit. The associated electronics for the character generator is underway.

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Monthly Progress Report
Phase II 1 June 1966
Report No. 3

Print Console and Positioning

Initial manufacturing releases for this section have been made. Approximately fifty percent of the castings and weldments for this area have been released, and the remainder will be released during the first week of June. All but a small amount of short lead electrical items have been purchased. Initial long lead mechanical components are now being received. Cabinet design has been completed and detailing is underway.

Electronics Console

Detail wiring diagrams are still underway and initial running lists for wiring the unit have been begun. Approximately one-third of the necessary digital cards and connectors have been received and wiring will begin during the first week in June. Initial drawer and chassis assemblies have been purchased and will arrive shortly. Detailing of wiring diagrams and wiring lists and wiring will continue during the month of June, and debugging of the digital portions of the console will begin at the end of the month.

Current Status of Work and Projected Work for Next Period

Program design is coming to a close in all areas. Detailing and manufacturing releases are well underway and will continue through the next reporting period. Long lead items are being received. Wiring in the digital areas will begin and continue through the month.

The program is on schedule and there are no indications that it will not remain so.

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PROJECT 105

MONTHLY PROGRESS REPORT

PHASE II

1 May 1966

Report No. 2

STATOTHR

Prepared by:

Approved by:

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Monthly Progress Report
Phase II 1 May 1966
Report No. 2

Introduction

This report covers the work accomplished on the Chip Format Printer from the middle of March until April 1st.

General

During this reporting period 75% of the final design has been established. Design layouts have been completed and detailed drawing started in most areas. Purchase requests for most long lead items have been issued and return indications are that these will not represent a program problem.

Although we are still proceeding with the magazine design in the chip ejection to film holder area, some concern must be expressed regarding the lack of a finalized film holder design to be supplied to us. - Supplied

Depending on the film holder changes, some redesign may be necessary in our areas which could effect our overall schedule. - Unnecessary.

Console Base

The finalized design on the Console Base (base support, azimuth pedestal, X-drive system, Y-drive system) have reached 95% of completion. Detailing of all components and major castings or weldments have been initiated and is approximately 40% complete. Some purchase items have been released (motor, tachs, etc.) and fabrication releases will be underway this coming month.

Electronics Console

Finalized mechanical design is underway on all structural members and selection of draws and racks. Detailing has been started and initial releases will start during the next month. Electronic components and mounting cards are now being purchased and some should arrive shortly.

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Monthly Progress Report
Phase II 1 May 1966
Report No. 2

Magazine

Finalized design is progressing in all areas. The film cassette design is completed with 90% of the details finished. The turret design is 3/4 completed and detailing is well underway. The chip ejection interface design is 80% completed, however, detailing has been held awaiting confirmation of chip holder design. All structural supports and overall configuration design are underway with special considerations now being given towards castings and other long lead items.

Data Recording

As stated in the last report, the data recording procedures were completely reviewed with hope that a CRT presentation could fulfill the requirements. Investigation, however, soon showed that although the alpha-numerics could be accomplished, that the digital display could not be done due to the extreme tolerance requirements.

Based on the above, we have returned to the initial proposed approach and have proceeded with actual design layouts.

Customer Meeting

A meeting was held with the customer representative to clarify some of the tape input and output requirements. The following items were discussed and agreed to:

1. It was confirmed that the "carriage return" and "line feed" commands would not be printed on the output chip.

2. It was confirmed that whereas only 40 characters would be required for the alpha-numerics, 44 would be required for the digital display. These include the above 40 plus EOT, SOM, EOA, and DC4. All of these 44 will be printed where necessary on the output chip.

3. It was confirmed that the MPC printed on the chip would be corrected to include only the characters printed on the chip prior to the MPC number.

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4. It was decided that the tape input would override manual controls with the exception of the "number of prints". This item would be selected by the operator either by tape or by manual operation.

   It was requested that the classification control would be removed from the control panel and would be supplied by tape input only.

5. It was decided that both circuit breakers and fuses would be employed throughout the unit. The choice depended upon the particular application. Critical failure indicators will be provided.

6. It was confirmed that the 3-phase power being supplied to the unit will be 4 wire and that we would supply more detailed requirements to the customer by the 15 of August.

7. The tolerance on the film footage control is changed from .1 feet to .2 feet.

8. It was agreed that the output chip film material requirements would be changed from .003 - .012 to .003 - .0075.

Current Status of Work and Projected Work in Next Monthly Period

This program is now in the final design stages and with detailing started in all areas. Long lead purchase items have been placed and some of these already received. The program is on schedule, however, some concern must be expressed due to the lack of finalizing on the chip holder configuration, which could effect this program unless settled immediately.

During the coming month it is anticipated that fabrication will commence on various components and initial wiring of electronic circuit cards will commence.

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PROJECT 105

MONTHLY PROGRESS REPORT

PHASE II

1 March 1966

Report No. 1

STATOTHR

Prepared by:

Approved by:

STATOTHR

Monthly Progress Report
Phase II 1 March 1966
Report No. 1

Introduction

This report covers the present status of work accomplished on Phase II of the 105 Program.

Work officially began on this phase of the program on January 1, 1966. Initially, some delays were encountered in establishing necessary working space and the assignment of personnel. This was resolved in the middle of January, and work effort has been increased at an ever expanding rate since then. The customer's technical representative has reviewed our facilities and progress twice during this period of time.

General

To date, the entire Phase I has been reviewed in light of the new specification, and the finalized design is now underway in all areas. All existing previous layouts have been examined, and numerous simplifications of various mechanisms have been made in order to simplify construction and to increase system reliability.

Console

For purposes of design, the Console has been broken into three major sections:

a) The Console Base
b) Magazine
c) Electronics Console

a) Console Base - The Console Base is composed of the structural supporting mechanisms, the azimuth pedestal, illumination source, X-drive system, and the Y-drive system. The X, Y and azimuth drives are now in final design, and it is anticipated that detailing will start shortly.

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Final selection of the illumination source has not been made; however, those illumination sources under consideration are now in the house and are being tested. It is anticipated that the final selection will be made in the coming month.

b) Magazine - Final design layouts are now being completed on the turret, chip ejection mechanism, the film cassette, and the film holder ejection mechanism. Some delay is being encountered in the film holder ejection mechanism area, due to the fact that we understand the film holders have been changed (additional weight) from the originally anticipated design. It is our understanding that we will be furnished with new film holders shortly. Final design in this area must await receipt of these holders or drawings and the anticipated weight of these holders.

Due to the addition of film processing pins and the extreme bend required to place the film in the chip holder, the film must be bent during insertion into a radius which extends the film outside of the thickness of the holder. Thus, if the holders are stacked one to another, the film during loading must come in contact with the next adjacent holder and rubbing and possible scratches can occur. We therefore must add extra mechanisms over that originally anticipated in order to support the holders during film loading, so that scratching will not occur. The above items have been discussed with the customer's technical representative.

c) Electronics Console - The electronic logic, along with necessary power supplies and all control mechanisms will be included in an electronic console. This electronic logic has been reviewed and is now being firmed-up, while finalized design has started.

The work specification has called for a positioning accuracy in X and Y to within a .1 mm range. It has been pointed out that this accuracy can only be achieved providing it is requested on the input tape. In short, if the input tape calls out an accuracy in the millimeter range then the next digit position must be included (if nothing else, as a zero)

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in order for the logic to accurately position. In other words, we can only position accurately if it is asked for on the input tape. The same also applies to azimuth rotation.

Data Recording

The data recording area has been completely reviewed, and new existing information is now being re-evaluated. Original CRT presentations were discarded because the illumination level was not capable of producing sufficient exposure and good recording. Since the original investigation, new systems and state of the art have now produced systems wherein the brightness is sufficient to warrant their re-investigation. If it is found that these developments can easily fulfill our data requirements both in digital and alpha numerics, this may be a better approach. Investigations in these areas are well under way and should be concluded within the next month.

Current Status of Work and Projected Work in Next Monthly Period

At the present time, most of the above areas will be ready for initial design review within the coming month and detailing will commence. The present program is now on schedule and at this moment, no delays are anticipated.