dec INTEROFFICE MEMORANDUM

DATE August 31, 1962

SUBJECT PRIMARY RESEARCH CENTER REPORT

TO H. Anderson FROM Elsa Newman

John Gilmore suggested I read the "Primary Research Center" report he once gave you. He believes there is material there for an article for DECUSCOPE either in the September or October issue. May I please have the report to work from?

What do you think of the August issue? I missed your guiding wisdom and hope you had a nic vacation.

-Tale

August 31, 1962

Security Guards

K. Olsen
H. Anderson
S. Olsen
L. Prentice
M. Sandler
R. Mills
K. Fitzgereld
B. Towle

Bob Lassen

COPY

We have reviewed several security agencies and Pinkerton's is our first choice. They are more flexible, show a greater interest and will be the easiest to deal with. Before we initiate a security guard program we should meet as soon as possible to establish the ground rules. All of our people should be notified in advance and perhaps a meeting should be called to brief our supervisors on this program.

The following are points of information and some suggestions which can be used as a starting point:

1. The major purpose of the program should be to provide a better personnel control by establishing tighter identification badge and exit/entry procedures with the help of trained security guards.

2. Cost per man hour - $2.35 (the difference in rates is negligible.

3. Each man should be <u>fully trained</u>.

4. Each man should be <u>uniformed</u> and <u>unarmed</u> .

5. We should interview each man before he is accepted for duty.

6. Each man will submit a daily written report (this is a normal part of their procedure).

7. Pinkerton's is unionized - they have a "no strike" clause in their contract.

8. We should discuss the hours of duty, the number of guards required, guard stations and periodic plant and exit/entry checks.

(a) Two guards on each shift should be adequate initially.

(b) A trouble spot could be between the hours of 5:00 P.M. and 6:00 P.M. Pinkerton suggests we lock all doors at 5:30 P.M. and that all people leaving the building after 5:30 P.M. should be let out by the guard.

(c) Another trouble area is during the hours of 7:00 A.M. to 8:00 A.M. This involves either a guard or a tight key control for early arrivals.

(d) One of the most important areas is our rather loosely arranged evening work schedule. Pinkerton's suggest that evening guards be given a list of all regularly authorized second shift employees. In addition they should be given a daily list of those people who have been authorized to work that evening - this is the individual's supervisor's responsibility.

(e) Our "extra" loading docks and so called common areas will bear special attention. All of the agencies were concerned about this.

COPY

BADGES

1. The various agencies felt that our present badge system is satisfactory. Pinkerton's feels that we should make no exceptions or special cases and that Visitors and Contractors should turn in their badges daily. I am inclined to agree.

2. The Personnel Office is currently responsible for the ordering and original issue of all badges.

3. Blocks of Visitor and Contractor badges have been issued to the receptionists in Buildings 12 and 5. The receptionists are responsible for the daily issue of all Visitor and Contractor badges.

4. The Personnel Office still continues to issue all Temporary and Permanent badges.

5. All badges are issued and received by written register.

6. Badges should be worn in a uniform place (left pocket or lapel for men - waist for women).

7. The security guards will help to enforce the proper wearing of badges.

dec INTEROFFICE MEMORANDUM

H.F.C.

DATE 8/30/62

SUBJECT Program Library Progress Report

TO PDP Distribution List FROM Beverly Clohset

This memorandum serves as a progress report for the PDP-1 library from January, 1962 to September, 1962.

Table I lists the programs available to the DECUS members in January, with reference to the types and quantities of tapes, and whether or not a write-up existed.

The first major library project, therefore, was one of augmentation. Letters were written to users requesting copies of tapes and/or write-ups and a complete survey of available tapes at DEC was undertaken. Although DEC did not cover the floor space it does now, this became quite a project. Tapes were found in the computer room in file cabinets, tape trays, envelopes, or just laying on a table. Various employees possessed tapes and the problem arose as to which employee had the latest and best version of a program. A list was made of every tape known in the building and after consultation with John Koudela, the tapes which potentially seemed to have the most use to the library were duplicated and placed in the files for later editing.

It was felt, at this time, that to have a well organized and useful library, tape labels and program write-ups should be standardized. It did not seem wise to develop completely new ideas in these areas, but rather to improve upon existing methods so that there would be literally no transition problem for the users.

The customary color coded labels for the various tape types were used with a new color being added for MACRO Symbolic. The colors assigned were:

Red	- DECAL Symbolic
Blue	- DECAL Loader
Yellow	- Read-In-Mode
Lavender	- FRAP Symbolic
Tan	- Binary
Purple	- MACRO Symbolic
Green	- Binary with Binary Loader

The following items were suggested as useful information to appear on the label:

Serial Number
Program Title
Tape Type
Starting Address
Registers Occupied
Sense Switch Settings
Arithmetic Precision
Tape Code

Standardization of write-ups became necessary due to the many forms available. Many write-ups were in the permanent memorandum files and not even found in the library. Many write-ups were written in paragraph form and left much to be desired in specific information needed by the programmer, such as, among other things, the operating procedure. On February 3, 1961, a memorandum to the PDP-1 Users was issued from Roland Silver and Edward Fredkin. The subject was "Standard Formats for Program Materials to be Distributed". Included in this memorandum was an outline for program write-ups that a number of users had found helpful not only in describing but also in studying the purposes and procedures of a program. This outline, with a few minor changes, was accepted as the standard outline for the library and is as follows:

1. IDENTIFICATION

    1.1 Serial Number; Program Title; Title Symbol(s) (if any); Type

    1.2 Author

    1.3 Date

2. ABSTRACT

    2.1 Purpose (one line)

    2.2 Example of the calling sequence

    2.3 Storage requirements and approximate execution time

3. PROGRAM SUMMARY

    3.1 Informal Description (a discussion of the program)

3.2 Variables and Parameters (non-descriptive symbols should be assigned to each variable, e.g., q = quotient, r = remainder, etc.)

3.3 Type of Variables and Parameters (integer, fraction, double length, etc.)

3.4 Example (a set of numerical values should be assigned to the variables with the appropriate values for the functions.)

3.5 Formal Description (description of the procedure that operates on variables to assign values to variables, in ALGOL notation, if possible.)

4. USAGE

4.1 Procedure (how to operate or compile the routine.)

4.2 I/O Devices Required

4.3 Switch Settings (sense switches and test word switches)

4.4 Miscellany (including special external equipment required)

5. CALLING SEQUENCE

5.1 Informal Description (a brief, clear description)

5.2 Example (should refer to section 2.2)

5.3 Formal Description (included in this discussion is the state of the machine at entry into the subroutine, definitions of words in the calling sequence, the effect the execution of a particular word has on the state of the machine, a description of the available result, and the way in which the subroutine returns.)

6. RESTRICTIONS

6.1 Subroutines Required

6.2 Registers affected outside memory block of program

6.3 Machine or set-up requirements

6.4 Memory required outside program block (e.g., common storage, sequence-break, jump cells set up)

6.5 Special Machine Status (e.g., sequence break mode status, status of any sequence break channel)

6.6 Special Status Changes

6.7 External Symbols (e.g., origin or other symbols which must be defined elsewhere)

6.8 Program Halts (the value of the program counter at a halt should be given)

7. PROPERTIES

7.1 External Symbols

7.2 Data Format

7.3 Accuracy (if appropriate)

7.4 Storage Required

7.5 Execution Time (preferably in cycles)

7.6 Useful Constants (as defined within the program and their addresses, relative to an external symbol if possible)

7.7 Other Properties

8. METHOD

8.1 Principle of Program (description of how it works)

8.2 Algorithm (should correspond to the procedure used in the program)

8.3 References (either to publications, or other program)

9. NOTES

9.1 Checkout Status

9.2 Program Listing

9.3 Miscellany

Al Blumenthal of DEC suggested the following outline for test program write-ups due to the different information necessary in diagnostic routines.

TEST PROGRAM WRITE-UP FORMAT

1. IDENTIFICATION

1.1 Serial Number; Title; Revision Number

1.2 Author

1.3 Date

2. ABSTRACT

2.1 Brief statement of purpose and important features

2.2 Memory requirements and execution time

2.3 Machine options required or restricted

3. USAGE

3.1 Manual controls and indicators

3.2 Operating Procedure

3.3 Error halts and diagnosing

4. MODUS OPERANDI

4.1 General Organization

4.2 Detailed Explanation

5. MISCELLANY

6. PROGRAM LISTING

7. FLOW CHART

After determining what could best constitute a basic library, considering what was presently available, a mass duplication of tapes, on the prototype, resulted. Write-ups were edited and in some cases completely written. On March 12, 1962, seventeen (17) DECUS Installation Members were recipients of tapes and write-ups, and nine (9) Individual Members received only the write-ups. This basic library, with a breakdown of types of tapes sent, is included in Table II. A small amount of mathematics indicates that a total of 595 tapes had to be duplicated to accomplish this service to the users group.

The service of the library to the users did not terminate at this point. The basic library has been updated by the following additions which have been distributed:

Addendums to:	BBN-1	FRAP
	DEC-3	FPC-8 to Concise for FRAP
	MIT-1	DEC Debugging Tape (DDT)
Write-Ups for:	DEC-16	Clear Memory
	MIT-2	(to correspond with tape)
Tapes for:	MIT-2	(latest version)
	MIT-3	MACRO Symbol Package
	MIT-3	MACRO Fio-Dec

Many DECUS Members have had occasion to use the library in requesting additional tapes and/or write-ups. An accurate record of every tape or write-up distributed has been kept by the librarian. Also, in this same mode, upon the issue of a Construction Requisition for a PDP-1, a basic library of software has been sent to the new DECUS Member.

To inform users of the progress of the library and keep them up-to-date on software materials that had been available, a column was written for the DECUSCOPE containing brief summaries of write-ups in the library.

The last full-scale project encountered was that of editing and duplicating tapes and standardizing write-ups. The condition of the library as of September 1, 1962, is listed in Table III. As can be seen the library is in two sections. The first section contains programs which have been satisfactorily debugged and checked out and are therefore available for distribution. Section two contains programs, which hopefully can be of some use to the programmers of DECUS, but unfortunately have not been completely debugged and can not be guaranteed.

Every write-up now contained in the library has been re-written, when necessary, so that all write-ups are in the standard outline form.

A good working program for the library that can be of service to a user, can be defined as one which contains both a symbolic tape and write-up. In January, 17 programs met these qualifications. In the ensuing months, symbolic tapes were developed and write-ups composed so that 31 programs are now included in this category.

In closing, a final mathematical investigation shows a total of 102 tapes in the library as of January as compared to 746 tapes in September.

NOTE:

The following abbreviations have been used in the column labeled tape type of the tables:

D.S. - Decal Symbolic
D.L. - Decal Loader
F.S. - Frap Symbolic
HBL - Hi Binary Loader
RIM - Read-In-Mode

TABLE I

PROGRAM LIBRARY (JANUARY, 1962)

Serial No.	Title	Tape Type	No. of Tapes	Write-Up
ADA-1	Analyzer			x
ADA-2	Frap Corrector			x
ADA-3	PRIM (Punch Read-In Mode Tape)			x
ADA-4	Typewriter Inquiry Control			x
ADA-5	AID	RIM	2	
BBN-1	FRAP	F.S.	1	
BBN-1	FRAP	HBL	7	x
BBN-2	Typewriter Control	D.S.	5	
BBN-2	Typewriter Control	D.L.	5	
BBN-2	Typewriter Control	F.S.	5	x
BBN-3	Binary Punch and Load	F.S.	5	x
BBN-6	Colossal Typewriter	HBL	6	x
BBN-10	Multiply Subroutine (FXD-18)	D.S.	4	
BBN-10	Multiply Subroutine (FXD-18)	D.L.	4	
BBN-10	Multiply Subroutine (FXD-18)	F.S.	5	x
BBN-11	Bit Manipulation Package			x
BBN-12	Decimal to Binary Conversion	F.S.	2	x
BBN-13	Binary to Decimal Printout and Punchout	F.S.	2	x
BBN-15	Gaussian Random Number Generator			x
BBN-21	Trace	D.S.	1	
BBN-21	Trace	D.L.	2	
BBN-21	Trace	F.S.	1	x
BBN-22	P-Trace and Octype	F.S.	4	
BBN-23	Random Number Generator (Coin, Random, Ranmodn)	D.S.	1	
BBN-23	Random Number Generator (Coin, Random, Ranmodn)	D.L.	1	
BBN-23	Random Number Generator (Coin, Random, Ranmodn)	F.S.	1	x
BBN-25	Rotate Test	F.S.	1	
BBN-27	Master Duplicator	F.S.	1	
BBN-31	Floating Point Package			x
BBN-32	Temporary-Storage Push-Down	F.S.	1	x
BBN-33	Pen Tracker Routines	F.S.	4	x
BBN-34	Display Line	D.S.	1	
BBN-34	Display Line	D.L.	1	
BBN-34	Display Line	F.S.	1	
BBN-37	Character Display	F.S.	1	x
BBN-43	Filter Computations	F.S.	1	x
BBN-45	Grid Plotting			x
BBN-46	Punchoff	F.S.	1	
BBN-46	Punchoff	HBL	2	x

TABLE I (CONTINUED)

Serial No.	Title	Tape Type	No. of Tapes	Write-Up
BBN-47	Divide Subroutine (FXD-18)	D.S.	1	
BBN-47	Divide Subroutine (FXD-18)	D.L.	2	
BBN-47	Divide Subroutine (FXD-18)	F.S.	2	x
BBN-50	Type, Punch, Display Decimal	F.S.	2	x
BBN-54	Compare	D.S.	1	
BBN-54	Compare	D.L.	2	
BBN-54	Compare	F.S.	1	x
BBN-65	Single Precision Floating Point	F.S.	1	
BBN-65	Single Precision Floating Point	RIM	1	x
BBN-66	Kalah	HBL	1	x
BBN-67	Debug	HBL	2	
BBN-500	Scope Raster	F.S.	1	
DEC-1	DECAL F 11	HBL	2	
DEC-2	MAC (Master Subroutine Control)			x
DEC-3	FPC-8 to Concise for Frap	F.S.	1	
DEC-3	FPC-8 to Concise for Frap	HBL	1	
DEC-6	Tape Punch Test	F.S.	1	x
DEC-7	Typewriter Controlled Frap			x
DEC-10	Read-In Mode Simulator			x
DEC-11	Checkerboard Test			x
DEC-12	Memory Addressing Test			x
DEC-13	Read Binary Test			x
DEC-14	Combined Reader and Punch Test			x
DEC-15	Multiply Step and Divide Step Test			x
DEC-16	Clear 4096 Word Memory	RIM	1	

TABLE II

BASIC DECUS PROGRAMMING LIBRARY FOR PDP-1

Serial No.	Title	Type of Tape Sent	Write-Up Sent
ADA-1	Analyzer	HBL	x
ADA-3	PRIM (Punch Read-In Mode Tape)	RIM	x
BBN-1	FRAP (Assembly Program)	F.S.	
BBN-1	FRAP (Assembly Program)	HBL	x
BBN-2	Typewriter Control	D.S.	
BBN-2	Typewriter Control	D.L.	x
BBN-3	Binary Punch & Load Package (HI)	F.S.	
BBN-3	Binary Punch & Load Package (MED, LO)	F.S.	x
BBN-10	Multiply Subroutine (FXD-18)	D.S.	
BBN-10	Multiply Subroutine (FXD-18)	D.L.	x
BBN-12	Decimal to Binary Conversion (FXD-18)	D.S.	
BBN-12	Decimal to Binary Conversion (FXD-18)	D.L.	x
BBN-13	Binary to Decimal Printout and Punchout (FXD-18)	D.S.	
BBN-13	Binary to Decimal Printout and Punchout (FXD-18)	D.L.	x
BBN-46	Binary Punchoff and Loader	D.S.	
BBN-46	Binary Punchoff and Loader	D.L.	x
BBN-47	Divide Subroutine (FXD-18)	D.S.	
BBN-47	Divide Subroutine (FXD-18)	D.L.	x
BBN-67	Debug	HBL	x
DEC-1	DECAL (Assembler)	HBL	
DEC-1	DECAL (Loader)	HBL	
DEC-3	FPC-8 to Concise for Frap	F.S.	x
DEC-5	Anytape Duplicator Verifier	F.S.	x
DEC-6	Punch Test	F.S.	x
DEC-11	Checkerboard Test (HI)	F.S.	
DEC-11	Checkerboard Test (LO)	F.S.	x
DEC-12	Memory Addressing Test	F.S.	x
DEC-13	Read Binary Test	F.S.	x
DEC-16	Clear 4096 Memory	RIM	
DEC-17	Instruction Test Programs	RIM	x
DEC-66	Simple Tape Control Program	F.S.	x
DEC-105	Divide and Multiply Test Using Random Numbers	F.S.	x
DEC-106	Type-Out Type-In Test	HBL	
MIT-1	DEC Debugging Tape (DDT)	HBL	x
MIT-2	Expensive Typewriter	HBL	x

TABLE III

PROGRAM LIBRARY (SEPTEMBER, 1962)

Serial No.	Title	Tape Type	No. of Tapes	Write-Up
ADA-1	Analyzer	HBL	8	
ADA-1	Analyzer	RIM	8	x
ADA-2	Frap Corrector	HBL	8	x
ADA-3	PRIM (Punch Read-In Mode Tape)	RIM	8	x
ADA-5	AID	RIM	6	x
BBN-1	FRAP (Assembly Program)	F.S.	6	
BBN-1	FRAP Concise Input	HBL	8	
BBN-1	FRAP Fio-Dec Input	HBL	8	x
BBN-2	Typewriter Control	D.S.	8	
BBN-2	Typewriter Control	D.L.	8	
BBN-2	Typewriter Control	F.S.	7	x
BBN-3	Binary Punch & Load Pkg. (HI)	F.S.	6	
BBN-3	Binary Punch & Load Pkg. (MED, LO)	F.S.	6	x
BBN-4	Sound Learning	HBL	8	
BBN-6	Colossal Typewriter	HBL	8	x
BBN-10	Multiply Subroutine (18-18 FXD Point)	D.S.	6	
BBN-10	Multiply Subroutine (18-18 FXD Point)	D.L.	8	
BBN-10	Multiply Subroutine (18-18 FXD Point)	F.S.	5	x
BBN-12	Decimal to Binary Conversion	D.S.	9	
BBN-12	Decimal to Binary Conversion	D.L.	12	
BBN-12	Decimal to Binary Conversion	F.S.	10	x
BBN-13	Binary to Decimal Printout and Punchout	D.S.	8	
BBN-13	Binary to Decimal Printout and Punchout	D.L.	6	
BBN-13	Binary to Decimal Printout and Punchout	F.S.	7	x
BBN-16	Histogram Subroutines	HBL	8	
BBN-21	Basic Tracing Subroutine	D.S.	12	
BBN-21	Basic Tracing Subroutine	D.L.	9	
BBN-21	Basic Tracing Subroutine	F.S.	8	x
BBN-22	Complete Program Trace	F.S.	8	
BBN-23	Several Random Number Generators (Coin, Random, Ranmodn)	D.S.	8	
BBN-23	Several Random Number Generators (Coin, Random, Ranmodn)	D.L.	8	
BBN-23	Several Random Number Generators (Coin, Random, Ranmodn)	F.S.	8	x
BBN-25	Rotate Test	F.S.	7	x
BBN-27	Master Duplicator	F.S.	7	
BBN-27	Master Duplicator	HBL	8	
BBN-32	Temporary Storage Pushdown	F.S.	8	x

TABLE III (CONTINUED)

Serial No.	Title	Tape Type	No. of Tapes	Write-Up
BBN-33	Several Pen Tracking Routines (Delay)	F.S.	6	
BBN-33	Several Pen Tracking Routines (Track Pen)	F.S.	6	
BBN-33	Several Pen Tracking Routines (Pen-Spot)	F.S.	6	
BBN-33	Several Pen Tracking Routines (Sprial)	F.S.	6	x
BBN-34	CRT Grid Plotting	D.S.	8	
BBN-34	CRT Grid Plotting	D.L.	8	
BBN-34	CRT Grid Plotting	F.S.	8	x
BBN-37	CRT Character Display	F.S.	8	x
BBN-40	Annotation Package	HBL	8	x
BBN-46	Binary Punchoff and Loader	F.S.	6	
BBN-46	Binary Punchoff and Loader	HBL	8	x
BBN-47	Divide Subroutine (18-Bit Fixed Point)	D.S.	11	
BBN-47	Divide Subroutine (18-Bit Fixed Point)	D.L.	12	
BBN-47	Divide Subroutine (18-Bit Fixed Point)	F.S.	7	x
BBN-50	Type, Punch, Display Decimal	F.S.	8	x
BBN-54	Compare Two Signed or Absolute Values	D.S.	8	
BBN-54	Compare Two Signed or Absolute Values	D.L.	8	
BBN-54	Compare Two Signed or Absolute Values	F.S.	8	x
BBN-57	Logarithm Base Two Subroutine	D.S.	8	
BBN-57	Logarithm Base Two Subroutine	D.L.	8	
BBN-57	Logarithm Base Two Subroutine	F.S.	8	
BBN-65	Single Precision Floating Point Pkg. (has been replaced by DEC-107)			
BBN-66	KALAH Game	HBL	1	x
BBN-67	Debug	HBL	8	x
BBN-111	Octype	D.S.	8	
DEC-1	DECAL Assembler	HBL	6	
DEC-1	DECAL Loader	HBL	8	
DEC-2	MAC (Master Subroutine Control)	D.S.	1	
DEC-2	MAC (Master Subroutine Control)	D.L.	1	
DEC-2	MAC (Master Subroutine Control)	RIM	1	x
DEC-3	FPC-8 to Concise for Frap	F.S.	7	
DEC-3	FPC-8 to Concise for Frap	RIM	7	x
DEC-5	Anytape Duplicator Verifier	F.S.	9	x
DEC-6	Punch Test	F.S.	7	x

TABLE III (CONTINUED)

Serial No.	Title	Tape Type	No. of Tapes	Write-Up
DEC-11	Checkerboard Test			
	(Old Version HI)	F.S.	8	
	(Old Version LO)	F.S.	8	x
	(New Version)			
	(Symbolic Listing Included in Write-Up)	RIM	8	x
DEC-12	Memory Addressing Test	F.S.	6	x
DEC-13	Read Binary Test	F.S.	6	x
DEC-16	Clear 4096 Memory	RIM	8	x
	(Symbolic Listing Included in Write-Up)			
DEC-17	Instruction Test Programs	RIM	7	x
	(Symbolic Listing Included in Write-Up)			
DEC-36	DECAL Library Tape Maker	D.S.	8	
DEC-36	DECAL Library Tape Maker	D.L.	8	
DEC-41	Dump DECAL Symbol Table	D.S.	8	
DEC-42	Symbol Search	D.S.	8	
DEC-42	Symbol Search	D.L.	6	
DEC-61	Prime Number Print in Decimal	HBL	7	
DEC-66	Simple Tape Control Program	F.S.	10	x
DEC-67	Music Programs	HBL	8	
DEC-105	Divide-Multiply Test Using Random Numbers	F.S.	7	
DEC-105	Divide-Multiply Test Using Random Numbers	HBL	9	x
DEC-106	Type-Out Type-In Test	F.S.	8	
DEC-106	Type-Out Type-In Test	HBL	8	x
DEC-107	Single Precision Floating Point	D.S.	8	
DEC-107	Single Precision Floating Point	D.L.	8	x
DEC-110	Input-Output Operational Subroutine Package for DECAL	D.S.	8	
DEC-110	Input-Output Operational Subroutine Package for DECAL	D.L.	8	x
MIT-1	DEC Debugging Tape (DDT)	HBL	8	x
MIT-2	Expensive Typewriter	HBL	8	x
MIT-3	MACRO (Assembly Program) Symbol Package	HBL	8	
MIT-3	MACRO (Assembly Program) Fio-Dec	HBL	8	x

The following programs have just recently been acquired by the library and have not been duplicated in quantities for distribution.

ScopeTrace - John R. Hayes
TED-An Off-Line Controlled Editing Program for the PDP-1 Computer - Charles R. Brown
and
Donald W. Connolly
Libtape for Decimal Input-Output Routines - BBN

The library contains only write-ups for the following programs:

ADA-4	Typewriter Inquiry Control
BBN-5	Tone Generation Routine
BBN-11	Bit Manipulation Package
BBN-15	Gaussian Random Number Generator
BBN-20	Time Delay Subroutine
DEC-10	Read-In Mode Simulator
DEC-14	Combined Reader and Punch Test

Following are programs which have not been edited

Title	Tape Type
Filter Computation Programs	F.S.
Plotgrid & Accessories	HBL
Scope Raster	F.S.
DECAL Dump	F.S.
Random Carry Patterns	BIN
Octype	D.L.
Octype	D.S.
Dec & Oct to Binary	D.S.
Punchoff	D.L.
Punchoff Loader	D.S.
Fredkin's Low Debug	HBL
Hi Punchoff	HBL
Primes	HBL
Eff. Address	D.S.
Eff. Address	D.L.
PTRACE	D.S.
PTRACE	D.L.
TYC (Eff. Addr.)	D.L.
TYC (Eff. Addr.)	D.S.
Punch English Title Block Subroutine	F.S.
Move Down	D.S.
Move Down	D.L.
Complete Typeout Pkg.	D.S.
Complete Typeout Pkg.	D.L.
Graph Paper	HBL
Time Sharing Colossal & TYC	HBL
Prime Number Program	F.S.
Frap Clear Memory	F.S.
W.C.'s Histogram & Bar Graph Generator	HBL
Typed Display	HBL
Track & Draw	HBL
TW	RIM
Program to Alpharead Card with Type-Out	RIM
Test Read Cards	HBL
See A Card	HBL
Frap Symb. for Type Out of Undef. Symb.	F.S.
Triumph IV	HBL

dec INTEROFFICE MEMORANDUM

File

DATE August 30th, 1962

SUBJECT PDP-4 Marshall Space Flight Center

TO Bob Beckman

FROM Kenneth H. Olsen

I received a call on Wednesday, August 29th from Mr. Robert Smith of the Marshall Space Flight Center. He would like to come with a team of people next Friday morning, September 7th to consider our PDP computer for space vehicle check out. I, of course, told him yes and they will arrive next Thursday evening and will come here first thing in the morning.

The people will be Messrs. E. C. Mitchell, Jerry Turner, W. O. Mitchell, Ellis Baggs and Robert Smith. We might have the visitor's badges made out for them ahead of time.

Because Andy, Stan and Ben Gurley are not here, I would like to have you take charge of this visit and give them the tour and everything they need. Ask Gordon Bell to stand by so that if they have technical questions, he can answer them. You might have them gather in my office and we can all drink coffee together. Then, you can take them on a tour and sit down and answer their detail questions.

They asked if I would arrange for hotel reservations for them. After I delayed a little bit they agreed to do this themselves. Maybe they were suggesting that we pay for their hotel, but I didn't understand this.

Kenneth H. Olsen

cc: Harlan Anderson
Gordon Bell
Stan Olsen

dec INTEROFFICE MEMORANDUM

DATE August 27, 1962

SUBJECT Purchase Order #491-3 (ITT)

TO H. Anderson

FROM Nick Mazzarese

Attached is a copy of Purchase Order #491-3 from ITT for purchase of ADX equipment.

/ak

Date of Requisition	Requisitioned by:	Account Number:
July 17, 1962	R. L. Lane	175-304

Date: August 4, 1962

To: Digital Equipment Corporation (DEC)
Maynard,
Massachusetts

ITT Information Systems Div.
Division of International
Telephone and Telegraph
Corporation (ITT)
600 Industrial Avenue
Paramus, New Jersey

PURCHASE ORDER NO. 491-3

Subject to the terms and conditions attached hereto and numbered-ADX-491-3, the following equipment is placed on order:

Quantity	Description
12 each	ADX Equipment, complete and ready to operate in strict accordance with technical specification attached hereto and hereby made a part hereof.

The acknowledgment and acceptance of this order must be made by DEC within (5) days or such other time as is agreed upon by the parties in order to constitute a contract.

ITT INFORMATION SYSTEMS DIVISION
Division of International Telephone
and Telegraph Corporation

By John N Ackley
Authorized Signature

Accepted:
DIGITAL EQUIPMENT CORPORATION

By Kenneth W Olsen

Date: _____

EXHIBIT "A" to PURCHASE ORDER
#491-3 July 16, 1962

ADX SYSTEM SPECIFICATION

I. Scope:

This specification describes an expanded PDP-1 computer system to be designed and manufactured by DEC for ITT for use in an Automatic Data Exchange.

II. Performance Specifications:

Digital Equipment Corporation shall supply an Automatic Data Exchange system consisting of digital computer PDP-1 and major components as itemized in the individual purchase order. The computer and all components supplied by DEC shall be fully compatible and shall function in accordance with the performance requirements specified herein.

A. Programmed Data Processor (PDP-1)

The PDP-1 is a digital computer designed and manufactured by DEC and described in DEC publication F-15B. A copy of F-15B is attached, labeled as Exhibit C and forms a part of this specification except as modified and supplemented herein and by mutual agreement between DEC and ITT.

B. Special Sequence Break and Line Unit Selection System

This is a 64 channel automatic interrupt feature which permits concurrent operation of several in-out devices. The Sequence Break System (SBS) shall be expandable in units of 64 channels, up to 256 channels, grouped into 16 groups of 16 channels each. These groups or sequences are arranged in a priority chain. A sequence can interrupt a lower priority sequence. A request by channel, or subsequence, may interrupt a channel from a lower priority sequence but it cannot interrupt another channel in the same sequence. A break by a particular sequence can be initiated by the request from any channel within that sequence subject to the above rules.

At the start of a break, the contents of the accumulator, the in-out register, and program counter, and the contents of the extend, overflow and EPC flip-flops are stored in adjacent fixed locations unique to that sequence. The next instruction is taken from a fixed location which is determined by the sequence number and the channel number causing the break, and whose address is defined by $(1000 + 20i + j)_8$, where "i" is defined as the sequence number and "j" the subsequence number. The program is now operating in the new sequence. The interruption is terminated by a JMP* instruction to that memory location which has held the contents of the program counter, extended program counter and the overflow and extend flip-flops. This special equipment also includes the provisions to select the various line units.

The following modifications and additions shall be provided to achieve compatability between the Sequence Break System (SBS) and the PDP-1 as described in Exhibit C:

1. All input-output functions shall be compatible with the SBS.

2. Tape control instructions that permit operation under SBS control and permit the time sharing of operations with the Central Processing Unit (CPU) of the PDP-1.

3. Instructions to turn off or inhibit the setting of a priority flag by the SBS on any output line not in use (i.e., in the "ready" state), until the execution of the next data transfer instruction which will automatically reactivate the flag.

4. CPU program flag no. 1 shall be used by SBS as the priority flag for the on-line typewriter.

5. The addition of the following instructions to the instruction list contained in Exhibit C.

   a. XAM(Y) - Operation Code 14.
   Exchange contents of memory location Y and the accumulator. C(AC) remain unchanged.

b. JDA - Operation Code 16

Jump and Deposit C (AC)

C(AC) $\longrightarrow$ Y

C(PC) & C(EPC) $\longrightarrow$ AC

Y + 1 replaces C(PC)

Address of next instruction is Y + 1.

JDA* - Operation Code 17

Jump and Deposit C(AC) deferred

c. TTT - Teletype Transfer (1 memory cycle)

This instruction shall permit integration of up to 512 teletype channels. The address portion of the instruction determines the unit and function.

6. I/O instructions to enable scatter read and gather write from and to magnetic tapes. That is the ability to write one continuous record of information, without disconnecting the output device, from different areas of core storage; or to read a continous record from one input device to different areas of core storage.

7. The CAL instruction described in Attachment C (Operation Code 16), is not provided.

C. Tape Control Unit, DEC Type 52

The Tape Control Unit shall be a standard DEC Type 52 with optional capability for duplex switching. After the central processor has provided the Tape Control Unit with the proper set-up commands, the tape control unit shall automatically transfer, on a break-in basis, the specified number of words to or from the core bank specified. The central processor shall not lose more than one memory cycle per word during this transfer. The memory bank selection of the central processor shall not be disturbed and transfers may take place between any core bank and tape. Upon completion of a transfer, a sequence break system flag shall be set.

D. Tape Unit, DEC Type 50

The Tape Units shall be standard DEC Type 50 with optional capability for duplex switching. The transports operate at 75 inches per second with a recording density of 200 bits to the inch. The format shall be the same as for the IBM 729 Model I. Seven tracks are written: six are binary or alphanumeric bits, and a seventh is used as a lateral parity. At the completion of a record, which may be of arbitrary length, a longitudinal parity is written.

One DEC Type 52 Tape Control Unit shall serve up to 8 Tape Units or transports. Up to four Tape Control Units may be incorporated in an individual configuration.

E. Line Units

The Line Units shall operate with the Sequence Break System and shall permit data interchange with teletype channels using 7.5 unit start-stop code. The 7.5 unit code consists of a one unit start pulse (space), five unit width information pulses (marks) or spaces followed by a 1.5 unit stop mark. The Outgoing Line Unit shall transmit in 7.5 unit code.

The Line Units shall be grouped with 8 Line Units in a group which operate from a common timing source within the group. This source is fixed by a crystal so that the above time intervals or units (Mark or Space) are 20 M.S. In the event that a different 7.5 unit transmission rate is desired, DEC will supply a variable clock.

The Incoming Line Units (ILU) will receive either 7.0, 7.42, Or 7.5 unit code.

Each Incoming Line Unit (ILU) samples the signal at the center of each unit. The PDP-1 must empty the one level ILU buffer before more information arrives. Thus, a flag for the sequence break is activated at the middle of the fifth information bit (at sampling time). The ILU will be unloaded before the end of the stop pulse and eliminate the need for additional buffering.

The input to the ILU will be a level of 0 volts for a mark and -3 volts for a space.

The output of an OLU will be a level of 0 volts for a mark, and -3 volts for a space.

F. Duplex Switches

The PDP-1 shall be capable of a simplex or duplex operation as specified in the individual purchase order. For duplex operation the following provisions shall be applicable:

1. Tape Control Units, Tape Transports and Line Units shall be switchable between both PDP-1's under program or Manual Control as specified by ITT.

2. A high speed 18 bit parallel transfer path between the two PDP-1's shall be provided for a duplex configuration. This transfer shall be under program control and capable of transferring at least 10,000 words/second.

The Duplex Feature necessitates one (1) additional cabinet of equipment which includes:

1. ITT-7374-Dual Transfer Path indicators and controls.

2. ITT-7371-Tape Control Units Duplex Switches, indicators and controls.

3. ITT-7370-Tape Unit Duplex Switches, indicators and controls.

Duplex Switches are applicable for the following components:

1. Tape Control Unit, DEC Type 52
2. Tape Unit, DEC Type 50
3. Incoming Line Unit Groups
4. Outgoing Line Unit Groups

The switches shall be under the programmed control of two PDP-1's with manual override provisions. If one PDP-1 selects a component by operating the associated Duplex Switch, the second PDP-1 shall not be able to affect this selection until the component is released by the first PDP-1. These switches shall operate within 100 milliseconds of the command given by the PDP-1.

III. Power Requirements:

The PDP-1 and all components shall operate from conventional 110 or 220 volt 60 cycle, or 117 volt, 50 cycle, AC power as desired and specified in accordance with Exhibit B at time of order. The low voltage DC power for operating the logic circuitry and electronic equipment shall be supplied from rectifiers distributed among the equipment cabinets.

Exhibit "D" attached hereto is a detailed description of the physical and electrical characteristics of each device as listed in Exhibit B. (i.e. size, weight, heat dissipation, voltage and frequency tolerance, and power consumption.)

EXHIBIT "B" TO ITT/DEC
PURCHASE AGREEMENT 491-3

DATED July 16, 1962

		LIST PRICE	DISCOUNT PRICE
1.	ITT-7301, ADX Multiplexed Message Processor	$132,300	$119,070
	a. Parity Check Feature	6,500	6,500
2.	ITT-7303, Additional Core Banks	30,000	27,000
	a. Parity Check Feature	1,500	1,500
3.	ITT-7302, Sequence Break System		
	64 Channels	42,000	37,800
	128 Channels	44,800	40,320
	192 Channels	47,600	42,840
	256 Channels	50,400	45,360
4.	ITT-7321, Magnetic Tape Control Unit	38,000	34,200
5.	ITT-7320, Magnetic Tape Unit	18,000	16,200
6.	ITT-7370, Magnetic Tape Unit Duplex Switch	2,500	2,500
7.	ITT-7371, Magnetic Tape Control Unit Duplex Switch	5,000	5,000
8.	ITT-7330, Incoming Line Unit Group (8)	5,600	5,600
9.	ITT-7331, Outgoing Line Unit Group (8)	4,800	4,800
10.	ITT-XXXX, Incoming Line Unit Group Duplex Switch	1,200	1,200
11.	ITT-XXXX, Outgoing Line Unit Group Duplex Switch	900	900
12.	ITT-7374, Dual Transfer Path (Indicators Included)	2,200	2,200
13.	ITT-XXXX, High Speed Multiply & Divide Feature	10,300	9,270
14.	ITT-7375, Additional Completion Pulse Trap Group (4)	500	500

15.	ITT-XXXX, One (1) Additional High Speed Channel Channel	2,500	2,500
16.	ITT-XXXX, High Speed Channel Control	9,000	8,100
17.	Fifty (50) Cycle Conversion for each Component:		
	ITT-7301, ADX Multiplexed Message Processor	3,500	3,500
	ITT-7320, Magnetic Tape Unit (ea.)	1,000	1,000
	ITT-7321, Magnetic Tape Control Unit	500	500
	ITT-7330, Incoming Line Unit Group (8)	100	100
	ITT-7331, Outgoing Line Unit Group (8)	100	100
	ITT-7303, Additional Core Bank (ea.)	200	200

Purchase Order No. 491-3
Exhibit "C"
Date: 7/27/62

TERMS AND CONDITIONS

1. EQUIPMENT:

An equipment shall consist of PDP-1 Computer, conforming to ADX System Specification attached hereto, (Product of DEC) together with any component or components listed in Exhibit "B" hereto in the configuration and quantities selected by ITT, and shall be complete including all normal accessories required to make an operable unit, such as power supplies, cables, connectors, meters, protective devices and the like, whether ennumerated in said Exhibit "B" or not, provided, however, that in computing the cost of the equipment such accessories shall be deemed merged in the various components and shall be furnished by DEC without additional charge. All components delivered hereunder shall be identical in function as the same may effect programming, maintenance and operation except as may be agreed to by both parties in advance, in writing.

Styling of cabinets, housings and external appearance shall be in accordance with designs of ITT and finish and color shall be as designated by ITT. ITT will provide such design and designations reasonably in advance of scheduled delivery.

Changes to styling of cabinets, housing and external appearance shall be submitted to ITT for approval and no action permitted until approval is obtained.

2. DELIVERY:

The first equipment shall be delivered on January 15, 1963 or such earlier date as the parties hereto may agree to and subsequent equipment shall be delivered at the rate of one (1) per month thereafter until the entire delivery has been completed. Time is of the essence in delivery. ITT will notify DEC of the configuration of each equipment six (6) months prior to the scheduled delivery date. Any subsequent change of configuration must be agreed to by both parties in writing.

3. REDUCTION IN QUANTITY:

ITT shall have the right to reduce the quantity of equipments by the giving of written notice thereof to DEC, provided however that such notice shall be given at least six (6) months prior to scheduled delivery date of equipment or equipments to be cancelled.

4. PRICES:

a) Prices shall be computed in accordance with Exhibit B attached hereto on the prices of the components and the quantities thereof selected for the configuration of the equipment by ITT. Prices given include accessories defined in paragraph 1 - "Equipment" above, and packing and crating in accordance with DEC's standard practice for safe air or truck shipment - method of shipment being at the selection of ITT. Price of nonstandard cabinetry shall be negotiated under Article 21 "Changes". Prices to ITT shall be the "Discount Price" unless the Quantity of equipment Purchased is reduced to less than six (6) pursuant to paragraph 3 above, in which event the prices shall be list price.

5. ACCEPTANCE:

Acceptance tests in accordance with the specifications attached hereto shall be conducted at the Maynard, Massachusetts, plant of DEC and shall be scheduled adequately in advance so as to allow for shipment within the time specified. DEC shall give ITT seven (7) days' advance notice of their readiness to conduct acceptance tests. DEC shall provide all reasonable facilities, assistance, test equipment and supplies necessary for the conduct of acceptance testing.

6 PAYMENT:

Upon submission to ITT of proper invoices therefore, DEC shall be paid the price computed as stated above for the equipments accepted and delivered to ITT. Delivery shall be f.o.b. Maynard, Massachusetts. Payment shall be as follows: 100% of the price for equipment, material and service shall be paid within thirty (30) days, following acceptance of the equipment at DEC and receipt in good order of the equipment at ITT or its designated point of delivery in continental U.S.A.

7. EXTRAS:

Except as otherwise provided in this Purchase Order, no payment for extras shall be made unless such extras and the price thereof have been authorized in writing by ITT.

8. INSPECTION:

Equipment to be provided hereunder shall be subject to reasonable inspection and test by ITT to the extent practicable at all times and places and, in any event, prior to acceptance.

9. WARRANTY:

DEC warrants for a period of one (1) year following acceptance and shipment, that the equipment shipped hereunder shall be free from defects in design, materials, workmanship and shall in every respect be strictly in accordance with applicable specifications. These warrantees shall survive acceptance and payment and shall run to ITT, its subsidiaries and to its customers. DEC shall promptly provide all parts and labor, at its own expense, necessary for satisfactory operation during said one (1) year period except that parts and labor for routine maintenance shall be provided by ITT. ITT agrees to pay all travel and living expenses of DEC employees in the performance of DEC obligations under this paragraph.

This warranty is limited to the above and does not include consequential damage of any kind.

10. TAXES:

The price for the equipment, materials and services includes any taxes incurred or applicable up to and including the time and place of shipment, such as but not limited to social security, old age benefit tax, Workmen's Compensation and Disability Benefit taxes, franchise taxes of DEC, federal and state income taxes, and any other taxes except as provided below. Any federal excise tax or state sales or use tax applicable to the equipment or materials shall be paid by ITT directly or added to the scheduled list prices.

11. SUBCONTRACTS:

In connection with any subcontracting by DEC related to the manufacture of PDP-1 computers for ADX Systems, DEC agrees that ITT shall be given the opportunity to perform such subcontract work in excess of $5,000 provided that price, delivery and quality are competitive. ITT, with the consent of DEC, may designate the components used in the equipment to be furnished, provided, however, that such consent shall not unreasonably be withheld.

12. PATENT INDEMITY:

DEC will defend any claim or suit brought against ITT, its subsidiaries and their customers for infringement of United States patents by any components sold hereunder to ITT or its subsidiaries. In any case suit or claim so instituted, DEC, if notified promptly in writing and given authority, information, and assistance for the defense of the same all at DEC's expense, will pay all damages and costs in connection therewith. However, DEC assumes no liability, consequential or otherwise, for infringement of patents covering any other products or any completed equipment or any assembly, circuit, combination, method or process or any part of parts thereof, in combination with the components furnished by DEC in accordance with this Agreement. In no event shall any cost or expense be incurred by ITT for the account of DEC without DEC's written consent. The above states in its entirety the liability of DEC with respect to patent infringement by any of said components to be sold under this Purchase Order.

13. WRITING:

DEC hereby grants and agrees to grant to ITT and its subsidiaries all rights to reproduce and have reproduced all or any part or any writings describing or relating to or resulting from the performance of work under this Purchase Order for dissemination within ITT and to ITT's customers. With regard to reproduction for sales and publicity, ITT shall be generally guided by the advice of DEC.

14. MARKING:

DEC shall place on any equipment delivered to ITT under this Purchase Order any ITT label, marking or trademark and shall remove any DEC label, marking or trademark all as specified by ITT. The additional cost, if any, of such marking or the elimination of such marking shall be at the expense of ITT and in addition to the prices shown in Exhibit B.

15. DEFAULT:

ITT may cancel this purchase order in whole or in part at any time by written or telegraphic notice whenever DEC shall default in performance or shall so fail to make progress in the work so as to endanger performance except that the purchase order shall not be terminated for such default where the default is due to causes beyond control of DEC and without its fault or neglect. Such causes may include but are not restricted

to acts of God or of the public enemy, fires, floods, epidemics, quarantive restrictions, strikes, freight embargoes and unusally severe weather but in every case the failure to perform must be beyond the control and without the fault or negligence of DEC. ITT may cancel this purchase order forthwith by written or telegraphic notice if DEC ceases to conduct its operations in the normal course of business including inability to meet its obligations as they mature or become insolvent or make a general assignment for the benefit of creditors, or if a trustee, receiver, liquidator or conservator for DEC is applied for or appointed. After notice of termination by reason of such default, DEC shall transfer title and deliver to ITT satisfactorily completed work and such work in process as may be directed by ITT. In case of termination by ITT pursuant to this clause, ITT shall not have any liability except for deliveries previously made or for equipment covered by the purchase order then completed and subsequently delivered in accordance with the terms of the purchase order.

16. PATENT RIGHTS:

DEC hereby grants and agrees to grant to ITT and its subsidiaries in and for the entire world, a nonexclusive royalty free license to make, use, sell, have made, and practice and have practiced any invention developed specially in connection with the supply of the equipments pursuant to this purchase order.

17. ASSIGNMENT:

This purchase order shall be binding upon and inure to the benefit of the parties hereto and their successors and assigns provided, however, that DEC may not assign this purchase order without the permission of ITT. DEC may assign any monies due to to become due hereunder to any bank or financial institution without the consent of ITT.

18. NOTICES:

a) Any notices or demands required or permitted to be given or made hereunder shall be sufficient if given or made either by personal service upon an officer or by mailing the same by registered mail in a sealed envelope, postage prepaid, and addressed to such party at the address shown on first page hereof, directed to the attention of the person who executes the Purchase Order on behalf of such party.

b) Any such notice or demand shall be deemed to have been given or made as of the time of its deposit in the United States Post Office or letter box. Either party hereto may from time to time designate any other post office address or officer by written notice to the other party.

19. MODIFICATION:

This Purchase Order contains all terms, conditions and provisions of this transaction and no agreement or other understanding in any way modifying the conditions hereof will be binding upon either party unless made in writing and executed by the other party. No term of Condition at variance with this Purchase Order proposed by either party in acknowledging or accepting this Purchase Order will be binding on the other party unless accepted in writing and executed by the other party. The furnishing of any articles or services by DEC specified in this Purchase Order constitutes an unqualified acceptance by DEC of all the terms conditions and provisions set forth herein unless otherwise modified in writing and executed by both parties.

No waiver of any of the provisions contained this Purchase Order shall be valid unless made in writing and executed by both parties. Failure of ITT to insist upon strict performance shall not constitute a waiver of any of the provisions of this Purchase Order or waiver of any other default.

20. COMPLIANCE WITH LABOR AND OTHER LAWS:

All materials and merchandise covered by this order shall be manufactured or produced under terms and conditions which meet the applicable requirements of the Fair Labor Standards Act of 1938 and all applicable Federal, State and local laws and regulations governing wages, hours and conditions of labor. DEC shall comply with all Federal, State and Municipal laws, rules and regulations that may be applicable to this order, and at the request of ITT shall furnish certificates to the effect that it has complied with the same.

21. CHANGES:

ITT shall have the right by written order to make changes from time to time in the work to be performed or the materials to be furnished by DEC hereunder. If such changes cause an increase or decrease in the amount due under the order or in the time required for its performance, an equitable adjustment shall be made and the order shall be modified in writing accordingly. Any claim for adjustment must be asserted within eight(8) days from the date the change is ordered.

22. DISCLOSURES:

DEC agrees to treat as confidential, all specifications drawings, blueprints, nomenclature, samples models and other information supplied by ITT. Unless written consent of ITT is first obtained DEC shall not in any manner advertise or publish or release for publication any statement mentioning ITT or the fact that DEC has furnished or contracted to furnish to ITT articles required by this order or quote the opinion of any employee of ITT. DEC shall not disclose any information relating to this order to any person not entitled to receive it.

23. TITLE TO DRAWINGS AND SPECIFICATIONS:

ITT shall at all times have title to all drawings and specifications furnished to DEC for use with this order. DEC shall, upon request from ITT, or upon completion of this order, return all drawings and specifications to ITT.

24. GOVERNMENT CONTRACTS:

When ITT notifies DEC 6 months in advance of delivery by means of a Configuration Schedule that any equipment or equipments are in fulfillment, in whole or part, of any Contract with the United States Government or any subcontract under such Government Contract the following additional provisions shall apply, and shall be inserted by DEC in all subcontracts thereunder.

A. Non-Discrimination:
The provisions of Sec. 301 of Executive Order 10925 (26 FR 1977) are hereby incorporated in and made a part of this Order by reference.

B. Classified Orders:
If this Order involves access to government classified matter, i.e., confidential, secret and top secret, Seller agrees to comply with all Government Military Security Requirements, a summary of which will be furnished by Buyer on request.

C. Renegotiation:
This order shall be subject to any Act of the Congress whether heretofore or hereafter enacted and to the extent indicated therein, providing for the renegotiation thereof and shall be deemed to contain all the provisions required by any such Act without subsequent amendment of this Order specifically incorporating such provisions.

D. Patent License:
If this Order is for $3,000 or more and involves experimental, development or research work, the Seller without further cost to the Buyer, hereby grants and agrees to grant to the Buyer and to the extent requested by the Buyer, to the Government, an irrevocable, non-exclusive, royalty-free right and license to use, sell, manufacture and cause to be manufactured, products embodying any and all inventions and discoveries made, conceived or actually reduced to practice in connection with the performance of this Order.

E. Termination:
The Buyer may terminate this Order, for the convenience of the Government, in whole or in part, by written or telegraphic notice. In the event of termination of this Order, except for default of the Seller, settlement shall be made by negotiation substantially in accordance with the procedure and formula set forth in the Termination Article of the prime contract for which this Order is issued. (A copy of such applicable Termination Article will be made available by the Buyer to the Seller upon request.)

F. Records:
Seller agrees that the Comptroller-General of the United States, or any Government Department, or any of their duly authorized representatives shall, until the expiration of three years after final payment under the Government contract referred to on the face of this Order, have access to and the right to examine any directly pertinant books, documents, papers and records of the Seller, and of any supplier of goods to the Seller, involving transactions related to this Order. Seller agrees to incorporate in all of its orders and contract with the suppliers or any articles, and with respect to the performance of any part of the work, to be incorporated in the items covered by this Order, a provision in form to the same effect as this paragraph.

G. Inspection and Audit:
The Seller agrees that its books and records and its plant or such parts thereof as may be employed in the performance of this Order, shall at all reasonable times be subject to inspection and audit by any authorized representative of the United States Government.

H. Government Regulations:
The following clauses of the Armed Services Procurement Regulations (ASPR), of the edition in effect at the date of this Order, are hereby incorporated in and made a part of this Order by this reference: a) Covenant against Contingent Fees (ASPR 7-103.30); b) Officials not to benefit (ASPR-7-103.19;) c) Buy American Act (ASPR 7-104.3); d) Walsh-Healey Public Contracts Act (ASPR 7-103.17 e) Utilization of Small Business

Concerns (ASPR 7-104.14); f) Convict Labor (ASPR 12-203); g) Eight Hour Law of 1912-Overtime Compensation (ASPR 12-303). h) Non Descrimination (ASPR 12-802)

I. References:

At the request of the Seller, the Buyer will make available to the seller the text of any of the foregoing references.

dec INTEROFFICE MEMORANDUM

File

DATE August 27, 1962

SUBJECT Color Movies of Parachute Jump

TO Jack Atwood

FROM Kenneth H. Olsen

Sometime in the future we may want to make up a demonstration or educational movie on the PDP computers. If we were to do this it would be very nice to have some footage of the computer at the parachute jump. I have no idea how expensive this would be but I think it would be a good idea to look into it and see how practical it would be at this time. We might rent a camera and take them ourselves or hire someone else to do it.

Kenneth H. Olsen

CC: Harlan Anderson
Stan Olsen
Stuart Grover

INTEROFFICE MEMORANDUM

DATE August 24, 1962

SUBJECT Shifting of Delivery Dates

TO K. Olsen
H. Anderson ✓
S. Olsen
M. Sandler
G. O'Dea

FROM Jack Smith

Who has the authority to shift a customer delivery date? Who is notified when a shift has taken place? Who should be notified when a shift has taken place? These questions have been causing me some concern for the past few weeks. The reason for my concern is that, try as I may, these questions go unanswered.

Just two days ago I found out quite by accident that the delivery date of the United Aircraft system was shifted from September to October. Was this shift necessary? Could a double work shift have prevented this? Could someone have been transferred from another job to help out? I'm not quite sure that these questions were reviewed by the right people in time to take preventative action. To the checkout people this shift was of no great concern. The customer was not greatly concerned. To our internal finance people this shift from one month to another could be of great concern. In this particular case I feel quite sure that this memo is the first time our finance people have heard of this shift.

Shifting of delivery dates should be made known as soon as possible, so decisions can be made. I feel that the people effecting delivery dates should be made to realize that shifting dates affects material procurement plans and module availability and other planning efforts. The authority to shift dates should be formalized and procedure for information flow installed.

dec INTEROFFICE MEMORANDUM

DATE August 24, 1962

SUBJECT MIT Computeriter

TO Ken Olsen
Harlan Anderson
Stan Olsen

FROM Bob Beckman

cc: "Quality of Performance" file

The Computeriter originally delivered with the machine donated to MIT had an extremely high failure rate. The original typewriter was eventually removed and "temporarily" replaced by a brown Computeriter.

The first Computeriter was brought back to the plant and completely overhauled. It was recently loaned to BBN and used for a month in their sound learning program. It operated quite reliably during this period. At the present time it is being rechecked, cleaned, and the case repainted.

The replacement Computeriter at MIT has been so reliable that the people there are very reluctant to part with it. I discussed this with John McKenzie and he has agreed to take back their original Computeriter on a trial basis so long as we leave the brown there as a spare. Assuming that the original machine operates as reliably as it did at BBN, we should wind up demonstrating that DEC can take even a "lemon" and get the maximum possible operation out of it.

MIT has a second Computeriter that they bought directly from Soroban. I think that, if they are willing, we should take it on ourselves to repaint this machine to match the computer.

August 23, 1962

Government Inspection

Stan Olsen

Jim Cudmore

On August 15, Mr. Babineau of Western Electric Supplies Inspection Organization, arrived to inspect order PM-707048. This order consisted of four 1115's, seven 1113's, and seven 1110's.

These units were retested for the inspector and all units were found to be acceptable.

cc: Ken Olsen
Harlan Anderson
Bob Hughes
Jim Burley

COPY

E. Parker

INTEROFFICE MEMORANDUM

DATE August 23, 1962

SUBJECT Computer Testing Before Shipment

TO PDP-1 Distribution List FROM Bob Hughes & Al Blumenthal

In the past we agreed informally to heat test all computers and systems that we manufactured. As a result of heat testing on the PDP-1, we discovered timing troubles which weren't discovered with the normal marginal check.

Heat testing is a powerful tool in preventative maintenance, and we feel it will reduce our field maintenance costs.

So, if everyone agrees, effective now, the quality control inspector for the given machine will require a margin record for all systems with the margins being taken at normal room temperature, and with the machine in the heat tent with ambient around the machine of +100° F.

The only exceptions to this rule will be authorized by Ben Gurley and Ken Olsen.

dec INTEROFFICE MEMORANDUM

K.H.O.

DATE August 22nd, 1962

SUBJECT

TO Stan Olsen

FROM Kenneth H. Olsen

I want to start an Inquiry Log immediately. I think this should be kept by one of the secretaries in the Sales Department. This log should be a loose leaf notebook with serially numbered pages. Each page should have a ditto form on it so that information can be put down in a consistent form and either typed or handwritten in. We should probably start a new notebook each month and then file the notebooks away.

Each Monday, I would like delivered to my office a status report on inquiries. In this report I would like to have a list of all outstanding inquiries that have not been answered. It should also list the date which they will be answered and who will answer them. Your secretary can readily get this from the log.

At the present time we do not get around to answering inquiries until they are overdue. It is embarrassing when some of these are answered in a negative way after we have taken the full length of time to say no.

Kenneth H. Olsen

cc: Nick Mazzarese
Bob Beckman
Harlan Anderson

dec INTEROFFICE MEMORANDUM

DATE August 17, 1962

SUBJECT Computer Documentation

TO Ben Gurley, Al Blumenthal, Gordon Bell

FROM Bob Beckman

cc: Ken Olsen
Harlan Anderson
Stan Olsen
Roger Melanson

Incorrect documentation (block schematics, wiring diagrams, and cable schedules) of computers in the field has been the subject of many customer complaints and has caused a great deal of difficulty and extra work in performing field maintenance and modifications.

The sources of documentation errors can be divided into two main catagories: initial errors at time of delivery, and errors generated as a result of field modifications. I suggest the following procedures as a means of helping to control this problem.

Most of the initial errors at delivery time are due to the fact that the people making up the documentation package to ship with the computer do not have an up-to-date list of applicable prints and/or drafting has not had time to make the necessary corrections. It is requested that the computer check-out groups supply an accurate list of appropriate prints for each computer. This list should be sent to Customer Relations as far in advance of the shipping date as possible and should be updated as necessary. At the end of the check-out procedure and before the final preshipment tests, marked up copies of all prints requiring changes should be turned over to drafting and a list of the prints being changed sent to Customer Relations. Shipment of the computer should not be made until all corrected prints are available and drafting should give high priority to the correction of these prints. Such a system does not necessarily mean that shipment of the computer will be held up waiting for the corrected prints. In most cases, it should be possible to make the necessary corrections during the time required for final testing of the computer and preparing it for shipment. If these procedures are followed, we can be reasonably certain that the initial documentation of the system is accurate.

Once control of initial documentation is acheived, it will be easier to keep up with changes due to modifications. In most cases it should be possible to accurately document a modification before the actual hardware has been changed. No modification work should be done until corrected prints are available and the customer's old prints should be removed and/or destroyed as soon as the change has been accomplished. On-the-spot changes should be nonexistant, or, at the most, very minor. In such cases, the personnel concerned should leave a hand-corrected copy of the new print with the customer and turn over another corrected copy to drafting for formal correction. The customer's hand-corrected copy must then be replaced as soon as possible.

I realize that these ideas are not new, but the number of difficulties and errors that have been cropping up indicate a need for more formalized and stricter procedures.

dec INTEROFFICE MEMORANDUM

4.3C

DATE August 17, 1962

SUBJECT Production Capabilities and Future Plans -
Attended by Maynard Sandler, Stan Olsen, and Jack Smith

TO K. Olsen
H. Anderson
S. Olsen
M. Sandler

FROM Jack Smith

The first topic of discussion was the build up of modules waiting to be tested. This bottleneck was caused by the failure of our automatic testers. Jim Cudmore has been right on top of the problem and feels it should be eliminated fairly soon. This area is our biggest bottleneck and requires constant attention.

A steady slate of 10,000 modules to finished goods for the next few months was agreed upon. Our own capabilities have been building up the past few months and our orders to outside vendors have been decreasing. It was agreed that we have an obligation to keep our outside vendors informed of any changes that would affect their planning.

Outside wiring, in contrast to module assembly, is our high cost area. It was agreed that we should try to do as much wiring in-house as possible. We will start to move up girls into the wiring group to be trained within the next couple of weeks.

The question of a separate area for the wiring group was discussed but no conclusions were formed.

dec INTEROFFICE MEMORANDUM

File

DATE August 15, 1962

SUBJECT PDP-4 Construction Procedure

TO H. Anderson FROM Jack Smith

Our present schedule calls for the construction of one basic PDP-4 per month.

Sub-assemblies for the Central Processor will be constructed in lot sizes under a job number assigned by Production Control. Each Central Processor to be constructed will be assigned an 8000 series part number and a manufacturing job number. The manufacturing cost for a set of sub-assemblies will be transferred to this 8000 series number. All additional meterial and labor with applied overhead for the completion of the machine will be changed to the 8000 series number.

With the assignment of an EN number, usually generated by the receipt of a customer order, modules will be ordered. Actual checkout of the machine will be charged to the EN number.

INTEROFFICE MEMORANDUM

DATE August 15, 1962

SUBJECT Executive Paging System

TO Brad Towle

FROM Kenneth H. Olsen

In some ways we have a poor system for executive paging. If we are called from the outside the operator first rings our phone. If we are not there, our secretary answers it. If she doesn't know where we are, she has the main operator gong us. By the time we pick it up and each of the secretaries has asked who is calling, the caller is rather impatient. I suggest that we consider the following system: Each secretary of those who are on the gong system will have a gong button on her desk. We can enlarge the number of those who are gonged somewhat if we use a more sophisticated coding system. Then, all calls will go directly to the secretary and the operator will not have to ask who the caller is.

Most of the people who are on the gong system will have more than one line coming into their office. Outside calls can come on one line and inside calls can come on another. In this way the secretary or the man in the office can differentiate between them.

This would mean working out a system in which the person being called can dial into the same line which the secretary is holding. If this can be readily done I think we should go ahead with the system.

We have heard a number of complaints about our telephone answering service lately. One complaint is that it sometimes takes minutes before the call is answered. The other complaint is that sometime after the operator calls individuals, she comes back and asks who is calling. I believe this is simply because she forgot to ask originally, but the implication is that she has the man on the phone and whether he is in or not is dependent on who is calling. If the girl forgets to ask immediately the name of the caller, she should not bother asking at all and let the man being called figure it out.

Kenneth H. Olsen

CC: Stan Olsen
Harlan Anderson
Maynard Sandler
Dick Best
Ben Gurley

INTEROFFICE MEMORANDUM

DATE August 15, 1962

SUBJECT

TO Harlan Anderson

FROM Kenneth H. Olsen

Thursday morning, August 14th Gordon Bell, Ben Gurley and myself visited the RCA branch of Foxboro. My impression of the people and of their competence were very high after this meeting. I think we can develop a very good relationship with them.

CDC has a number of advantages on the charts which they have drawn. Their costs are somewhat lower, and they have a high speed arithmetic element available for the CDC 160, and they theoretically can expand in memory indefinitely.

We told them that we are developing a high speed arithmetic package and that this will be available. We offered to send them the specifications on this and also offered to work out the details of this with them.

I think that if at all possible we should make the expand memory available as a standard feature and do not increase the cost for this.

Although the CDC 160 is slightly less expensive in some areas, I do not suggest that we try to meet them on price. If we do this, CDC will probably lower their price and then no one will make any money.

We do have a very significant advantage over CDC in that we are physically close and that they know that we have people who are right here who can speak for the project. I also have the feeling that we have gained their confidence.

They proposed to go into this field relatively slowly, they will order 2 or 3 computers this year for delivery early next year and after that expect to sell between 4 to 6 computers each year. They do not expect to make money as a group until 1965, although they expect to lose less and less each year before that.

They are considering the power field and they feel that they have some equipment which puts them in a propriety position in this area. This is completely separate from the project which they bought a CDC 160 for.

We have promised to do a number of things for them. Some of the ones which I remember are as follows:

1. A price on the standard memory switch.
2. Tentative specifications on the high speed arithmetic element.
3. A detailed list of all programming helps which we have available and those which we promised to have available.
4. Tolerance to power failure.
5. We propose to run detailed reliability tests for them.

The list of things which we promised them is a lot longer, these just happen to be the things which I remember.

I suggest that after the WESCON show we set up the PDP 4 in our west coast office and run it 24 hours a day for 4 weeks with a test program on it to gather life data. The alternative to this is to bring the machine back here and run the life test here, but I think it can be done just as well on the west coast. I suggest that they do not use the machine for any other use during this period.

They say that certain applications, an algebraic compiler is competitively very important. Some of the chemical companies want to run their analyses on the computer and because these optimizing programs are algebraic they feel a compiler is very important.

They are very much interested in the tolerance of the computer to power failure. They must have standby power for their systems and so they have to know how long it will take before the machine fails after a power failure. They will have standby power, but they need time to switch it in. 30 milleseconds is good, 16 might do and 8 would be poor.

I told them that we are developing a high frequency motor generator to improve our tolerance to power failure and they would be very much interested in this.

I think we should look into very large silicone control rectifiers to be used on a switch turn off power so that we can run our experiments on time delays.

They have a circuit problem with our IOT pulses because they are too narrow for their circuits. I suggest that we go over this carefully with them and see if we can't work this out for them. I think Ben Gurley or Dick Best should be involved in this.

Kenneth H. Olsen

CC: Ben Gurley
Gordon Bell
Stan Olsen

dec MEMO

DATE August 13, 1962

TO B. Savell

A. Blumenthal

R. Boisvert

FROM J. Smith

Tape Control "52" for Honeywell was delivered to off line checkout this morning.

cc: H. Anderson ✓

H. Anderson

dec INTEROFFICE MEMORANDUM

DATE August 13, 1962

SUBJECT MIT Failure Record

TO PDP-1 Distribution List FROM Bob Beckman

Attached is a listing of the failures that have occurred in the MIT PDP-1. John McKenzie made up the list for me and I added the comments in parenthesis.

I am trying to get similar information on other computers and eventually I hope to have some well documented "reliability" figures.

FAILURE RECORD OF PDP-1, M.I.T., EE DEPT.

DATE	RUNNING TIME	DESCRIPTION		REMARKS
9-15-61	128	PDP-1 installed at MIT		

Initial Acceptance Tests run on 9-28-61.

CENTRAL PROCESSING UNIT

9-28-61	195	Replaced (1310) delay line	-1H10	Double time pulses
		Replaced (4410) pulse generator	- 1J5	Deposit inoperative
		Replaced (1104) inverter	- 1E3	Slow gate
10-13-61	345	Replaced (1104) inverter	- 1H5	Read-in trouble, slow gate
10-26-61	517	Replaced (1213) flip-flop	- 3D1	RS flip-flop not cleared
12-28-61	1410	Replaced (1105) inverter	-1C22	Law inoperative - shorted capacitor
3-28-62	2800	Replaced running time meter		Worn gears
7-13-62	2800 + 1540	Replaced running time meter		Worn gears

(A new type running time meter is now installed and used on all PDP-1's.)

PUNCH LOGIC

11-30-61	1040	Replaced shorted capacitor - punch motor control	

(The capacitors in the punch motor control have been replaced by Thyrectors.)

TYPEWRITER LOGIC

3-14-62	2605	Replaced (1703) switch filter -	11B1	Shorted capacitor
6-25-62	2800 + 1333	Replaced (1703) switch filter -	11B1	Shorted capacitor

(1703 Modules now have new type capacitors.)

TYPEWRITER

3-28-62	2800	Replaced typewriter - previous machine had a history of miscellaneous failures at a rate of about one every two weeks.

PAPER TAPE READER

4-4-62	2800 + 50	Replaced reader brake - the original brake could not be adjusted to maintain reliable stop on a line operation.

(This was a modification initiated by DEC.)

DATE	RUNNING TIME	DESCRIPTION	REMARKS
12-30-61	1430	Display installed at MIT	
4-27-62	2800 + 350	Replaced blower in display system - open winding	
6-5-62	2800 + 1060	Replaced shorted (2N1719) transistor in deflection amplifier	
6-26-62	2800 + 1345	Replaced blower in display system - open winding	

INTEROFFICE MEMORANDUM

DATE April 2, 1962

SUBJECT Annual Merit Review for Hourly Employees - Week 4/2/62

TO See Distribution

FROM Bob Lassen

Because of existing wage conditions and because our employees are accepting increasing responsibilities, we feel that it is imperative to conduct our Annual Merit Review for Hourly Employees immediately instead of the customary July 1 date. This review will include all hourly employees except those who are not required to either punch or fill in timecards.

Please complete a Merit Rating Form for each hourly employee in your department and return it to the Personnel Office for scoring by Wednesday noon (April 4). Do not complete the Attendance section of the rating form as we will score this directly from the official personnel attendance cards

Wage increases will be governed by three factors this year. They are: A New Starting Rate, Company Job and Wage Structure and the employee's Individual Merit Rating. I plan to meet with each group on Thursday, April 5 and Friday, April 6 to help with the necessary wage adjustments resulting from the new starting rate and the company job and wage structure.

In the interests of employee relations, we feel very strongly that all hourly increases should be effective April 9, 1962. Although this is relatively short notice, we will ask your fullest cooperation in completing this review quickly and effectively so that the Accounting Department will have all necessary information by April 9.

Distribution:

M. Sandler
R. Best
B. Gurley
J. Padiman
R. Hughes
L. Prentice
R. Melanson
H. Crouse
K. Olsen
H. Anderson
S. Olsen
R. Mills
J. Atwood
T. Johnson
J. Burley
D. Denniston
R. Lassen

EMPLOYEE'S RATING CHART

Employee's Name _____ Rated By _____ Total Value _____

Date _____ Checked By _____

Numerical Value	0	1	2	3	4	Numerical Grade	REMARKS
Accuracy of Work	Many Errors	Careless	Average	Careful	Most Accurate		
Speed of Work	Very Slow	Slow	Average	Fast	Very Fast		
Attendance	Very Poor	Poor	Average	Good	Excellent		
Use of Working Time	Deliberately Wasteful	Lazy	Average	Good	Busy		
Job Knowledge	Poor	Limited	Average	Well Informed	Complete		
Ability to Learn	Dull	Learns Slowly	Average	Learns Quickly	Exceptional		
Attitude Towards Supervisor	Disregards Wishes	Poor Attitude	Average	Follows Orders Cheerfully	Helps		
Acceptance of Responsibility	Evades	Poor	Average	Good	Very Good		
Ability to Direct Work of Others	None	Uninterested	Average	Good	Leader		
Overall Effect on Work of Others	Antagonistic	Hinders	Average	Helps	Excellent		

H. Anderson

INTEROFFICE MEMORANDUM

DATE August 13, 1962

SUBJECT Computer Acceptance Tests

TO PDP-1 Distribution List FROM Bob Beckman

The attached PDP-1 testing procedures primarily are intended as a starting point for negotiating final acceptance tests with customers.

A more detailed description of Part II of the test is in preparation and will be distributed as soon as available.

Comments and suggestions will be appreciated.

PDP-1 COMPUTER SYSTEMS PRE-DELIVERY AND POST-INSTALLATION TEST PROCEDURE

This test procedure shall be followed for basic PDP-1 computers and computers with certain central processor options as noted below. The test consists of the two parts described below. Part I uses testing routines that demonstrate hardware operation. Part II is an operational test of the computer and the Macro programming system.

PART I

Part I consists of operating the following maintenance routines for the length of time specified.

1. Memory Address Test (30 minutes)
   This program checks for proper addressing of every memory register (including memory extention if applicable).

2. Memory Checkerboard Test (1 hour)
   This program tests for proper operation of the memory system by placing various "checkerboard" patterns in each memory register, and then checking for proper retrieval of the information. When two memory modules are installed (8K total memory) the patterns shall be run 30 minutes in each memory module. An additional 30 minutes will be allowed for each additional memory module.

3. Instruction Test (30 minutes)
   This program is a series of small routines that check for proper operation of the various computer instructions.

4. Multiply/Divide Test (30 minutes)
   This program generates random numbers and uses them in multiplication and division operations. Optional sense switch settings allow this program to be used for either a standard PDP-1 or a PDP-1 with automatic multiply/divide.

5. Reader Test (30 minutes)
This program tests the operation of the photo-electric paper tape reader. Various test switch settings allow for continuous and "start-stop" operation at various speeds.

6. Punch Test (Approximately 30 minutes) (1 box of tape)
This program exercises the paper tape punch and allows for various combinations to be punched out and later verified.

7. Typewriter Test (30 minutes)
This program exercises all characters available on the computer typewriter.

PART II

This part of the test demonstrates the proper operation of the computer and the basic programming system.

The basic programming system consists of three programs: The Macro assembler, Expensive Typewriter, and DDT. Expensive Typewriter is a typewriter control program that allows control and modification of a program after it has been placed in memory. DDT is a debugging program useful in preparing new programs.

The test shall consist of loading the Macro assembler into the computer and using it to assemble appropriate programs. Appropriate punched tapes and print-outs shall be generated. Expensive Typewriter and DDT shall be assembled and demonstrated.

The programs to be assembled by Macro shall produce recognizable operations appropriate to the system under test. If desired, the customer may substitute special programs at this point. It is the responsibility of the customer to prepare and test such special programs in advance.

A satisfactory test shall consist of a total of 8 hours of operational time, and a maximum of 45 minutes of down time during the entire test.

"Operational time" is defined as unattended computer operation without manual intervention unless specified in the program. Necessary manual setup operations (i.e. insertion of paper tape in reader) are considered part of the operational time.

"Down time" is defined as the time during which operation of the test is halted for the performance of corrective maintenance.

SYSTEM ACCEPTANCE TEST FOR PDP-1 COMPUTER

Options: ☐ Multiply-Divide
☐ Extra Memory

PART I TEST	Time in Hours	OPERATE TIME		DOWN TIME		REMARKS	APPROVAL
		Start	Stop	Start	Stop		
1. Memory Address (DEC-12)	0.5						
2. Memory Checkerboard (DEC-11)	1.0						
3. Instruction Test (DEC-17)	0.5						
4. Mul./Div. Test (DEC-105)	0.5						
5. Reader Test (DEC-13)	0.5						
6. Punch Test (DEC-6)	Approx. 0.5						
7. Typewriter Test (DEC-106)	0.5						

dec INTEROFFICE MEMORANDUM

DATE August 10, 1962

SUBJECT Catalog Files

TO All Engineers
J. Ebner, Library

FROM Henry J. Crouse

The new location of the vendor catalog files has made immediate reference to all files less readily accessible for engineering personnel.

The library has retained all semiconductor files and a second complete set will be made available in Purchasing.

To the end that prime information be immediately available, the library will be supplied with standard reference works ie., E. E. M., E. B. G., RADIO MASTERS, etc. In addition those basic components catalogs that are in constant usage.

Two file clerks are continously updating and expanding the vendor files so that the most current information is available. As sales people make their regular visits they are asked to discard obsolete information and insure current literature is made available.

The attached sheet is provided for your suggested list of catalogs you feel important to be in the library.

Henry J Crouse

cc: Kenneth Olsen
Harlan Anderson
Stanley Olsen

TO: Henry Crouse, Purchasing Department

ENGINEER

INTEROFFICE MEMORANDUM

DATE August 10, 1962

SUBJECT Job Responsibility, Purchasing Department

TO All Interested Personnel FROM Henry J. Crouse

The Purchasing Department is now located in Building 5, opposite end of the Production Department.

The procurement of materials and services have allocated to buying personnel as follows:

BUYER	DESCRIPTION
Henry Crouse	Semiconductors, major components, capital equipment.
Frank Kalwell	Electrical components, wire and cable, fasteners.
Richard King	Maintenance, repair and operating supplies (MRO), ie. hardware, tools, typewriters, desks, chairs, lumber, etc. for all departments.
Robert Blackwood	Sub-contracting.
Deborah Kuyamjian	Distributer Buyer for Engineering. Twenty-four hour service for material available in Boston jobber stock.
David Glazier	*Expediting for Production material only.
Anne Gill	Secretary to Henry Crouse.
Elaine Fletcher	Secretary to Frank Kalwell and Richard King.
Helen Fricault	Secretary to Robert Blackwood.
Donna Files	Filing and Returned Materials.

*Expediting for material ordered for other than production requirements is the responsibility of the ordering buyer.

Henry J Crouse

INTEROFFICE MEMORANDUM

DATE August 10, 1962

SUBJECT Job Responsibility, Purchasing Department

TO All Interested Personnel **FROM** Henry J. Crouse

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Helen Fricault	Secretary to Robert Blackwood.
Donna Files	Filing and Returned Materials.

*Expediting for material ordered for other than production requirements is the responsibility of the ordering buyer.

Henry J Crouse

Harlan Anderson

dec INTEROFFICE MEMORANDUM

DATE August 9, 1962

SUBJECT Summary of Field Service

TO PDP-1 Distribution List FROM Jack Shields

SUMMARY OF FIELD SERVICE

July, 1962

Number of calls: 10
Man hours: 75

Maynard Area		Calls
PDP-1B	BBN	7
PDP-1C-1	ITEK	1
PDP-1C-3	CRL	1
PDP-1C-4		
PDP-1C-5	MIT	0
PDP-1C-6	CRL (OAL)	1
PDP-1C-9	GEOTECH	0
PDP-1C-17	SRL	0

Los Angeles Area	Calls*
*No service reports were received from the Los Angeles office for July, 1962	

BBN

Improper operation of the peripheral equipment during the morning check on the PDP-1B. The unit selector module, which logically selects the proper in/out equipment, was inoperative. The reader buffer indicators for bits 6, 9, 10, and 13 were always on. The indicator problem was solved by replacing the shorted transistors in the indicator driver module. Further reader checks found a defective 4128 module in the reader logic. Replacement of the defective components corrected this problem.

The IOT control flip flops would operate incorrectly when IOT commands were attempted. This problem was traced to the IOS flip flop being set when in read-in mode operation. A defective 4129 module, in the IOT done logic caused this problem.

Problems with both the tally punches at BBN. The on-line punch would always punch hole #8. This trouble was caused by a shorted 1184 transistor in the solenoid driver for hole #8. Replacement of the transistor corrected the on-line punch trouble. The off-line punch would fail to punch hole #2 due to an open solenoid in the punch. The punches ran well for about 8 hours and then more trouble developed with the on-line punch. The solenoid driver for bit #4 would break down after about 4 hours of operation. The solenoid driver for hole #4 was replaced and extensive checks were run on the on-line punch and it's associated logic. The punch operated perfectly and no apparent reason could be found for the two solenoid driver failures in the on-line punch.

Sequence break problems caused another call at BBN. Improper decoding of the sequence break priority chain made it impossible to get a sequence break on channels 14-17. The problem was traced to an open transistor in an 1104 module in the priority chain input to channels 14 through 17. Replacement of the transistor corrected the sequence break problems. While on the same service call, problems with a time sharing program would develop when the time share program attempted to use the mag drum. Investigation found that IOT instructions were being improperly trapped following a drum transfer. Further investigation found that the drum restart pulse would logically generate a start clear pulse which would clear the break started flip flops - a control element for trapping IOT commands when in restricted mode operation. Logic changes in the drum restart operation were added to the PDP-1B and this solved the time sharing problems.

Intermittent pickup of hole #5 in the on-line punch. This was caused by a defective 4214 flip flop in the punch buffer. Replacement of the module corrected the punch problem.

The overflow flip flop would not restore when dismissing a sequence break. An open transistor in the 1105 module, which makes up the equation MB^{1}_{0} · SBS restore = $\overline{1\_OV1}$, caused this trouble. Replacement of the open transistor allowed proper operation of sequence break restore. It was also found that when the computer was in restricted mode operation, a CAL instruction in memory bank #1, would call location 100 in memory bank Ø. This trouble was traced to a broken wire which set EMA5 at 100——> MA time. Replacement of the broken wire corrected the CAL instruction trouble.

ITEK

Improper operation of the 2 step power off cycle at the Itek installation. This problem was traced to a cold solder connection on K2 relay in the AC power control. The improper cycle of memory power also caused a pair of read/write drivers to short. When the power control problem was solved, the memory drivers were replaced and memory was re-adjusted for proper margins.

CRL

Problems with the punch tearing holes on computer #1. A good cleaning of the die block assembly and resetting the punch pin fulcrum solved these problems.

CRL (OAL)

Computer would fail intermittently and when it failed no programs would run at all. It was found that shock testing the machine would cure the trouble. After a series of shock tests, a cold solder connection was discovered on the input to the instruction register flip flop IR_1. Resoldering the connection solved this problem.

dec INTEROFFICE MEMORANDUM

File

DATE August 8, 1962

SUBJECT Determining of Most Economical Order Quantities

TO G. O'Dea
D. Mills

FROM J. Smith

An investigation into our method of the reordering of computer parts is currently being instituted. At present time there is a system attempting to purchase the most economical order quantity. However, the current system is rather vague and could be improved upon. With the rapid growth of our organization and inventory control, it is becoming necessary to sophisticate some of our present methods. Determining the most economical order quantity is a function of inventory control and should be noted on our control cards.

To arrive at the most economical order quantity certain information must be made available. Economical order quantity is a relationship between the cost of acquisition and the cost of possession. Cost of acquisition has more or less been arrived at by information supplied by purchasing. Purchase processing costs have been found to be approximately $10.00 per purchase order. Cost of possession is a little more difficult and requires the cooperation of our Accounting Department. Cost of possession involves the rate of inventory investment which includes taxes, insurance, interest on average investment, and storage costs. I would appreciate the help of someone in Accounting in working with me to gain this information.

cc: K. Olsen
H. Anderson
M. Sandler

INTEROFFICE MEMORANDUM

DATE August 7, 1962

SUBJECT Potter Instrument Co. - Tape Handlers

TO Harlan Anderson
George O'Dea
Ben Gurley
Jack Smith

FROM Henry J. Crouse

As a result of a meeting on August 6, 1962, twenty Potter Tape Handlers were ordered on our Purchase Order Number 20248.

The net price of one Handler is $6,574.50 with an additional charge of $100.00 for those Handlers painted I.T.T. blue.

A delivery schedule has been established as indicated:

1	Gray	10/8/62
2	Blue	10/15/62
3	Blue	10/22/62
4	Blue	10/29/62
5	Blue	11/5/62
6	Blue	11/12/62
7	Blue	11/19/62
8	Gray	11/26/62
9	Gray	12/3/62
10	Gray	12/10/62

The balance of ten units will be scheduled when firm requirements are received.

For purpose of payment Potter Instrument has terms of 1/2/10 N/30.

File

INTEROFFICE MEMORANDUM

DATE August 6th, 1962

SUBJECT

TO Alma Pontz

FROM Kenneth H. Olsen

Arnaud de Vitry is planning to leave the country August 30th and before he leaves, he needs a statement of his earnings. He would like a letter from us summarizing the director's fees he received in 1962. He would like to have this broken down into two figures - that before June 30th and after June 30th. He will be here on Tuesday, August 7th and would like to pick up the letter at that time. This is a director's meeting and so he will receive a director's fee at that time and this should be included in the letter.

Kenneth H. Olsen

cc: Goerge O'Dea
Harlan Anderson

INTEROFFICE MEMORANDUM

DATE August 3, 1962

SUBJECT Use of Outside Vendors

TO K. Olsen
H. Anderson
S. Olsen
M. Sandler

FROM Jack Smith

Outside vendors plus an increase in our own work force has just about cleaned up our huge backlog of work. Our production has just about reached its steady state and our requirements from outside vendors has been steadily decreasing.

It is fast becoming time for us to decide just what we want built outside and in what quantity. We are all aware that we must build outside that quantity of units that is above our own capabilities, and also those items that can be purchased at a cost below our own manufacturing cost. We must of course be very careful in this area because of the many advantages of in-house processing. These advantages in many cases more than offset any monetary gain to be realized by outside processing.

My dealings with outside vendors this past year has convinced me without doubt that it would be to our advantage to have all our work done in-house. Price, quality, transportation, and communication problems were the factors considered in coming to this conclusion. We of course know that it is not possible at the present time to process 100% of our production in-house.

In making a decision as to what should be processed outside, I feel we should first look to the high-cost areas, those areas whose manufacturing cost is far above our own. Module assembly both in-house and outside are relatively the same. Logic wiring done outside is on the average one-third above our manufacturing cost. It is in this area that I believe we should try to do 100% in-house. What shortages this causes in module assembly could be handled by outside vendors until this is no longer necessary.

INTEROFFICE MEMORANDUM

DATE 8/3/62

SUBJECT Government Inspection

TO Stan Olsen

FROM Jim Cudmore

On Tuesday, July 30, Mr. Moore and Mr. Babineau arrived to inspect a shipment of 74 modules to Western Electric, Burlington. This shipment also contained some accessory items; 2-721 P.S., 2-1919 Power Cables and 1-1954 module extender. These modules had been electrically tested, mechanically inspected, packaged and boxed. Maynard explained that opening these packages and re-testing would entail some expense and would certainly delay deliver. A call was placed to Burlington to see if this inspection could be waived. It turns out that this inspection can not be waived if the purchase contract calls for it.

The inspection began on Tuesday at 10:00 A.M. and ended Thursday at 5:00 P.M. During the first day, 33 inverter modules were tested and I am embarrassed to admit that one module had a broken D-662 diode. This diode was actually in two pieces. It is hard to believe that this passed both electrical and mechanical inspection. The only conclusion can be that the failure occurred during packaging or in the finished goods stock room.

Late Tuesday afternoon, our wave soldering techniques were inspected. Our present methods employ an activated flux which caused some concern for the inspectors. They were quite impressed, however, by the completeness of our cleaning and felt that the flux was not really a cause for alarm.

On Wednesday, Mr. Babineau returned to witness the testing of 20-1201 F.F. Four units had second pulse total transition times that exceeded the 140 NSEC spec. by approximately 3 NSEC. This seems to me to be cutting a very fine line for there may be that much difference from scope to scope. Mr. Babineau was very conscientious and would check every measurement before proceeding to the next.

On Thursday, the remainder of the units were tested. As the day wore on, Mr. Babineau became less conscientious and was willing to trust the technician making the tests while he checked the power supply testing. At 5:00 P.M., all units were being repacked and the inspector's stamp was placed on all boxes.

Our calibration procedures on scopes and meters seem to satisfy the inspectors.

I understand that we have another order from Burlington. It is needless to say this repeat testing throws a transient in the system. In the future these inspections will have to be planned ahead to facilitate the testing.

CC: Ken Olsen
Harlan Anderson
Bob Hughes
Jim Burley

NO 70350

WESTERN ELECTRIC COMPANY, INC.
TELEPHONE SALES DIV. - EXCL. INST.
SUPPLIES INSPECTION ORGANIZATION

INSPECTOR'S REPORT

SHEET 1 OF 2 SHEETS

SUPPLIER'S NUMBER			
AREA	DIST.	PRELIM.	PERIODIC
1	3		

SUPPLIER'S NAME: Digital Equipment Corp.

FACTORY ADDRESS: Maynard, Mass

SUPPLIER'S CERTIFICATION AND SIGNATURE: material, construction, finish, electrical properties & performance as specified.

James G. Culmsel
SUPPLIER'S SIGNATURE

THE FOLLOWING MERCHANDISE IS SUBMITTED FOR INSPECTION. INSPECTION DOES NOT COMMIT W.E. CO. TO ANY PURCHASE IN EXCESS OF CONTRACT OR ORDERS AND DOES NOT AFFECT THE SUPPLIER'S GUARANTEE.

Modules and Accessories

LINE NO.	DATE	CONTRACT NO. OR ORDER NOS.	SPEC. NO. OR DRAWING NO.	ISS. NO.	SIZE TYPE LIST	MATERIAL CODE NO.	QUANTITY SUBMITTED		QUAN. PASSED
1	7/31, 8/1-2/62	BZ-09608-60	Power Supplies	Cat#	722	42086	2		2
2			Power Cables	"	1919		2		2
3			Inverters		4102		6		5
4			"		1104		5		5
5			"		1103		22		22
6			Flip-Flops		1209		11		11

SAMPLING PLAN — —

LINE NO.	INSPR. NO.	CASE NO.		INITIAL SAMPLE INSP.	INITIAL SAMPLE DEF.	PA/TD	2ND OR RESUB. INSP.	2ND OR RESUB. DEF.
				—	—	—	←PREV. TOTALS→	
1	016	01755		2	0			
2				2	0			
3				6	1			
4					0			
5				22	0			
6				11	0			
							XXX	XXX

ITEM NO.	QUAN. NON-CONF.	HELD	PASS	REJ.	DETAILS OF NON-CONFORMANCE AND MISCELLANEOUS INFORMATION
1	1			✓	Lower level voltage is 3 volt higher than 3.7 volts max. specified
2	4			✓	Total Transition time is from 2 to 5 nano-seconds over the 140 nsec max. specified.

INSTRUCTION NO.	INSP. EVIDENCE	STANDARD NO.	CIRCULAR NO. PACKING SPEC.
42,086	D2	—	—

NON CONFORMANCE AUTHORIZATION

FINAL / PRELIM REPORT: THE SUPPLIER (IS)(IS NOT) AUTHORIZED TO (USE)(SHIP) MERCHANDISE AS NOTED.

INSPECTOR'S SIGNATURE: S. H. Babinian

COPY OF SD-2158 FORM TO:

FORM SD-2100

SUPPLIER _____

INSPECTOR _____

SUPERVISOR'S APPROVAL

SD-2158-1-C (11-60)

SD-2158-2-C (11-60)

INSPECTOR'S REPORT

No. 70350

WESTERN ELECTRIC COMPANY, INC.
TELEPHONE SALES DIV.—EXCL. INST.
SUPPLIES INSPECTION ORGANIZATION

SHEET 2 OF 2 SHEETS

LINE NO.	DATE	CONTRACT NUMBER OR ORDER NUMBERS	SPEC. NO. OR DRAWING NO.	ISS. NO.	SIZE TYPE LIST	MATERIAL CODE NO.	QUANTITY SUBMITTED	QUAN. PASSED
1	7/31, 8/1-3/62	BZ 09608-60	Flip Flops	Cat #	1201	42086	20	16
2	↓	↓	Module Extender	"	1954	↓	1	1
3			Delay	"	4301		1	1
4			"	"	1304		7	7
5	↓	↓	Decoders	"	1150	↓	5	5
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								

SUPPLIER'S NAME: Digital Equipment Co.

FACTORY ADDRESS: Maynard Mass

MATERIAL: Modules and Accessories

SAMPLING PLAN — —

LINE NO.	INSPR. NO.	CASE NO.	INITIAL SAMPLE INSP.	INITIAL SAMPLE DEF.	INITIAL SAMPLE PA/TD	2ND OR RESUB. INSP.	2ND OR RESUB. DEF.
			—	—		← PREV. TOTALS →	
1	016	01955	20	4			
2	↓	↓	1	0			
3			1	0			
4			7	4			
5	↓	↓	5	0			
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17	XX	XX				← TOTALS →	

INITIAL	2ND OR RESUB.

dec INTEROFFICE MEMORANDUM

"Copy" File

DATE August 2, 1962

SUBJECT

TO Ken Olsen

FROM Gordon Bell

cc: Harlan Anderson
Ben Gurley
Bob Beckman

(Mass. General Hospital File - LINC File)

I talked to Dr. Rasner at Yale University who is going to buy time on our PDP-1 prototype. Last weekend he had just visited Wes Clark and looked at the LINC computer. The LINC "is the answer to every scientist's dream". His points were:

1. lots of analog real time inputs and outputs
2. an economical mag tape system which would allow real time data to be processed repeatedly
3. a machine that could do some routine calculations.

He is planning to come here and needs these things for the PDP-1 prototype. He also wants us to supply data on the PDP-1 prototype, its detailed iot operations not included in F15B.

1. The PDP-1 A to D converter operation. The commands for the converter, etc.
2. How does the trigger signal couple into the computer? How is the signal synchronized?

I sent him information on the MACRO program and DDT program. He had gotton information from Fredkin's write-up on DECAL and said that it was one of the most unenlightening documents he had ever read. He will be visiting us within the next two weeks.

####### ##########

dec INTEROFFICE MEMORANDUM

Tate

DATE August 2, 1962

SUBJECT Depreciation Base for DEC - PDP-1

TO H. Anderson FROM R. Mills

You had asked, if possible, that we use a two (2) year base for writing off the DEC - PDP-1, which amount was to be capitalized at total value in the EN at June 30, 1962, which is approximately $21,000. I feel that since we are on a double declining balance base for the BBN machine over four (4) years, that we would jeopardize this position, which is indeed liberal, by trying to take two (2) years on our own demonstration machine.

I would appreciate discussing this with you at your earliest convenience.

CC: G. O'Dea

# # #

INTEROFFICE MEMORANDUM

DATE: August 2, 1962.

SUBJECT: Job Allocation, Mechanical Design

TO: All Engineers, Ken Olsen, Stan Olsen, Harlan Anderson, N. Mazzarese, M. Sandler, J. Smith, B. Maroni, Ken Pierce, H. Crouse, B. Blackwood, F. Kalwell, D. King, Wm. Brackett

FROM: Loren Prentice

To better acquaint All Engineers and Management with Job Responsibility within the Mechanical Design Department, a memo will be issued periodically as required.

ENGINEER	JOB NUMBER OR EN NUMBER	DESCRIPTION
Ken FitzGerald	1,000-00	Overall Supervision of Machine Shop, Sheet Metal Shop and Carpenter Shop
	2076	ITT Operator Console
	EN-1000	Relocation and Expansion of Sheet Metal Shop and Relocation of Machine Shop
Klaus Doering	1073	Quality Control Procedures
	1072	Quality Control Standards
	EN-1000	Dies and Tools, Installation of same for SPIU Board Production
Scott Miller	1058 & 2078	Anelex Reader
	1062	PDP-4
	1020	New Logos for PDP's and All In-Out Equipment
	1000	Color Redesign and Design of Appearance for Systems
John Fadiman	1034	Scale Drawings of PDP-1 and PDP-4
	2311	Typewriter Control Panel
Ron Cajolet	1064	Display Development #31
	1026	Magnetic Tape Development
	2289	MT-1520 Memory Tester
	1062	PDP-4 Paper Tape Punch
	2159	Line Filter for Burroughs Card Reader

L. B. Prentice	100-00	New Dies and Development of Dies
	1053	All Changes Pertaining to Computer Cabinets
	EN-1027	New Imposion Shields for Type 30-A Displays
	EN-1000	Relocation Project Bldg. 5

dec MEMO

File

DATE August 1, 1962

TO Nick Mazzarese FROM Harlan Anderson

This is the configuration that Mr. di Scipio is interested in:

MMP

64 SBC

2 Tapes

1 Tape Control Unit

8K (Core)

dec INTEROFFICE MEMORANDUM

File

DATE August 1st, 1962

SUBJECT Quality Control Procedure

TO Dick Best
Bob Hughes

FROM Kenneth H. Olsen

We had visitors a couple of weeks ago from North American to review our facilities. They were particularly interested in our Quality Control procedures. They found our procedures unsatisfactory and as a result we were removed from the bidders list.

My impression is that our quality and our Quality Control are reasonably good, but our procedures are informal and are not well controlled. I would like to see Bob Hughes make a schedule for systematizing this so that when we are reviewed we can give people very simple straightforward manuals that will explain exactly what we are doing.

There is a new consulting firm in West Acton called Reliability Dynamics Institute. We might listen to a proposal from them to set up this procedure for us.

Kenneth H. Olsen

cc: Maynard Sandler
Jack Atwood
Stan Olsen
Harlan Anderson

HEA

WORK SCHEDULE, JULY-DECEMBER, 1962

K. H. Olsen J. L. Atwood

INTRODUCTION

The accompanying schedule shows the predictable work load in our department for the third and fourth quarters of 1962. It is broken down into regular monthly jobs, trade show activities, and other presently known projects.

The work required to produce these jobs is shown in "work-weeks" by function at the bottom of each weekly column. (One "work-week" equals one week's work by one person or one day's work by five persons or any combination totalling five work days.)

These figures are not definitive; they are only educated guesses. More precise scheduling will depend on the availability of time card data for the specific jobs shown.

A basic effort has been made to spread the work load evenly by job functions throughout the period. However, it would certainly be possible to make further adjustments by changing delivery dates on non-critical projects.

In actual practice, the time required for various projects will vary from the norm. Preparations for any given trade show, for example, depend entirely on the type of display to be used and the kind of equipment to be shown.

All figures on Sheet 4 include a "base load" factor equivalent to the average amount of time required for routine jobs which are not listed separately, such as the issuance of the Biweekly Report and the printing of test data sheets. The factors are: copy, ½ ww.; art, ½ ww., photography, 2 ww.; typing, ½ ww.; printing, 1½ ww.; and mailing (including collating and binding), 1 ww.

The average work loads shown are calculated individually for the third and fourth quarters since most of the fourth-quarter projects which should appear on Sheet 3 are not known at this time. Thus, the third quarter figures more closely approximate the normal situation.

Sheet 4 suggests the use of temporary help to meet peak requirements in the mailing function, which includes collating and binding. This has been a satisfactory solution where no special skills are involved.

Other than temporary help, the only provision for outside services included in this schedule is in the printing function. Because of the growing volume of in-house work, such as forms and memoranda, and because our equipment is not designed for top-quality commercial results, only a relatively small share of the total departmental printing has been assigned internally.

EXHIBITS

Sheet 1 - Regularly Scheduled Monthly Jobs

Covers general monthly mailings, space advertising (when done), promotional and operational publicity, employee publication, customer mailings, and sales force mailings.

Sheet 2 - Trade Show Displays and Mailings

Covers design, construction and crating of displays and packing of show literature. Also covers promotional mailings in connection with specific shows. ("OK" indicates period when design is approved and materials are ordered.)

Sheet 3 - Projects Presently in Prospect

Covers publications currently in process and some of those which should be undertaken during this period.

Sheet 4 - Work Load by Job Function

Plots the number of work-weeks required to produce the jobs listed on Sheets 1, 2 and 3 together with average work loads for each function.

CONCLUSIONS

1. This schedule covers only the basic ingredients of a sound promotional program and only the minimum publication requirements.

2. Maintenance of the schedule depends on (1) the availability of qualified personnel and appropriate equipment and (2) strict adherence to all dates by all parties concerned.

3. Maintenance of the over-all work load depends on (1) full use of departmental services by "customers" within the company and (2) the careful integration of new projects into the existing schedule.

4. Minor fluctuations in functional work loads can be accommodated, when necessary, by overtime operation or the temporary shifting of personnel between functions. Major fluctuations will require either adjustments in the schedule or the short-term use of outside specialists.

5. While all but one of our present personnel have reached a satisfactory, or better, level of professional competence, the department is not yet adequately staffed with qualified permanent employees in certain critical areas. For example, our reproduction typist and our two clerk-typists are temporary help. They can be trained today and gone tomorrow.

6. The third-quarter deficiencies indicated on Sheet 4 are approximately as follows:

	Available	Required	Lacking
Copy writing	1	3	2
Art	2	3	1
Photography	3	3½	½
Typing	1	2¼	1¼
Printing	1	2¼	1¼
Mailing	3	5½	2½
	11	19½	8½

In addition to the 11 shown, the department includes four other persons (Helene Shebak, Gert Loynd, Jackie Micklay, and myself) whose time is devoted almost entirely to administration, planning, production, training, and other supervisory work.

RECOMMENDATIONS

1. This schedule, together with any modifications, should be approved as soon as possible so that it can be used as a guide for activities commencing July 1.

2. Depending on the effect of any modifications, approval should also be given for the addition of the following personnel as quickly as qualified candidates can be located:

a. Assistant advertising manager - who can help on copy writing and supervision.

b. Reproduction typist - who can come with us on a permanent basis to handle technical typing and part of the general typing load.

c. Two clerk-typists - who can also come on as permanent employees and do typing, collating, binding, or mailing, depending on the work load in each area. (One of these would be a replacement for Frances Morris.)

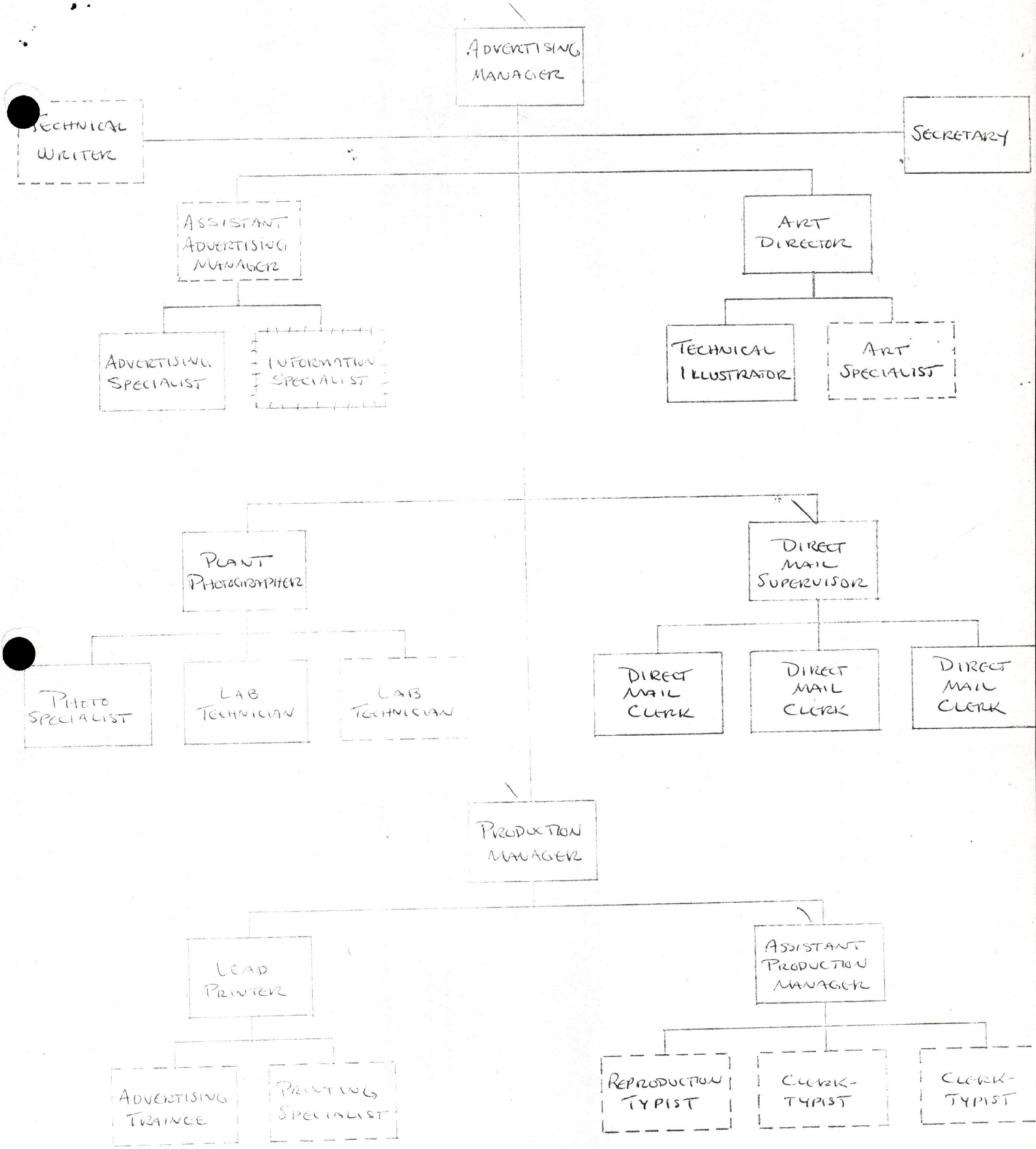
d. Advertising trainee - who can be assigned to printing, photography or mailing, depending on the work load. (Paul McDonald is scheduled for transfer to this job, which would meet the fractional personnel requirements listed in No. 6 above.)

e. Laboratory Technician - who can handle the growing volume of photocopying and duplicating. (Joan Merrick is due to transfer to this job, which is intended to be the start of the Office Services operation.)

3. If the functional work loads continue as forecast, approval will also be needed for an information specialist, who could concentrate on publicity and public relations work; an artist, who could do paste-ups, forms, signs, and other routine art work; and another printer, who could put in full time in the press room.

4. Since the department is now to be known as "Technical Publications," consideration should be given to the possible transfer of Bob Buyer, the technical writer, from Engineering to Technical Publications. This would give him more freedom and encouragement to promote his services to potential customers in the company, and it would put him in close working relationship with the typists, artists, photographers, and printers who can help him get his material into finished form. It would also provide our group with competent technical editing assistance on product literature and publicity.

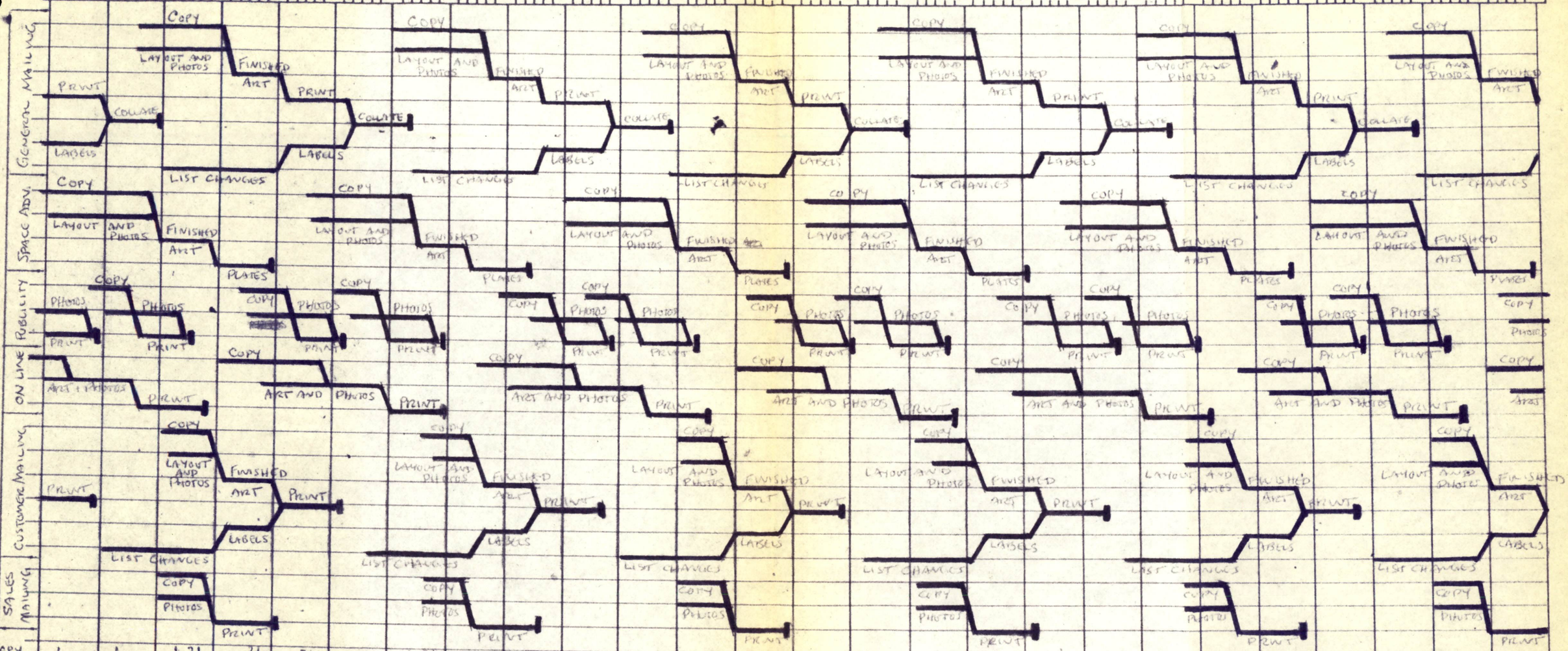
Acceptance of these recommendations would permit us to have a functionally oriented department with direct lines of responsibility, as shown by the chart on the following page.


ADVERTISING MANAGER
TECHNICAL WRITER
SECRETARY
ASSISTANT ADVERTISING MANAGER
ART DIRECTOR
ADVERTISING SPECIALIST
INFORMATION SPECIALIST
TECHNICAL ILLUSTRATOR
ART SPECIALIST
PLANT PHOTOGRAPHER
DIRECT MAIL SUPERVISOR
PHOTO SPECIALIST
LAB TECHNICIAN
LAB TECHNICIAN
DIRECT MAIL CLERK
DIRECT MAIL CLERK
DIRECT MAIL CLERK
PRODUCTION MANAGER
LEAD PRINTER
ASSISTANT PRODUCTION MANAGER
ADVERTISING TRAINEE
PRINTING SPECIALIST
REPRODUCTION TYPIST
CLERK-TYPIST
CLERK-TYPIST

1962

JULY | AUGUST | SEPTEMBER | OCTOBER | NOVEMBER | DECEMBER

2 9 16 23 30 6 13 20 27 3 10 17 24 1 8 15 22 29 5 12 19 26 3 10 17 24 31



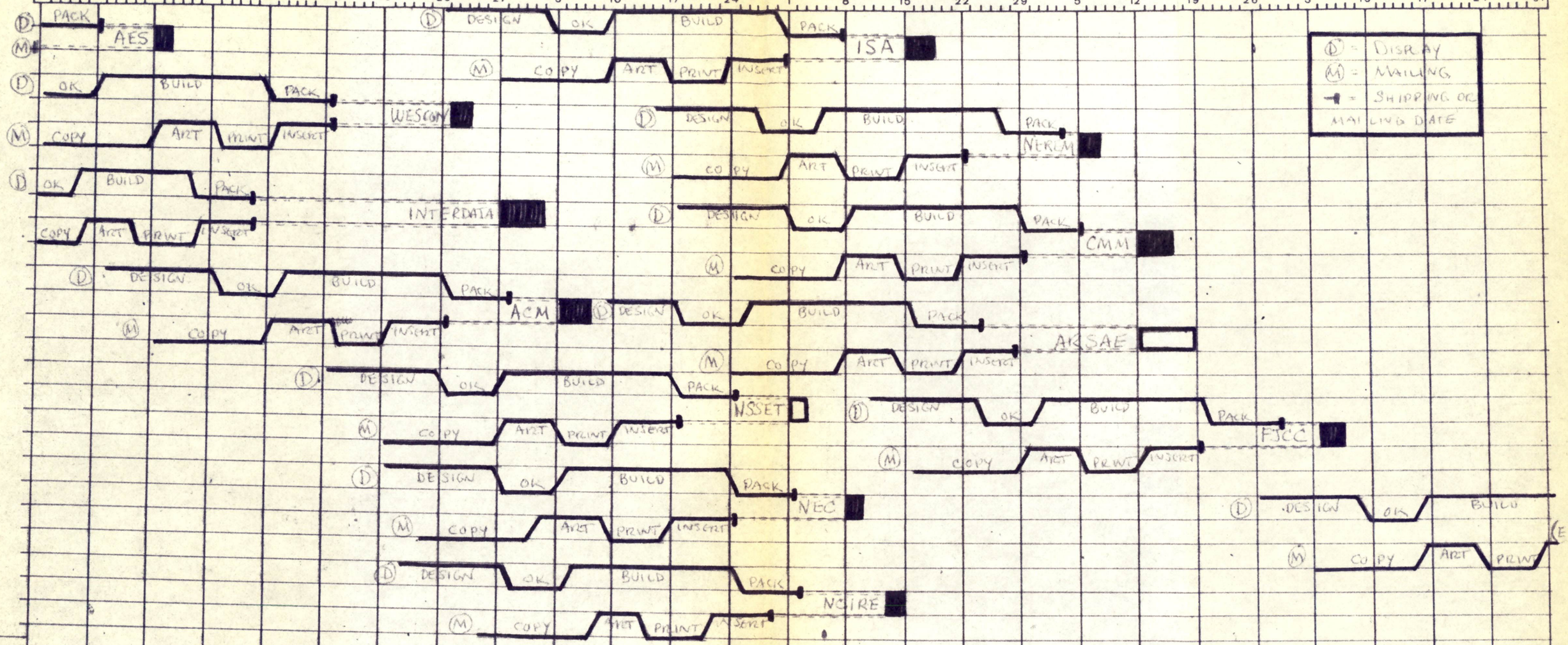
| | | |

1962

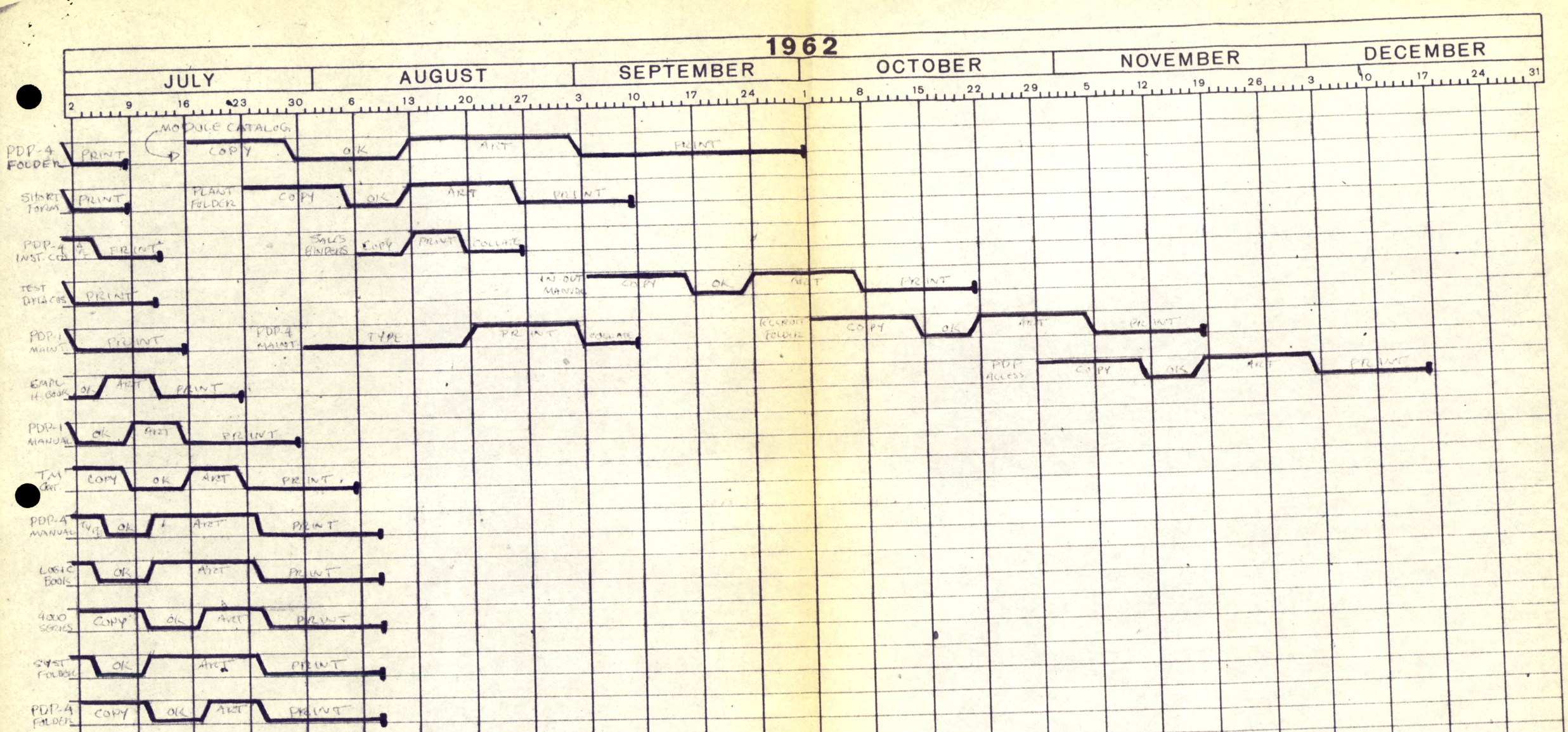
JULY | AUGUST | SEPTEMBER | OCTOBER | NOVEMBER | DECEMBER

2 9 16 23 30 6 13 20 27 3 10 17 24 1 8 15 22 29 5 12 19 26 3 10 17 24 31

(D) = DISPLAY
(M) = MAILING
= SHIPPING OR MAILING DATE



COPY	1		1/2		1/2		1/2		1/4	1		1 1/2		1 1/2		3/4		1/4	1		1 1/4	1		1/4		1/2		1/2					1/4		1/2		1/2		
ART		1/2		1 1/4		3/4		1/2		1/2	1		1 1/4		1 1/2		1 1/2		)	)		1 1/4	1		3/4		1/2		1/2		1/2			1/4		1/2		1/2		1/2	
PHOTO				1/2				1/4							1/4		1/2		1/4			1/4		1/4		1/4													
TYPING	1/4		1/4		1/4		1/2						1/2		1/4		1/2		1/4		1/2		1/4		1/2		1/4												
PRINT				1/4		1/4			1/4					1/2		1/4		1/2		1/4		1/2		1/4		1/2		1/4						1/4				1/4	
MAILING	1				2		4			1	1						1		1	3		1		3		2		3		2	1							
TOTAL	2 3/4		2 1/2		1 3/4		3 3/4		4 3/4	1 1/4	3		4 1/4		3 1/2		3 1/2		3		3 1/2	6		3 3/4		1 3/4		5		3 1/4		3 3/4		1/2		2		1	



COPY	2	1/2	1/2	1	1	1	1/2			1	1	1/2		1/2	1/2	1/4		1/2	1/2	1/4		
ART	1 1/4	2	2 3/4	1/4	1/4	1/4	1	1	1	1/4	1/4		1/2	1/2	1/4		1/2	1/2	1/2		1/2	1/2
PHOTO	1/2	1	1 1/2		1/2	1/2	3/4	3/4		1/4	1/4		1/4	1/4	1/4		1/4	1/4	1/4		1/4	
TYPING	1	1/2	1/2	1/2	2 1/2	2 1/2	2				1/2	1/4			1/4	1/4			1/2	1/4		
PRINT	1	3/4	1/4				3/4	1/2	1													
MAILING	1	2	1					1/2		1												
TOTAL	6 3/4	6 3/4	6 1/2	1 3/4	4 1/4	4 1/4	5	2 3/4	2	2 1/2	2	3/4	3/4	1 1/4	1 1/4	1/2	3/4	1 1/4	1 3/4	1/2	3/4	1/2

digital EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

ORIGINATOR JL ATWOOD

DEPARTMENT ADVERTISING

DATE 6/24/62

PROJECT SHEET 3 - PROJECTS PRESENTLY IN PROSPECT
(—| = DELIVERY DATE)

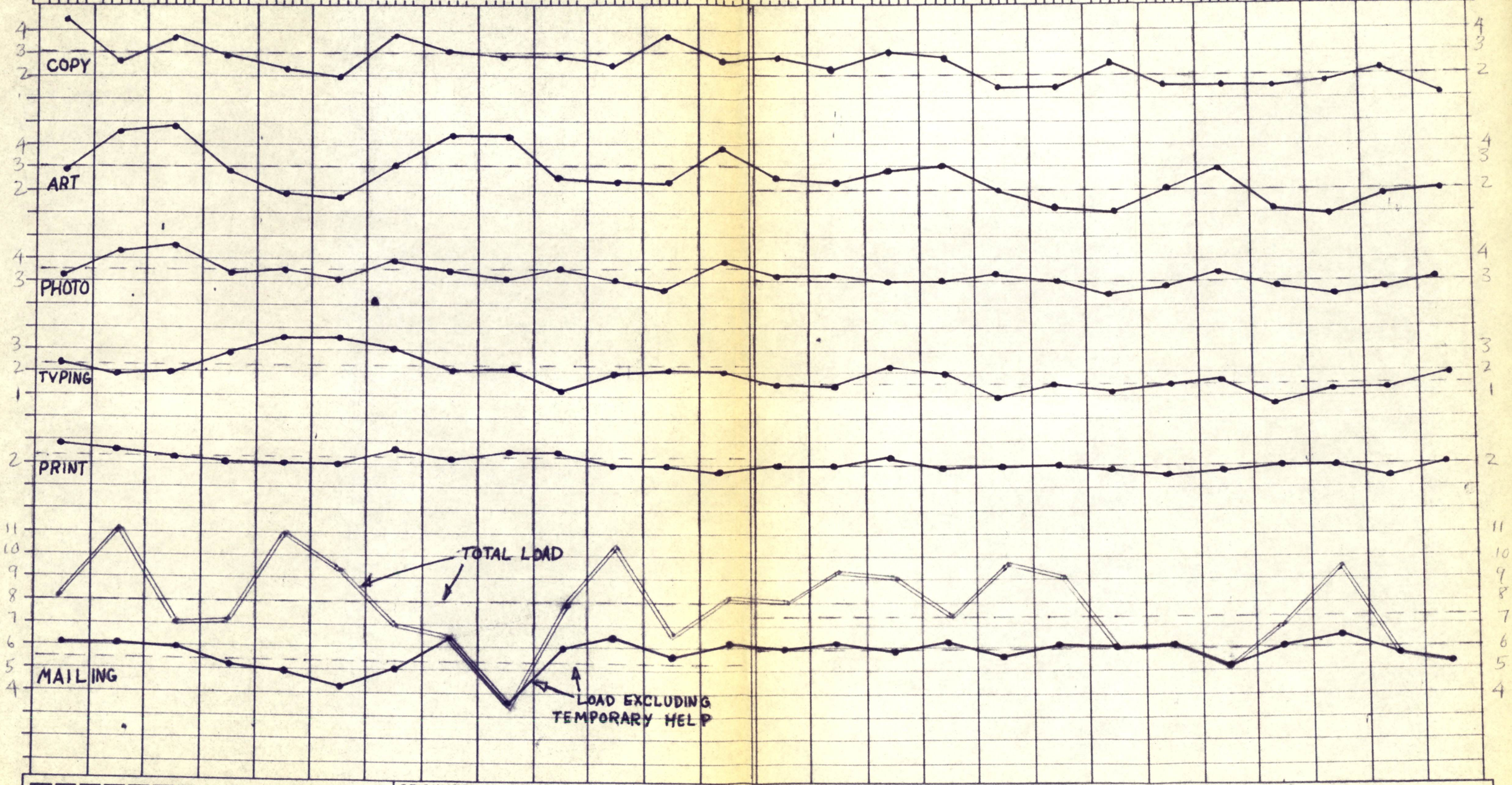
DF100-6

1000-6/62

1962

JULY | AUGUST | SEPTEMBER | OCTOBER | NOVEMBER | DECEMBER

2 9 16 23 30 6 13 20 27 3 10 17 24 1 8 15 22 29 5 12 19 26 3 10 17 24 31



digital EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

DF100-6

ORIGINATOR J L ATWOOD

DEPARTMENT ADVERTISING

DATE 6/27/62

PROJECT SHEET 4 - WORK LOAD BY JOB FUNCTION
(- - - = AVERAGE LEVEL FOR QUARTER)

1000-6/62

INTEROFFICE MEMORANDUM

DATE July 31st, 1962

SUBJECT

TO Kenneth H. Olsen
Harlan Anderson
Stan Olsen
Dick Best
Ben Gurley

FROM Russ Doane

There will be a meeting in Ken Olsen's office at 8:30 a.m. on Thursday, August 2nd to discuss the status of VHF modules and decide about announcing them at WESCON.

OK
RHG.

dec INTEROFFICE MEMORANDUM

Fdc

DATE July 30, 1962

SUBJECT Quantity Discount Schedule

TO Harlan Anderson

FROM George O'Dea

At the last Works Committee Meeting, you mentioned being concerned about the position of DEC in relation to the Robinson-Patman Act.

Dick Mills and I had occasion to discuss George Rice's memorandum of July 18 on the matter of the PDP-4 quantity discount price schedule. It occurs to us that one feature of this discount schedule could be bothersome under Robinson-Patman. That feature is the fact that included in the discount structure is credit for machines ordered earlier in a given year. This after-the-fact recognition of credit seems more difficult to justify than straightforward future quantities on which savings should be significant.

Conceivably you may wish to discuss this with Jack Barnard of Gaston, Snow.

# # #

CC: Dick Mills

dec INTEROFFICE MEMORANDUM

DATE July 27, 1962

SUBJECT Warranty expirations

TO Dick Mills

FROM Bob Beckman

cc: K. Olsen
H. Anderson
S. Olsen

Listed below, by months, are the various installations that will have warranties expiring during the balance of this calandar year. I've also indicated what I can determine would be the base value for the various computers and options involved.

To date I have received very little information as to what these various concerns plan to do. BBN has indicated that they do not plan to have a maintenance contract for their Los Angeles installation and they will probably be on a per call basis for at least a month or two after we finish the planned overhaul of the Cambridge installation. In the absence of any indication otherwise I have to assume that any work done will be on a per call basis.

August:	Itek	126,600
	BBN (LA)	161,720
	JPL	190,500
September:	BBN (Camb.)	125,000
	Beckman (#1)	130,300
October:	BBN (Camb.)	25,500
November:	BBN (Camb.)	53,675
December:	CRL (OAL)	122,300
	JPL	91,300

P. S. Itek just called and said they will handle it on a per call basis.

dec INTEROFFICE MEMORANDUM

#3.9.

DATE July 25, 1962

SUBJECT ITT #5 Unit - First Detailed Cost Breakdown

TO Ben Gurley FROM R. Mills

Following is the cost breakdown of the ITT #5 Unit shipped in May. As can be seen on the whole, this was a very poor performance of cost reporting as between the individual items - even though the overall cost follows our current pattern.

	Job #	Sales Value	Cost
			1,269.18
PDP-1C-19 EN -	2133	101,300.	81,761.20
			5.20
Memory Ext. Control	2175	9,000.	3,846.33
Memory Modules -12	2176	189,000.	45,456.84
Tape Unit - 50	2177	54,000.	27,135.30
Tape Unit Duplex Switches	2177	10,000.	
Tape Controls -52	2178	68,400.	34,597.84
Tape Control Duplex Switches	2178	10,000.	
Auto. Multiply & Divide	2179	9,270.	1,530.36
Special 80 Channel Seq.	2181	33,000.	3,384.61
Add. Hi Speed Channel Connec.	2182	2,500.	259.24
Total		486,470.	199,246.10 - 41%

I would appreciate our getting together in order that we might firm up our reporting procedures.

# # #

cc: Harlan Anderson

dec INTEROFFICE MEMORANDUM

File

DATE July 25, 1962

SUBJECT DEC Insurance Program

TO Harlan Anderson

FROM George O'Dea

On July 9 you requested that I review the DEC insurance program.

After studying each policy in detail, it can be stated that coverage, with one exception, is prudent and premiums in all cases reasonable.

The one exception was use and occupancy insurance where annual gross profits were only insured up to $1,265,000. On discussing this matter with Dick Mills, we agreed that in face of today's volume, this amount is inadequate. We have met with Tom Motley of Field & Cowles and increased the coverage to a gross profit of $3,200,000. Further, we have established a quarterly review system whereby we will automatically consider this matter in light of future volume developments.

In general, I feel Dick Mills is highly knowledgable on insurance matters. With the increase in U&O coverage, our insurance needs are adequately met for now.

As DEC continues to grow, we should find ourselves in a better position to bargain on premium rates. This aspect will also be reviewed at quarterly intervals.

# # #

dec INTEROFFICE MEMORANDUM

DATE July 25, 1962

SUBJECT PDP-4 Customer Relations

TO Robert Beckman

FROM Gordon Bell

cc: Ben Gurley
Harlan Anderson
Stan Olsen
Ted Johnson

For planning purposes, Customer Relations should assume a delivery of PDP-4's at a rate of one/month starting August 1st. As soon as the card punch is checked out on the PDP-4 at DEC, it should be considered a "computer in the field", and order normal warranty.

DELIVERIES ARE:

DEC - Already installed

FOXBORO/NABISCO - Acceptance August 1st, by Foxboro, the machine remaining at DEC until October 1st. (Used by Foxboro for Debugging Programs, and Reliability Data Gathering) The machine is sent to Foxboro (Foxboro, Mass) for systems integration and finally the machine will be delivered to Nabisco - Chicago, January 1st. A DEC Customer Relations man should be present there and help train the Nabisco/Foxboro field people and maintain the machine for a period of 2 - 6 months.

I believe the period should be 2 months to force a deadline on the machine's performance evaluation and to encourage the field personnel to take over sooner. In the future, if we have Industrial Control/Computer Applications a 6 month hand holding period mightbe necessary, but for the first application where a precedent is likely to be set, it would be nice to try to accomplish the task in 2 months.

CORNING GLASS WORKS: - The delivery to Corning is September 15th. It will be necessary to keep this machine operating after acceptance.

PERSONNEL: - Bill Kellicker has said that he would be willing to spend some time in Chicago for DEC - Nabisco-Foxboro. We should find out who Foxboro plans to have at Nabisco and arrange for him to take over Kellicker's job, etc. Bill Kellicker, I believe, would make a very good Customer Relations Man since he is mature, technically competant, and can probably be taught the other ingredients. I am willing for Customer Relations to interview him for a job to handle the above functions (provided that PDP-4 is properly maintained, and any other jobs they have which need doing).

I would like to suggest that he be the assistant to the project engineer in charge of the Corning machine (Gordon Bell is the project engineer for this machine), and 2 weeks after the Corning machine is delivered and accepted, begin work in the Customer Relations Department. Within the next few weeks, he will come from the drum project. ##### ###### #####

dec INTEROFFICE MEMORANDUM

DATE July 25, 1962

SUBJECT Training Program

TO Ken Olsen
Harlan Anderson
Stan Olsen
Dick Best
Ben Gurley
Maynard Sandler
Bob Lassen
Bob Hughes

FROM Gordon Bell

TRAINING PROGRAM: - The enclosed diagram attempts to clarify (in my own mind) the steps through which individuals with technical background (without an engineering degree) entering DEC progress. It is shown graphically to condense, the boxes and how they interact, and that all details are not shown are relatively unimportant. The sequence should be important since it would be nice to maximize the individual's affectiveness and minimize training time, holding quality and output constant.

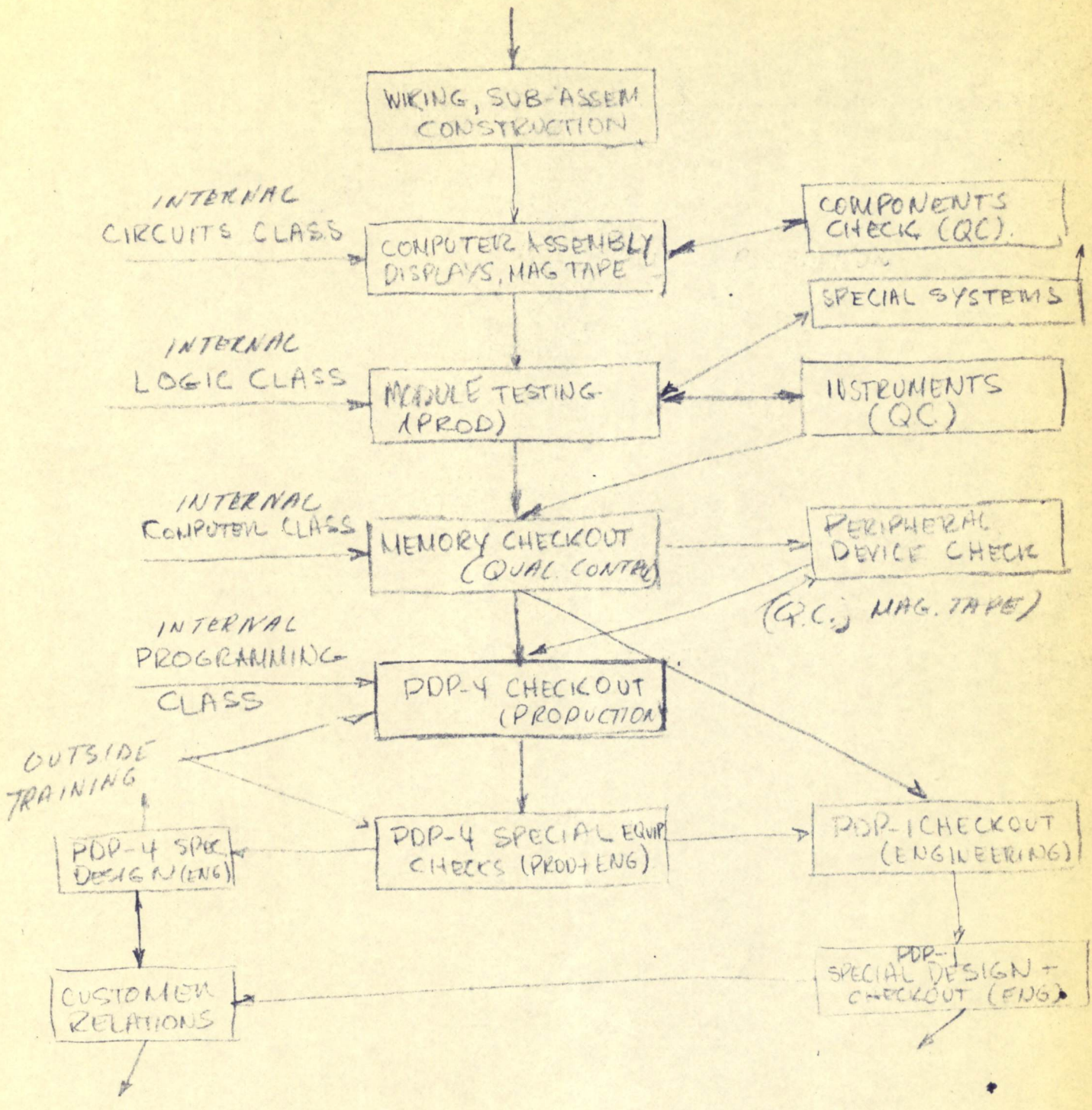
Our present promotion scheme is informal (good perhaps for a small company), but it often promotes good individuals too rapidly without long enough training and on the other hand forces us to look outside to fill jobs, simply because our training leaves gaps, and is inadequate. This, of course, is because we grew very rapidly and needed lots of trained individuals and didn't have time to train internally. (A good example of this is PDP-1 checkout personnel)

Basically, I would like to have a more formal procedure. Ingredients of the procedure perhaps are:

1. State the various stages of training
2. Rotate people through jobs that are necessary, assuming they will eventually progress.
3. Evaluate the people at the various boundaries
4. Insert DEC internal training at the appropriate times and stages. (We'd probably have fewer in the programming classes, but more who knew what they were doing.)
5. Allow outside training at higher stages

CONCLUSION: Let's define.

######## ########



President

PERSONNEL TRAINING

dec MEMO

DATE July 24, 1962

TO A. Blumenthal FROM Jack Smith

cc: H. Anderson
B. Gurley

EN 2249 System for United Aircraft went into Checkout today with a full complement of modules. The shipping date of this system is 10/1/62. This will allow ten weeks for Checkout.

NOTE: This memo is correcting the memo sent July 24, which was in error. Please take note of the underlining above.

dec INTEROFFICE MEMORANDUM

DATE July 24th, 1962

SUBJECT

TO Harlan Anderson
Gordon Bell
Ben Gurley

FROM Kenneth H. Olsen

I received a call from Dr. Frank Ervin on Wednesday to talk about our offer for a computer. He felt this was a very generous offer. They have the feeling that they can be much more successful in asking for money from the government than they have before, and so they are even more enthusiastic about the program than before. However, they are confused by which computer would be best for them.

Dr. Ervin would like to do experimental work where he ties the computer directly to the experiment. However, as Chairman of the Computer Committee he is perhaps going overboard in trying to be objective making the decision. Many of the other people would like to do statistical work which they are now doing on the 7090. Because of this work, he feels they probably should have a more capable computer than the PDP-4. I suggested to him that he probably needs more than one computer, and that if he is doing experiments directly on the computer, it might not be satisfactory for the people who want to do statistical work. The reliability of a computer being tied to experiments isn't up to what normal users expect. He likes to hear these words because he would like nothing better than to have his own computer, which he might share with a few other laboratories. It is now up to us to convince them that what they should have is one of ours for laboratory use, and then continue to rent 7090 for those who want to process cards, or maybe they should even rent a full-time 1601.

He is still concerned about the programming helps that would be available on a PDP-4. I have told him that I have the same problem that he has in trying to evaluate what programmers say about these things. I told him that I would continue to look into it and encouraged him that when I get back from vacation, we can talk further about it. If Gordon Bell can do anything to influence these people on the usefulness of the PDP-4 and the wonderful aids that will be available, I think it would help our cause. I don't think that we are interested in competing with IBM in the processing of large amounts of statistical data.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE July 24, 1962

SUBJECT Warranty Billings

TO Harlan Anderson

FROM George O'Dea

While it is too late to do anything about this retroactively for fiscal '62, I wonder if you might consider for future orders showing the warranty portion of the sale separately on the invoice.

The basis for such a treatment is to permit deferring this portion of the income over the life of the warranty agreement implied in the sale. It is fully justifiable on the grounds that the liability for warranty expense is definitely associated with the sale, but costs thereon will not be recorded until a future date.

Unless this poses some customer relation problem, it seems we should go to such a treatment as soon as possible in order that all transactions being invoiced at the close of fiscal '63 will have the deferral spelled out.

Internally, we could apply this portion of income against actual warranty expense to determine how ~~much~~ well this phase of the operation is doing.

# # #

dec INTEROFFICE MEMORANDUM

DATE July 23, 1962

SUBJECT

TO Harlan Anderson

FROM George O'Dea

It has now been one month since I joined DEC, and the time has come to make my first recommendation of a course of action.

That recommendation is to set up a complete corporate forecast for fiscal 1963.

The reason for this particular recommendation is graphically illustrated by our present cash dilemma. In spite of spectacular growth and substantial profits, we are almost certain to default on the note payments due Shawmut in August and September.

Yes, they will probably go along with the default, and may even be delighted to increase the loan, but right now I doubt if anyone knows how much more we'll need, or when we'll need it.

Specifically, the fiscal '63 forecast should begin with sales. From this estimate (I think it should be dignified by being made by yourself and Ken) we can strike a quick P&L. On the basis of this quick P&L, you and Ken can decide how much we will plow back for development, and how much you feel we can tie up in the acquisition of new capital equipment and other balance sheet type of expenditures.

We may then prepare a quick balance sheet and approximate our cash strains.

Once the quick forecast of financial statements has been prepared and okayed, we will be in a position to go into the necessary detail to identify the significant areas of income and commitment with those individuals responsible for their execution. These matters can then be flagged to fall out from our regular monthly financial statements in order that our progress can be measured.

I strongly urge that you approve this undertaking and will start it off with a forecast of sales for fiscal '63. This would be best if it were in the form of new orders received.

# # #

CC: Ken Olsen

INTEROFFICE MEMORANDUM

DATE 7/20/62

SUBJECT Definition of Standard DEC PDP-1 Program Library

TO PDP-1 Distribution List FROM John Koudela, Jr.

A meeting was held on July 11, 1962, to define a Standard DEC PDP-1 Program Library. The following personnel were present:

H. E. Anderson
G. Bell
R. Beckman
H. Morse
M. Graetz
J. Koudela

The purpose of defining such a library is to be able to precisely describe and guarantee exactly what "software" is to be delivered with each PDP-1. This has never been adequately done in the past.

The Standard Library will consist of two sections: (1) maintenance programs, and (2) all other programs (which may be called "general programs"). This library is to be clearly distinct and independent of the DECUS Library (programs written by users). DEC, however, may contribute to the DECUS Library in the sense of a "user".

For the sake of uniformity, program classification and labelling can be the same for both libraries.

Program Numbering

DEC NNN-M

where NNN is a serial number in octal and M represents the letters A through Z (used sequentially) to designate revisions.

Punched Tape Labelling

Labels will be color-coded and measure 1 by 6 inches:

Yellow	RIM	Read-In Mode Format
Purple	MS	Macro Symbolic Format
Green	BSL	Binary with RIM Self-Loader
Tan	BIN	Binary without Self-Loader

A punched tape label may indicate any or all of the following items:

1. Program Number
2. Short Program Title or Title Symbol
3. Tape-Type Abbreviation (RIM, MS, etc.)
4. Starting Address (SA=NNNN)
5. Registers Required (Reg=NNNN-MMMM)
6. Halt Address (HA=NNNN)
7. Arithmetic System and Precision (FXD-18, FLT-18-18, etc., for fixed point 18-bit arithmetic, floating point 18-bit fraction-18-bit exponent arithmetic, etc.)
8. Sense Switch Settings
9. Tape Code (FIO-DEC, CONCISE, etc.)

Program write-up format and content has been fairly well standardized and is described elsewhere.

Standard DEC PDP-1 Program Library

1. MACRO Assembly Program (presently MIT-3), including

   a. MS Tape of MACRO
   b. BSL Tape of MACRO
   c. MS and BSL Tapes of Standard MACRO-Instruction Definitions
   d. MS and BSL Tapes of MACRO Symbol Package
   e. Technical Write-up and Program Listing
   f. Program Write-up (including description of MACRO Binary Self-Loader)

2. DEC Debugging Tape (DDT), presently MIT-1, including

   a. MS Tape
   b. BSL Tape (Hi Loader only)
   c. Program Write-up

3. Expensive Typewriter (presently MIT-2), including

   a. MS Tape
   b. BSL Tape (Hi Loader only)
   c. Program Write-up

4. Punchoff (presently BBN-46), including

   a. BSL Tape (Hi Loader only)
   b. Program Write-up

5. Simple Octal Debugger (to be written), including

   a. MS Tape
   b. BSL Tape (Hi Loader only)
   c. Program Write-up

6. Simple Tape Duplicator (to be written), including

   a. BSL Tape (Hi Loader only)
   b. Program Write-up

7. Arithmetic Routines (MS Tape only and Program Write-up for each)

   a. Multiply Subroutine (FXD-18) presently BBN-10
   b. Divide Subroutine (FXD-18) presently BBN-47
   c. Random Number Generator (FXD-18) presently BBN-23
   d. Single DEC Floating Point Package (FLT-18-18) presently DEC-107

Summary

1. Number of Tapes (all types) in Standard Library: 18
2. Number of Write-ups in Standard Library: 11
3. Status of programs to be converted to MACRO:

   a. Punchoff: Write-up and Frap Symbolic Tape available
   b. Multiply and Divide Subroutines: Write-ups and Frap and Decal Symbolic Tapes available
   c. Random Number Generator: Write-up and Frap and Decal Symbolic Tapes available
   d. Single Dec: Write-up available; basic program and interpreter in Decal Symbolic; function generator subroutines in Frap Symbolic

This memo is submitted to the addressees for approval and comment.

dec INTEROFFICE MEMORANDUM

DATE July 20, 1962

SUBJECT

TO Gordon Bell
Ben Gurley
Harlan Anderson ✓

FROM Kenneth H. Olsen

On Thursday morning, we were visited by all the top people from Bolt, Beranek and Newman. They came here to impress on us the poor operating efficiency of their PDP-1. While they were talking, we impressed upon them the problems we have in working with them, the difficulties we have in working out arrangements with them, the fact that they exaggerate their cases, and that we think they are too shrewd and hard-driving.

After we exchanged hard words for a while, everybody was apologetic and cooperative, and we concluded that the only thing we can do is to make that machine work well. I promised them that Ben Gurley would show up on Monday to review the situation and to work out a plan by which we will get that thing in good shape in the immediate future. Two other interesting points came up from the meeting. We told them that we gave them $34,000 to put DECAL down on paper in useful forms and as far as we can tell, we got nothing useful out of it. Licklider argues with this, and is in the mood to prove to us that DECAL is useful, and that we might be able to get him to do the writing at not too great a cost. I told him that we would be very happy to talk over the situation with him. It might be a good idea if Ben Gurley talked about this when he was down to BBN next week.

The other interesting point was about a new project they are working on. Jordan Baruch has about 1/3 of a million dollars to experiment with data collection for hospitals. He plans to hook wire lines between typewriters in wards at Mass. General Hospital to the PDP-1 computer in Cambridge. Into this will feed all patient data including prescriptions and dosages and the like. This first piece of money is just to demonstrate it for the first year, and if it works out, the project will grow. Even though this is experimental in nature, it is important that it have almost 100% reliability. I told Leo Beranek that they just can't run experiments in a laboratory on a computer and then have it available for 100% reliability on this hospital type use. He had apparently never considered this, and wanted us to work on the machine so that they could have their laboratory experiments and the hospital work all going simultaneously. I suggested that they seriously consider a PDP-4 computer, because it is less expensive than a PDP-1, and they might be able to buy one for this hospital experiment alone. Because it already has teletype inputs, this might be a lot easier to use. In a final situation, they would like about 10 teletype inputs.

This hospital unit would also need a magnetic tape unit because of the large amount of information to be stored. Because there is no reason for it to be compatible with IBM, and because many of the characteristics are not as critical as they are in business usage, a link type tape unit or one of the other inexpensive units that we have looked at might be just the thing. We should probably decide which of these tape units is best and go after it with all enthusiasm.

When they came down to visit, they had in mind getting a new PDP-1 computer. I suggested that this would not be the answer to their problem, because under no circumstances can we give them one immediately, and they have to get their unit working immediately. However, they are going to generate a list of terminal equipment which they would want on a new machine if they got one, and we will then give them a price on this with a trade-in for the old one. If we did this some time ago, we might have saved a lot in installation costs. There might still be a significant amount of saving in maintenance and installation costs, and it might be worth our while to be quite generous on this. We tend emotionally to be against giving them anything, because they don't seem to appreciate anything we do for them. However, I think this might no longer be the case, and it might be very worth while for us to be generous on this point. One of the first things we should do is find out what our real manufacturing cost is, and whether there is anything salvagable or not in the old machine if we got it back. We asked them to generate a list of the terminal equipment, because telling us simply they wanted exactly what they have now is not really sufficient. A few of the things like two typewriters and two punches might be very difficult and expensive, and there might be considerable saving in leaving them out.

Kenneth H. Olsen

Rile

dec INTEROFFICE MEMORANDUM

DATE July 20, 1962

SUBJECT A Light Pen Pricing

TO Bob Beckman
John Koudela

FROM Bob Savell

cc: Harlan Anderson
Ben Gurley
Pete Bonner

Harlan Anderson and myself have gone over the costs of our present light pen, light pen amplifier module (1559), copper shield, pulse amplifier, and installation costs for our light pen and have come up with the following list prices. The prices are broken down as follows:

Cost for a complete light pen installed at the factory in a Display 30 is still $1300.

Prices of individual items are as follows:

The pen itself	$600
1559 light pen amplifier module	475
Copper shield	100
Pulse amplifier 4603	89
Cable	5
Installation	60

When quoting replacement parts the individual list prices stated above may be used with the exception of the installation price which is shown for a reference only. We do not normally sell the light pens apart from the Display 30's except to be used as spares or replacements, and would not normally consider installing one in the field. All displays are wired to accept light pens whether or not a light pen is ordered with the display. If someone orders a light pen after purchasing a display, then the total price for the light pen will still be $1300.

######## ########

INTEROFFICE MEMORANDUM

DATE: July 18, 1962

SUBJECT: PDP-4 QUANTITY DISCOUNT PRICE SCHEDULE

TO: H. Anderson, B. Beckman, G. Bell, R. Best, P. Bonner, J. Burley, D. Denniston, J. Fadiman, B. Gurley, T. Johnson, J. Koudela, K. Larsen, N. Mazzarese, R. Mills, J. O'Connell, G. O'Dea, K. Olsen, S. Olsen, B. Stephenson

FROM: George Rice

The quantity discount for PDP-4's will be computed from a table*. This table price will permit customers who buy computers in quantity to obtain a discount. The discount will be greater for high volume customers and will be the same as the present price sheet for one computer customers.

The discount applies to the current price of the computer at the time the purchase order is placed. The discount schedule is available only for the PDP-4A or PDP-4B and the following options:

Type 17 (4096 Word memory module),
Type 25 (Real time option),
Type 65 (Printer-keyboard and control),
Type 75 (Paper tape punch and control).

PDP-4 DISCOUNT TABLE

Total number of machines ordered during past year plus number of machines in present order.	Price per machine by per cent of current price.	Discount per cent
1	100	0
2	94	6
3	88	12
4	82	18
5	76	24

This discount schedule allows for discounts up to 24%. There is no provision for cancellation for customers who buy

*The table will give a per cent discount depending upon the size of the order and on the previous orders made during the past year.

many machines to obtain a low price then cancel part of the order. If a customer should cancel part of an order, they will be subject to a penalty which will adjust the price upward to that which would apply for the number of machines delivered plus a fixed penalty. The amount of the fixed penalty will be determined by the number of machines cancelled and the time differential between the cancellation notice and the delivery date of the cancelled machines.

INTEROFFICE MEMORANDUM

File

DATE July 23, 1962

SUBJECT Actual Cost - Beckman Unit #2

TO H. Anderson
R. Mills

FROM E. Simeone

Following is an analysis of the actual manufacturing cost of the PDP-1 and options sold to Beckman in May. In addition to the PDP-1, this job included automatic multiply and divide, special input-output and a spare paper tape reader and punch.

	Total	% of Total Cost
Direct Labor	$ 1,464.25	3.1%
Overhead	1,620.89	3.4
Direct Materials	14,612.53	31.3
Manufactured Parts	8,202.06	17.6
Finished Goods	20,685.16	44.6
Total Cost	$ 46,584.89	100.0%

We did not attempt to segregate the cost of the options from the total cost, as it would be strictly an estimate. At the time this job was being processed, one job number was assigned to the entire unit, including options. However, we will, in the very near future, be able to analyze costs by showing the central processor and options as separate items.

A detailed analysis, showing labor by Engineers and Technicians and material costs by major items, will follow.

# # #

INTEROFFICE MEMORANDUM

DATE: July 18, 1962

SUBJECT: PDP-4 QUANTITY DISCOUNT PRICE SCHEDULE

TO:
H. Anderson
B. Beckman
G. Bell.
R. Best
P. Bonner
J. Burley
D. Denniston
J. Fadiman
B. Gurley
T. Johnson
J. Koudela
K. Larsen
N. Mazzarese
R. Mills
J. O'Connell
G. O'Dea
K. Olsen
S. Olsen
B. Stephenson

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Type 25 (Real time option),
Type 65 (Printer-keyboard and control),
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INTEROFFICE MEMORANDUM

DATE July 17, 1962

SUBJECT Raw Materials Inventory

TO Harlan Anderson FROM Len Rittner

Mechanization of the raw materials inventory provides us with many advantages. In this program, the following steps should be adequately covered:

1. Assign part numbers to all items. (See previous memo on part numbers.)

2. Update all the material lists for modules and other products in Engineering. Control changes through released engineering documents.

3. Maintain the master deck of cards for material lists of each product.

4. Print out in advance the material lists on material requisition (continuous) forms. The quantity can be either filled in as issued, or may be pre-printed in advance using the job lot size as the multiplier.

5. Explode out all needed master lists and sort by part number to get total requirements. Match against stores and get quantities needed to order to cover requirements. (See memo on stock status.)

6. Go to either average pricing or standard pricing of inventory items. As an offshoot of the stock status, use the same information for the distribution of charges to correct EN number and also for pricing the inventory. This will be the subsidiary ledger and will replace the Kardex and other clerical records.

Following this through, the withdrawal card is pre-printed and punched in advance as part of the material list breakout. After variables such as quantity and charge number are noted, it is used to indicate the withdrawal from the stock status and also used to transfer the cost from inventory into the EN number.

7. The format of the stock status for finished goods can readily be used for the stock status of raw material inventory.

# # #

INTEROFFICE MEMORANDUM

DATE July 17, 1962

SUBJECT Suggestions

TO Harlan Anderson

FROM Len Rittner

The following report covers a number of unrelated points that may be of value:

1. All documents used at DEC should be cataloged, flow charted and analyzed with a view of eliminating, consolidating and otherwise improving the flow of forms and documents.

2. While it may cause some immediate problems, I believe it advantageous to publish an organization chart of the company, clearly deliniating lines of authority and responsibility.

3. A standard practice manual should be developed for the company indicating administrative policy and practices. It should cover all major activities and serve as a guide for Managers and Supervisors. Detailed procedures and practices could be further developed for functional activities such as Personnel, Purchasing, etc.

4. A standardization program of inventories is a most valuable program to be developed. This should be started by first listing everything that is in stores and with Engineering aid, whittle this down wherever feasible. Having fewer items in inventory will allow for more dollars to be invested in larger quantities, and lower unit costs, of the standard remaining items.

This should be done not only with engineering and manufacturing inventory, but also stationery and maintenance supplies.

The incentive to use standard items is this:

a. It is immediately available

b. The unit cost is lower

c. Use of the standard fastener or stationery item could go to a general overhead, a special would be bought directly to the man's cost center.

5. A formalized suggestion program for all employees would probably be advantageous. This would encourage everyone to contribute creative thoughts to any activity that would help the company. Incentives could be status awards such as recognition in company paper, or a special dinner monthly for the winner and his family with management, etc.

6. Workable budgets should be placed on all EN numbers, capital assets, and inventories. Periodic checks (once a week, once a month, depending on urgency) should be made to relate actual costs to projected budgets.

The thought is to tie into one monitoring plan the budget, the cost to complete, the physical status of completions and the schedule. In this plan, any inconsistencies between physical completions and dollars become immediately apparent.

7. We need to re-evaluate our techniques in arriving at make or buy decisions. Further in our decisions to make or buy, we should look into efficient production runs and economic ordering quantities. While other elements other than cost (such as delivery, having the facility available, keeping manpower busy, etc.) may enter into the decision, the cost factors themselves should be evaluated. Enclosed is a classic nomograph which considers many of the economic lot factors. This is not an end all, but rather a suggested start in this direction.

8. Engineering documentation might be improved by:

a. Making a project summary. This is the title sheet and serves as a table of contents for the product.

b. Making a "family tree" for the complex systems and computers. The enclosed sample is one I made for part of the PDP-4. It shows the relationship of the various levels and is most helpful not only for manufacturing, but also for scheduling and even drafting and designing activities.

c. Making engineering changes. Before a change is made, the effectivity (in terms of when to be made effective) should be carefully evaluated. One way is to have the managers involved initial off the proposed change with an estimate of the cost. While the technical need for the change is most important, the amount of dollars involved in making the change effective immediately must also be evaluated. Many times, the existing stock and work in process can readily be used up with an integration of the change with the fresh start of a new manufacturing lot.

# # #

dec INTEROFFICE MEMORANDUM

DATE July 17, 1962

SUBJECT Sales Documentation

TO Harlan Anderson FROM Len Rittner

The enclosed chart shows the flow of the two major sales documents, the customer order and the invoice.

There is considerable duplication of information on these two documents. It may be desirable to combine information and eliminate clerical effort in this operation.

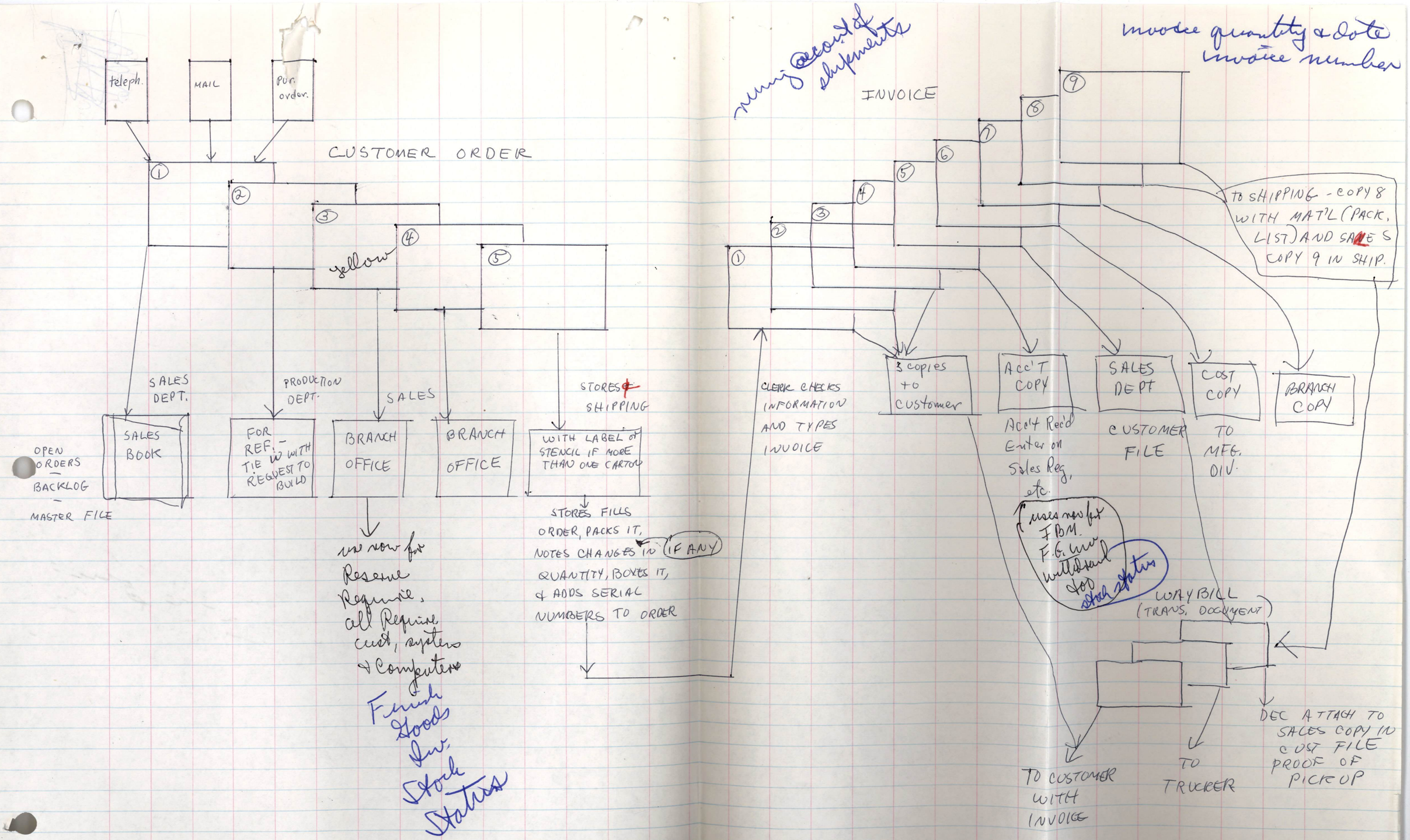
Ditto processing cannot be used because of poor appearance, as the forms going to the customer must be professional looking and sales minded.

With this thought in mind, if we could use our own equipment in this operation, it would be a sales aid that could be most valuable. The problem is complicated by the fact that stores and shipping are in one building, while sales is in another.

With the storage of information from the customer order, the invoicing would require the addition of quantity shipped and date. This is verified in stores as to physical availability before invoicing. Initial check of teletype and similar equipment to indicate status in stores before invoicing did not seem feasible, but a detailed study of equipment similar to the enclosed pamphlet may prove more practical.

I believe it feasible to explore the tying in of the customer order, the invoice, and the shipping label in one documentation setup. The customer order information would be stored into our equipment, the shipping information transmitted through tele-processing or other data input means, and the invoices and shipping documents printed out from our equipment and sent to customers.

# # #



teleph.
MAIL
Pur. order.
CUSTOMER ORDER
1
2
3
4
5
yellow
SALES DEPT.
PRODUCTION DEPT.
SALES
STORES & SHIPPING
SALES BOOK
FOR REF. - TIE W WITH REQUEST TO BUILD
BRANCH OFFICE
BRANCH OFFICE
WITH LABEL or STENCIL IF MORE THAN ONE CARTON
OPEN ORDERS
BACKLOG
MASTER FILE
use now for Reserve Require, all Require cust, systems & Computers
Finish Goods Inv. Stock Status
STORES FILLS ORDER, PACKS IT, NOTES CHANGES IN QUANTITY, BOXES IT, & ADDS SERIAL NUMBERS TO ORDER
IF ANY
running account of shipments
invoice quantity & date invoice number
INVOICE
1
2
3
4
5
6
7
8
9
TO SHIPPING - COPY 8 WITH MAT'L (PACK, LIST) AND SALES COPY 9 IN SHIP.
CLERK CHECKS INFORMATION AND TYPES INVOICE
3 copies to customer
Acc't COPY
SALES DEPT
COST COPY
BRANCH COPY
Acc't Rec'd Enter on Sales Reg, etc.
CUSTOMER FILE
TO MFG. DIV.
uses now for FBM. F.G. inv. withdrawal too
stock status
WAYBILL (TRANS. DOCUMENT)
TO CUSTOMER WITH INVOICE
TO TRUCKER
DEC ATTACH TO SALES COPY IN CUST FILE PROOF OF PICKUP

Transmit data in machine language

. . . using regular telephone lines!

Here is transmission of fixed and variable data . . . in machine language . . . at any hour . . . with maximum simplicity and minimum cost! Existing telephone lines—local, long distance or private—are used to carry the data from multiple points of origin to a central point where it is received in the form of punched cards. These cards can be entered directly into an IBM data processing system to automate requisitioning, billing, inventory control, etc. The equipment can be readily handled at the transmitting point by clerical personnel.

The IBM 1001 Data Transmission System perfectly complements the in-line processing abilities of an IBM RAMAC® System, enabling it to maintain current, accurate records of transactions periodically reported from many scattered locations. Some typical applications are outlined on the inside spread.

IBM

International Business Machines Corporation
Data Processing Division
112 East Post Road, White Plains, New York

520-1259-1 Printed in U. S. A.

New economy in IBM TELE-PROCESSING* equipment

*Trademark

IBM 1001

Data Transmission System

185-150/mo.

At Each Data-Originating (Transmitting) Point,

a simple card reader with combined keyboard permits automatic transmission of fixed numerical data from prepunched cards and variable numerical data entered manually. The keyboard also includes five operating keys for remote control of the card punch at the central location.

In preparation for transmission, prepunched cards—each representing an item to be requisitioned or reported—are pulled from a tub file. When connection with a card punch at the central point has been established, by conventional dialing techniques, these cards are inserted, one by one, into the card reader where they are read and transmitted at approximately 12 card columns per second. Variable data, such as quantity or price, may be manually keyed-in along with each card.

The IBM 1001 will transmit a maximum of 22 *numeric* characters from any one prepunched card. The remaining card columns may contain prepunched and interpreted *alphabetic* description data. Although this alphabetic data is *not* transmitted, it greatly facilitates visual use of the cards at the originating point.

At the Central Receiving Location,

the data transmitted from an originating point feeds into an IBM card punch through a Data Translator which converts the signals sent over the telephone circuits back into punched card code. The punch, either an IBM 24 or 26, automatically punches into cards both the data read from prepunched cards and the data manually keyed in at the remote station.

These cards may then be fed into an accounting machine to print shipping orders, invoices and other documents; or into a RAMAC or other type of data processing system to update accounting and inventory records while also producing printed documents.

If the cards are punched on a 26 printing punch, the cards themselves may be used as documents for filling orders or for taking the required action.

If a high volume of cards is to be received within a short period, more than one punch may be installed. When not in use as a receiving station for the 1001 Data Transmission System, the punch may be used off-line for normal manual card punching.

The Data Translator permits the sending location to dial a receiving punch directly without the intervention of an operator at the central location. Thus transmission of data can be made at any hour of the day. If there are several punches at the central location, connection can be provided automatically to any available punch.

Hospital Charge Reporting

Application Details

Terminal units located at charge stations throughout the hospital transmit charges as incurred by each patient to the data processing center, where the punched cards produced are fed directly into an IBM RAMAC for updating patient accounts on a random basis.

If IBM unit record punched card equipment is used, the charge cards would be manually placed behind the proper patient's header card. At billing time these would be fed to an accounting machine which would head and print an itemized bill.

All data is transmitted from prepunched patient identification and charge code cards. Intra-building telephone lines are used for transmission.

Advantages of IBM 1001 to hospitals:

- All patient charge records are kept current.
- Eliminates billing of late charges after patient's discharge.
- Eliminates cost and trouble of collecting from discharged patients.
- Revenue analysis of charges by code is readily available.

Store Ordering of Frozen Foods

Application Details

Each store manager keeps a tub file of cards prepunched with the numerical code for each item stocked. Cards may be printed to provide for manager to keep a record of date and quantity ordered over a period of months. Latest notation could inform clerk operating the card reader of the quantity to be ordered. Manager makes up his order by pulling cards on items needed. Items with a quantity of one are segregated. These are fed into the card reader and are transmitted to the warehouse where they are received in punched card form.

Multiple quantity items are entered by keying the quantity manually and inserting the item card, or by manually keying both quantity and item code read visually from the card. The same 1001 data transmission terminal can also be used for connection with dairy, produce, bakery and other suppliers equipped with a receiving punch unit.

Advantages of IBM 1001 to food stores:

- Permits more timely and accurate ordering.
- Permits reduced inventories at stores.
- Orders are received in punched card form for machine billing and inventory accounting.
- Eliminates messenger pickup of orders.

Centralized Inventory Control

Application Details

Manufacturers of machine parts frequently find that certain high cost items are in demand only in some areas and are seldom called for in others. Warehouses in the latter areas carry only token balances of such items, but must know quickly where to locate ample quantities for order fulfillment when necessary. An IBM 1001 System transmitting data regularly from warehouses to an IBM RAMAC System at inventory control headquarters offers an excellent answer to this problem.

Each warehouse posts its receipts and shipments to manual files and transmits these transactions and new balances as they occur to the inventory center via the IBM 1001's terminals. This data, received in punched card form, is fed into an IBM RAMAC for in-line updating of inventory balances. The data transmitted is:

From prepunched cards—
Warehouse number
Product number

From Keyboard—
Type of transaction and quantity received or shipped.
New balance
Order or receiving number

Advantages of IBM 1001 in centralized inventory control:

- Current reporting complements the in-line processing abilities of the RAMAC System.
- Eliminates numerous long distance telephone calls to locate items for order fulfillment.
- Low cost and simplicity of operation makes 1001 ideally suited for the application.

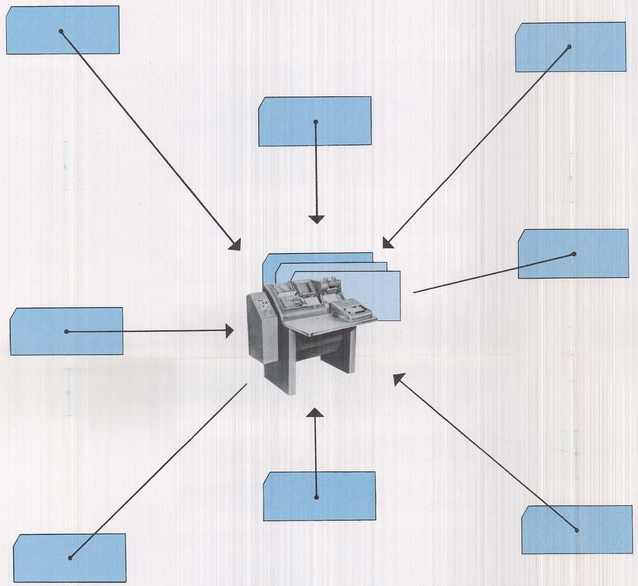
Stores Accounting [Public Utility]

Application Details

IBM 1001 feeds current data from various warehouses to an IBM data processing center. Prepunched cards are used for the more active items. Code numbers of less active items are manually keyed, using a self-checking number (24/26 optional feature) for accuracy.

Advantages of IBM 1001 combined with RAMAC:

- Permits reduction in costly inventory.
- Makes possible truly current inventory control.
- Increases reporting accuracy.
- Eliminates card punching at accounting center.



Centralized Payroll

Application Details

Various company locations throughout the country use mail and wire service to transmit payroll data on hourly workers to payroll headquarters. An IBM 1001 System permits each location to transmit via telephone lines to headquarters the following information which is received in punched card form:

From prepunched cards—
Location code
Department number
Man number

From Keyboard—
Type hours, hours worked

Advantages of IBM 1001 for centralized payroll:

- Payroll data is received directly at the processing location in punched card form ready for immediate machine use.
- Data can be received from remote points at any hour, day or night.
- System is low in cost, easy to operate, and makes really practical the centralization of payroll.
- Replaces manual punching of data into cards at receiving point and relieves operators for other duties.

Utility Cash Reporting

Application Details

Branch offices of the public utilities collect bills and deposit cash locally but customers do not receive credit until prepunched bill stubs are received at headquarters.

Using an IBM 1001 Data Transmission System, a terminal at each branch office (or at those offices not reached by a messenger pickup service) permits direct use of prepunched bill stubs to transmit collection details to billing headquarters on the same day. Only control totals and partial payments need be keyed-in manually. Public telephone lines are used as the transmission medium.

Advantages of IBM 1001 to utilities:

- Customer accounts are updated as much as two days earlier.
- Eliminates customer irritation caused by delinquent billing of customers who have just paid their bills.
- Eliminates cost of preparing unnecessary delinquent bills.

Student Attendance Reporting

Application Details

It is highly important that accurate student attendance records be reported daily by every department within a college or every school within a system. The IBM 1001 provides an excellent means of centralizing attendance recording on low-cost IBM equipment at the business office.

Each department or school is equipped with a 1001 Transmission Terminal. Instructors are provided with a prepunched student card for each student for each class period. These cards contain, student number, department or school number, class number and class period.

To report an absence, the instructor simply selects the student's card for that period. Absence cards are picked up periodically by a messenger and taken to the local attendance office. Here they are transmitted via the 1001 to the central business office where the data is punched into new cards. The new cards are used to prepare printed reports on other IBM equipment, while the original cards are returned to the instructors through their mail boxes.

When all cards for a student have been machine-sorted into period sequence, and have been printed in a report, it is easy to spot cases of class cutting.

Advantages of IBM 1001 in student attendance reporting:

- A complete absence list is available to the school attendance officer each day.
- Clerical work by instructors is reduced.
- Cuts are readily detected.
- Accuracy is improved by standardization and elimination of transcription errors.
- The 1001 is readily adaptable to such other applications as instructors' payroll and supplies requisitioning.

Salesman's Order Procedure

Application Details

Salesmen servicing such accounts as retail drug stores, liquor stores, filling stations, etc., have many detailed orders to turn in to the distribution point at each day's end. Traditionally, this is done by:

1. Personal visit, requiring time and mileage;
2. Telephone, entailing overtime clerical help to take down orders;
3. Mailing written orders, often resulting in delays of 24 hours.

The IBM 1001 provides an accurate, fast and economical means of automating order entry. The manufacturer installs a 1001 Transmission Terminal in each salesman's home. Using prepunched cards and the manual keyboard, the salesman transmits his orders during the evening to the distribution point, where they are received in punched card form. This makes possible machine writing of stock picking lists, invoices, etc., the first thing in the morning.

Advantages of IBM 1001 in salesman's order procedure:

- Expedites order entry for faster customer service.
- Orders are received in machine-processable form.
- Elimination of transcription errors increases accuracy.
- Ability to dial receiving punch directly obviates need for overtime clerical personnel.

dec INTEROFFICE MEMORANDUM

~~Follow up 2/25/62~~

DATE July 16, 1962

SUBJECT

TO
K. Olsen
✓ H. Anderson
S. Olsen
M. Sandler
B. Gurley

FROM Jack Smith

We are currently quoting customers a 4 month delivery for Mag. Tape Type 50 Units. Determining factor being our method of ordering potters. Customer order type method is now in use. On receipt of customer order for a type 50 we in turn order a potter unit and assign this unit to the customer order. Potter requires a 14 week lead time, thus determining our four month delivery quotation. If this delivery is sufficient, we can continue to order potters on a customer order bases. Shorter delivery of type 50 units to customer will require manufacturing for stock and we will have to start to forcast our needs as soon as possible. Please advise.

H. Anderson

dec INTEROFFICE MEMORANDUM

DATE July 16, 1962

SUBJECT Computer Maintenance Contracts

TO PDP-1 Distribution List FROM Bob Beckman

Attached is a brief description of the recently established field maintenance policies and charges.

Several of our customers, whose warranties have already expired, have been receiving free service for the past few months. These "extended warranties" will expire at the end of this month and further service of their equipment will be subject to the charges described here. As others' installations reach the end of their warranty period, the organizations concerned will be notified and further maintenance work by DEC personnel will be subject to these charges.

FIELD MAINTENANCE SERVICES AVAILABLE

Digital Equipment Corporation offers field maintenance service for PDP computers and associated equipment on a per call basis, or one of two maintenance contract plans. The following is a brief discussion of the services available and charges involved.

The services discussed here are available anywhere within the continental limits of the United States. For convenience, two "areas" are defined: Area 1 is everything within a fifty (50) mile radius of a DEC service center. Area 2 is everything outside this 50 mile radius. At the present time, DEC service centers are located at 146 Main Street, Maynard, Massachusetts, and 8820 Sepulveda Boulevard, Los Angeles, California.

PER CALL BASIS

Maintenance work performed on a per call basis is subject to the following charges:

1. $20.00 per hour of actual on-site work (minimum charge, $20.00).
2. Transportation at $.10 per mile (automobile) or actual cost of commercial transportation.
3. Cost of replacement parts.
4. Additional charges for installations in area 2.
    a. $20.00 per day (including travel time).
    b. Minimum charge $100.00 plus transportation.

MAINTENANCE CONTRACTS

Charges for maintenance contract plans #1 and #2 will be figured as a percentage of the base value of the equipment. The base value for this calculation will be the current published retail price of standard equipment, the last published retail price of a discontinued item, or the selling price of equipment unique to a particular installation, as applicable.

With one exception, the maintenance contracts provide for preventative and corrective maintenance on all PDP computers and associated equipment. No contract maintenance is available for

computer typewriters that have been in service for more than eighteen (18) months.

PLAN NUMBER 1

This plan provides minimal preventative maintenance service and limited corrective maintenance service. It is intended for those users who plan to do a portion of the necessary maintenance themselves. The plan provides for one (1) preventative maintenance call per month, to be scheduled by DEC, and a limited number of trouble calls per year. The number of trouble calls allowed is a function of the complexity of the installation. Twelve (12) trouble calls per year are allowed for a basic computer with no options, and the number of calls will be increased by one (1) call per year for every $600.00 per year (or portion thereof) over the charge for a basic computer. Once the limit on trouble calls has been reached, additional calls will be on a per call basis. Charges for plan #1 are:

1. 2% per year of the base value of the equipment.
2. Cost of replacement parts.

PLAN NUMBER 2

Plan number 2 provides the same monthly preventative maintenance calls to be scheduled by DEC, but places no limit on the number of trouble calls during the contract year. Charges for plan #2 will be figured on the basis of 5% per year of the base value of the equipment.

ADDITIONAL PROVISIONS

All service is on a "working hours only" basis. Working hours are defined as 0800 to 1630, Monday through Friday, (Excluding holidays). The calls must be placed within these hours. Work once started will continue as long as necessary.

Troubles traced to modifications or to additions not supplied or approved in writing by DEC, will be charged for at the per call rates regardless of any existing maintenance contracts.

Items of equipment that are still within the original warranty period will continue to receive free service as in the

past. As warranties expire, the items concerned can be added to existing maintenance contracts with appropriate adjustment in charges.

For further information concerning field services and maintenance contracts, contact:

R. J. Beckman
Manager, Customer Relations
Digital Equipment Corporation

dec INTEROFFICE MEMORANDUM

DATE July 16, 1962

SUBJECT Foxboro Meeting

TO Harlan Anderson

FROM George Rice

Your proposed meeting with Gardner Hendrie of Foxboro has been scheduled for July 23 at 10:00 a.m. at Foxboro's Natick plant.

The termination date for Mr. Hendrie's present investigation of computers is set for July 25. On this date Mr. Hendrie has to propose to his superiors a computer for Foxboro's use.

We should receive a letter in a day or two on a drum system that Foxboro would like. We should be prepared to answer Foxboro with a drum proposal by July 23.

cc. Gordon Bell

INTEROFFICE MEMORANDUM

DATE July 16, 1962

SUBJECT Production Planning

TO Harlan Anderson

FROM Len Rittner

In order to accomplish good production planning, a concrete sales forecast must first be determined. With an estimate of commitments and a probable product mix, the production plan can then be developed. By knowing in advance the levels and rates of capabilities needed, production can determine material, manpower and facilities requirements. This can be translated into detailed production schedules and manpower and equipment loads.

A strong production control group is needed. This group should include the present material control function as well as take over the activities of planning and scheduling. The pricing function should be transferred to Accounting at the time that the material records become mechanized.

With a sales forecast, realistic budgets become feasible and production rates become practical and obtainable. The over-all plan can be flexible to allow for updating, but the need for this detailed plan seems most desirable.

# # #

INTEROFFICE MEMORANDUM

DATE July 13, 1962

SUBJECT Material Handling

TO Harlan Anderson FROM Len Rittner

From a material handling point of view, I believe it advantageous to do the following:

1. Combine shipping and receiving into one operation, consolidating manpower and facilities.

2. Combine production and finished goods stores into one operation in the same manner.

3. Place all moving of materials, shipping, receiving, stores, traffic, etc., under the responsibility of one individual, probably reporting to manufacturing.

4. Establish direct line flow having the shipping and receiving room on the dock in Building #5, incoming inspection directly next to it, and then stores, all in a controlled area setup.

This will allow for not only the efficient movement of materials, but will insure the flow of material into stores, available and accounted for, eliminating unauthorized withdrawals enroute to stores.

5. Make a feasibility study of procuring (or renting) one motorized fork lift truck unit to move pallets where we presently do this manually. Allow for large aisle in Building #5 for the free movement of trucks and other traffic.

6. Purchase desk wheels to be used in moving desks and tables rather than lifting onto pallets as we do now.

7. Look into the value of use of "drop tests" or other testing to insure a minimum of breakage in shipment of our equipment and products.

8. Clearly define company policy that all receipts require receiving reports and all shipments require shipping papers. Identify all materials in shipping, receiving and inspection areas with papers indicating status.

# # #

INTEROFFICE MEMORANDUM

DATE July 13, 1962

SUBJECT Traveling Requisition

TO Harlan Anderson

FROM Len Rittner

As a parallel step with the stock status summary and other refinements of material management, it is recommended that a traveling requisition be utilized for all repetitive purchase requisitions of material.

The requisition "travels" from Production Control to Purchasing and after procurement, is returned to Production Control. The value of the permanent requisition goes beyond the obvious savings of clerical work by both the Production Control and Purchasing personnel.

It establishes a history of usage and procurement by DEC part number of every repetitive item used. Such information is not now available. This enables us to determine usage and rates of usage, relate this to vendor price breaks and delivery and quality performance. It makes it easier to determine the economic ordering quantity (balancing the costs of acquisition against the costs of possession) and tells the buyer which vendor to place the order with based on performance and price quotations.

The size and format of the traveling requisition is such (see sample attached) that it can be immediately incorporated in the Production Control Kardex. When the Kardex is dropped for a data processing stock status, the traveling requisition will be the connecting link between the stock status and the Friden typing of purchase orders. This one document is needed, as I believe completely automatic procurement is not feasible. An administrative audit is needed by a competent procurement officer before commitment of the company of its largest expenditure of dollars.

Use of the traveling requisition in buying repetitive materials, with all facts relative to the procurement transaction readily at hand, will help result in purchasing the economic quantity and price from the best rated vendor.

# # #

CHARGE NUMBER	ORD. POINT		DEC NO.
SHIP TO	ORD QUANT.		DESCRIPTION
REQ. BY	UNIT CODE	USAGE	
1	3		5
2	4		6

P. O. NO.	VENDOR	ORDERED QUANT	UNIT COST	DELIV SCHED	BUYER		APP. BY	QUANT REQ.	DEL REQUEST

TYPIST PLEASE NOTE— THIS SCALE CORRESPONDS TO TYPEWRITER (PICA) SCALE— SET PAPER GUIDES SO THAT CARD SCALE WILL REGISTER WITH MACHINE SCALE WHEN CARD IS TURNED INTO WRITING POSITION. START INDEX THREE (3) POINTS FROM LEFT EDGE OF CARD. USE OTHER POINTS OF SCALE FOR OTHER DIVISIONS OF VISIBLE TITLE. SET TABULATORS TO INSURE PERFECT ALIGN[redacted] OF EACH DIVISION OF INFORMATION. FOLD BACK OR REMOVE STUB AFTER TYPING. USE NEW TYPE[redacted]ER RIBBON.

KARDEX VISIBLE D[redacted]N CAT. NO. 1-0152 REMINGTON RAND —11 DIVISION OF SP[redacted]RAND CORPORATION 131 PRINTED IN U. S. A.

DEC NO.

DESCRIPTION

VENDOR	VENDOR NO.	DEL. PROM	ACT DEL	PRICE SCHEDULE

INTEROFFICE MEMORANDUM

DATE July 13, 1962

SUBJECT Stock Status of Finished Goods

TO Harlan Anderson FROM Len Rittner

A stock status summary of modules has been in operation for several weeks.

The next step is to enlarge this report to include planned requirements, in-process in manufacturing, minimum orders points, and availability.

Basic controls have been established on the input information, and we are ready to pick up the actual requirements (both internal and external customers). This information is available in Sales. Next, the lots in process in production should be picked up from manufacturing (with scheduled completion dates).

Based on the budgets allowed for finished goods, the minimum for each module can then be established. For example, an estimated one month's usage may be used as a possible ground rule in determining the minimum.

The dollars to be expended in finished inventory, the safety margins required, and the delivery dates quoted all go to determine this minimum stock.

The format of the basic stock status report would then look like the enclosed sample.

This stock status would not only be used for physical control of units, but would also be used as the subsidiary ledger for the finished goods inventory account. By carrying units prices, an extension of all the units should equal the general ledger dollar amount (except for reconciliations - receivings not vouchered, etc.).

A supplemental report should then be made breaking out the actual requirements on both a time needed and where used basis. This explodes out by module exactly what is needed, where it is used or who the customer is, and when it is needed. The actual code could be EN number for internal orders or customer number, if external. The code of date needed could be by week, such as July, first week would be 7 1.

Additional benefits of the report are the determination of sales backlog in terms of both units and dollars (now being done on a detailed clerical basis) and the use of this information in extrapolating trends to determine what modules to build in advance of orders.

Also, this stock status should replace Myer's records, the Kardex, and Maynard's detailed sheets indicating requirements. Copies run off by IBM can be distributed to Production, Sales and wherever else needed.

Conversion from this card setup to our computer will be a relatively simple matter, as all input information and designed output will already have been programmed.

# # #

dec INTEROFFICE MEMORANDUM

DATE July 13, 1962

SUBJECT DELIVERY OF MEMORY STACKS

TO K. Olsen
H. Anderson
B. Gurley
H. Crouse

FROM Jack Smith

Replies have been received from G.C. and Ferroxcube confirming their shipping dates of Memory Stacks to us. Ampex is bringing in the second spare Memory for MIT Monday. The fifth spare Memory for ADX-2 was installed into the system today; this completes the system. Arrival of the second MIT spare Memory from Ampex Monday morning will bring to a close a slight panic, which was not quite as bad as it first seemed. Delivery of the ADX-2 system was delayed just a matter of a few days. The MIT system is still on schedule according to Al Blumenthal.

Both G.C. and Ferroxcube have confirmed that they will ship early next week. This will put us back on schedule for all future computers.

Delivery dates of Readers, Punches and Typewriters have been confirmed and offer no problem outside of constant attention.

dec INTEROFFICE MEMORANDUM

DATE July 12, 1962

SUBJECT Minneapolis-Honeywell Computer Order

TO H. Anderson
cc. B. Gurley
A. Blumenthal
J. Myers
J. Koudela

FROM Bob Savell

On July 10, 1962 I called Mr. Richard Moore at Minneapolis-Honeywell at Harlan Anderson's request to discuss questions he had relating to Minneapolis-Honeywell's Computer order. The questions were:

1. Can we deliver part 2 of the revised price quotation which included all the in-out buffer options by September 30?
2. Does the price quoted in the TWX include cabling?
3. Can we deliver a Mag-tape control 52 and two tape transports type 50 by September 30?

Information was gathered from a number of sources to answer these questions with results as follows:

1. Al Blumenthal and Jack Smith have stated that they can have the buffers design completed and construction completed by about August 15. This will allow six weeks for check-out and unforeseen circumstances before the requested delivery date of October 30. A list of all the modules required for the buffers with quantities was shown to Jim Myers and he stated that he could supply these modules by September 30.

Based on these answers I am informing Mr. Moore today that we can deliver the buffers by October 30.

2. After discussing the quote with John Koudela and with Mr. Moore we have concluded that the price does not include cabling and have so informed Mr. Moore. Mr. Moore completely agrees that it would be much simpler for the people who are going to supply the special devices to provide their own cables than it would be for us to try to do the job.

3. Jack Smith can supply to check-out one tape control 52 by August 15, one tape transport 50 by August 7, and one tape transport 50 by September 7. Jim Myers stated that he can have a set of modules for tape control 52 and for a tape unit 50 by August 30 and the remaining set for tape unit 50 by September 15. This will allow us to deliver one tape control 52 and one tape unit 50 by September 30. The second tape unit 50 by October 30.

Due to the advantages of checking out the buffers while the computer is still here, Andy feels that we should attempt to construct the buffers for delivery with the machine by September 30.

I have not promised Mr. Moore that we will do this. We are still quoting October 30 delivery to Minneapolis.

I have just finished talking to Mr. Moore on the phone and quoted the delivery dates mentioned above. He says that there is absolutely no question but that we will receive purchase orders for the tape controls and transports and buffers and the computer system. He now has complete authority from their customer to purchase all these items and will call me early next week with a P.O. number and expects to have confirming purchase orders to us by the end of next week.

dec INTEROFFICE MEMORANDUM

DATE July 12, 1962

SUBJECT Programming

TO Ken Olsen
Harlan Anderson
cc. Ben Gurley

FROM Dit Morse
Gordon Bell

Programming:

The following people will be working in these projects for the next two months:

DEC Business Programming- Dit 1/5, G.B. - 1/8, Alan Kotok 1/3

Compiler for PDP-4 , thru PDP-1- Alan Kotok 2/3, Dit

Maintenance and In/out Routines- PDP-4 Steve Piner

DEC Library for PDP-1 - S. Graetz, Carol Austen

Double Precision Floating Point I PDP-4 Julie Cole

General Coding - Nancy Lambert

INTEROFFICE MEMORANDUM

DATE July 10, 1962

SUBJECT Receiving Report

TO Harlan Anderson

FROM Len Rittner

Presently in use is a "blind" receiving report which requires that all information be hand written by the receiving personnel. It is proposed to tie in the receiving report directly with the Purchase Order snap-out set. In this way, information typed on the purchase order that is also placed on the receiving report (such as purchase order number, vendor, part numbers, description of items, etc.) will automatically go on the receiving report when the purchase order is typed.

This is accomplished by slipping a ditto master receiving report in with the purchase order and then typing the purchase order in the usual way.

The ditto master is sent to the receiving area. When receipts are made, the variable information (actual quantity received, etc.) is written in by the receiving clerk. The receiving report is then distributed and the master saved for the next receipt (if it is a partial receipt).

A ditto master slip may be added to the master for each partial receipt or the entire receiving history may be placed on the receiving master.

On the sample (A) enclosed, the separate slip idea is used. Also enclosed are two samples (B) of the receiving history type.

If desired, the receiving document can also be used for an inspection report. In fact, it may be desirable to eliminate the inspection copy of the purchase order and replace it with the receiving-inspection report to establish quality batch control of each lot received.

When the Purchase Order snap-out sets run out (6-12 months supply now on hand), the use of a purchase order ditto master should be explored. Also, by that time we should type the purchase orders on the Friden, making a card for input into the stock status summary of our on order commitments.

# #

RECEIVING REPORT

digital | EQUIPMENT CORPORATION

PURCHASE ORDER NO. 1234

DATE: July 6, 1962

RECEIVING REPORT NO. _____

DATE REC'D _____

REC'D BY _____

TO

JONES + CO
MAIN STREET
BOSTON, MASS.

SHIP TO

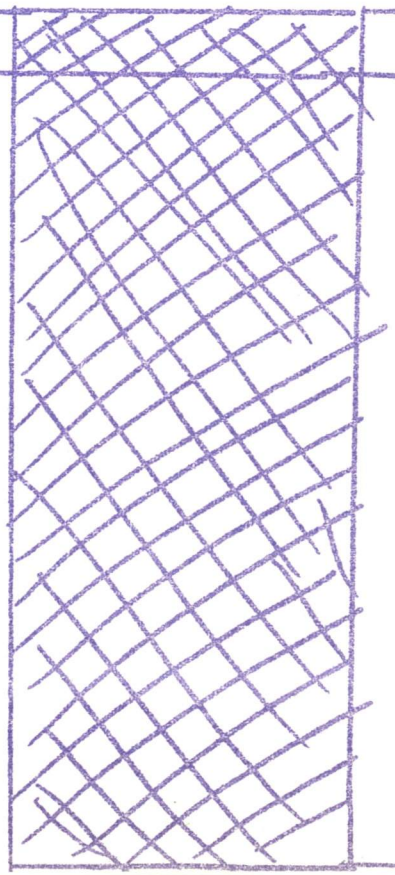
DIGITAL EQUIPMENT CORPORATION

MAYNARD, MASS.

TO BE DELIVERED BY	SHIP VIA	TERMS	F.O.B.	GOVT CONTRACT NO.	ACCT. NO.

ITEM	QUANTITY	STOCK NO./DESCRIPTION	RECEIVED	REJECTS
1		1 IBM EXECUTIVE TYPEWRITER (Blue)		
2	1	1 IBM EXECUTIVE TYPEWRITER (Green)		

SAMPLE A



RECEIVING REPORT

digital | EQUIPMENT CORPORATION

PURCHASE ORDER NO. 1234

DATE: July 6, 1962

TO

JONES & CO.
MAIN STREET
BOSTON, MASS.

SHIP TO

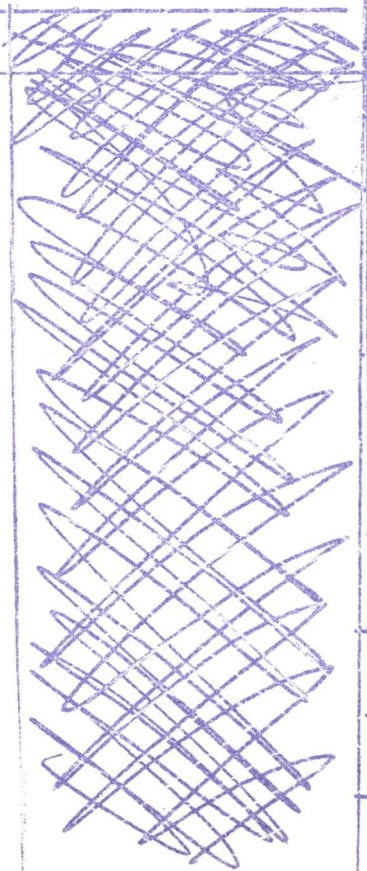
DIGITAL EQUIPMENT CORPORATION

MAYNARD, MASS.

TO BE DELIVERED BY	SHIP VIA	TERMS	FOB	GOVT CONTRACT NO. & ST. NO.

ITEM	QUANTITY	STOCK NO. / DESCRIPTION
1	1	IBM EXECUTIVE TYPEWRITER

SAMPLE B



RECEIVING NUMBER	DATE REC'D	ITEM NO	QTY REC'D	ACC'T QTY
222	7/10/62	1	1	1

RECEIVING REPORT

digital | EQUIPMENT CORPORATION

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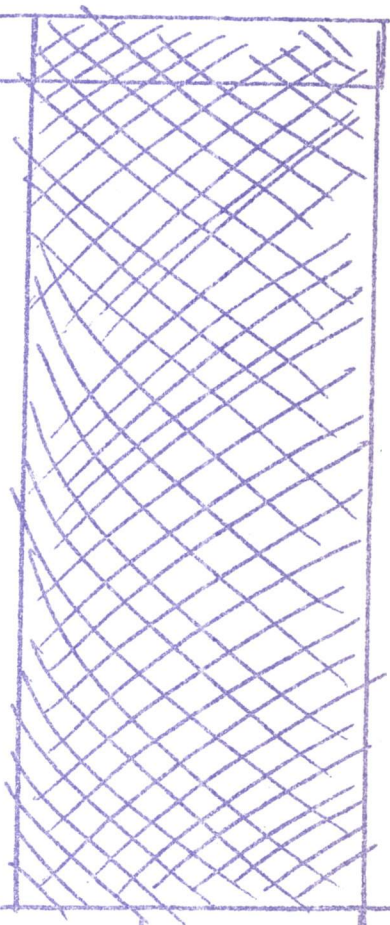

RECORD OF MATERIAL RECEIVED

RECEIVING NUMBER	DATE REC'D	ITEM NO.	QUAN. REC'D	ACCEPT. QTY	RECEIVING NUMBER	DATE REC'D	ITEM NO.	QUAN. REC'D	ACCEPT QTY

dec INTEROFFICE MEMORANDUM

DATE July 10, 1962

SUBJECT Computer Maintenance Contracts

TO Ken Olsen
Harlan Anderson
Stan Olsen
Ben Gurley
Dick Mills
Al Blumenthal

FROM Bob Beckman

After examining all available records, and having several discussions with Ben Gurley, Al Blumenthal and Dick Mills, I recommend the following general form for DEC maintenance services, charges and contracts.

For convenience, two geographical areas are referenced. Area 1 refers to those areas within fifty (50) airline miles of a DEC service center. Area 2 refers to all areas outside the 50 mile radius from a DEC service center. At present, DEC service centers are Maynard, Massachusetts and Los Angeles, California. (We'll specify the address in Los Angeles since I strongly suspect that you could be in Area 2 and still be in Los Angeles).

Maintenance services would be offered under one of three methods; per call basis, maintenance contract Plan Number 1, or maintenance contract Plan Number 2. These three methods are covered individually below.

PER CALL BASIS. Maintenance work performed on a per call basis would be subject to the following charges.

1. $20.00 per hour of actual on-site work. (Minimum $20.00).
2. Transportation at .10 per mile (automobile) or actual cost of commercial transportation.
3. Cost of replacement parts.
4. Additional charges for installations in Area 2.
    a. $20.00 per day (including travel time).
    b. Minimum charge $100.00 plus transportation per call.

MAINTENANCE CONTRACT PLAN NUMBER 1. This plan would provide minimal preventative maintenance service and limited corrective maintenance service. The plan provides for one preventative maintenance call per month, to be scheduled by DEC, and a maximum of twelve (12) trouble calls per year. Charges for both Plan 1 and Plan 2 would be figured as a percentage of the cost of the equipment. The base cost would be the current published retail price of standard equipment and options, the last published retail price of a discontinued option, and the selling price of equipment unique to a particular installation. I strongly recommend this percentage system, since it will make it relatively easy to determine the charge for a particular installation regardless of the items involved. Charges for Plan 1 would be figured at a 2% per year rate.

The limit of twelve trouble calls per year assumes a basic computer with no options. The number of calls would be increased by one call per year for every $600.00 per year (or portion thereof) over the $2400.00 charge for a basic computer. Once the limit has been reached on trouble calls, additional trouble calls would be charged for on the per call basis.

Under this plan, monthly charges for a basic PDP-1 would be $200.00, and monthly charges for a system such as the "Dynamic System Simulator" at CRL would be about $800.00.

MAINTENANCE CONTRACT PLAN NUMBER 2. Plan #2 includes the monthly preventative maintenance calls to be scheduled by DEC, but places no limit on the number of trouble calls during the contract year. Charges under Plan #2 would be figured on the basis of 5% per year.

Under this plan monthly charges for a basic computer would be $500.00, and the charges for the CRL installation would be about $2000.00.

There are several general conditions that would apply to both Plan #1 and Plan #2. First, all service is on a "working hours only" basis. Working hours are defined as 0800 to 1630, Monday through Friday (excluding holidays). The calls must be placed within these hours. Work once started will continue as long as necessary. This is obviously a serious limitation on the service provided, but I feel that it is necessary at this time. By clearly stating it now, we make it possible to offer a third plan at a later date that would provide for 24 hour, every day service.

Another general provision would stipulate that troubles traced to modifications or to additions not supplied or approved in writing by DEC, would be charged for at the per call rates.

I feel that the free service that we are presently providing to several installations should be terminated as soon as possible. For that reason I recommend that the procedures and charges outlined above be adopted and that the firms concerned be notified no later than 16 July that the warantee extensions are terminated as of 31 July . The general provisions of the various maintenance plans available can be included in these letters of notification, and the final form of the contract can be developed between now and the end of the month.

###

INTEROFFICE MEMORANDUM

DATE July 9, 1962

SUBJECT Material Requisition

TO Harlan Anderson

FROM Len Rittner

The Material Requisition (enclosed) has been in use for about a month and has proved satisfactory for both finished goods and raw material transactions. This requisition has replaced some 8 or 9 forms that were previously used to record withdrawals.

The next refinement needed is a color coding of the requisition copies to indicate distribution and use of the form for credit transactions (returns to inventory).

Room has been left on this form to allow for pre-running the job lot sheets. Conversion of the job lot sheet to this material requisition form will standardize all stores transactions onto one document.

When the material lists are picked up by data processing, the job lot sheets can be printed out on continuous forms by the 402 using the same format. The issue of the job lot sheets would be both the production authorization and the kit release.

This would parallel the other programs of stockstatus of inventories and the formation of a part numbering system that would be digestible by IBM.

# # #

MATERIAL REQUISITION

NO. _____

DATE _____

Quantity Issued	DEC Part Number	Description	Account or Job Number	Unit Cost	Type of Inventory	Posted Inventory	

DIGITAL EQUIPMENT CORPORATION • MAYNARD, MASSACHUSETTS

dec INTEROFFICE MEMORANDUM

DATE July 9, 1962

SUBJECT PDP-1 Field Service Summary

TO PDP-1 Distribution List FROM Bob Beckman

Attached is the first of a series of monthly summaries of field service performed on PDP-1 installations.

The purpose of these summaries is to keep everyone up to date on the amount and type of field service work being performed. Anyone who wants more specific information on particular failures can let me know and we'll run off Xerox copies of the actual field service report.

###

SUMMARY OF FIELD SERVICE

June, 1962

Number of calls: 15
Man hours: 161

Maynard Area		Calls	Los Angeles Area		Calls
PDP-1B	BBN	6	PDP-1C-7	BBN	0
PDP-1C-1	ITEK	1	PDP-1C-12	LRL	*
PDP-1C-3	CRL	0	PDP-1C-13	JPL	0
PDP-1C-4			PDP-1C-15	BECKMAN	5
PDP-1C-5	MIT	1	PDP-1C-16		
PDP-1C-6	CRL (OAL)	1			
PDP-1C-9	GEOTECH	1			
PDP-1C-17	SRL	0			

BBN

An unusual amount of service calls to BBN this month. This is due in part to the recent additions and modifications to the PDP-1B.

One problem was the intermittent pick-up of bit 7 in memory. The trouble was traced to a defective inhibit driver for the afore mentioned bit. An interesting point about this problem was, checkerboard program would run, even though the inhibit driver for bit 7 was defective. Another service call found an open solenoid for bit 16 in the off-line typewriter, and a defective forward escapement clutch on the off-line punch (the off-line punch is a tally punch on the PDP-1B).

While trying to initiate a sequence break on any channel, the inclusive Or of channel 7 would always occur. This problem was traced to an open transistor in the decoding of MBD_7.

* Installation Phase

Problems with done pulses on both typewriters when manually striking a key. This problem was due to PDP-1B logic and a logic change was put in the computer so that it would operate in the proper manner.

Another service call for new memory problems at BBN were traced to the 1701 voltage regulator module in the 735 power supply. The defective regulator caused fluctuations of the inhibit current. Replacement of this module and readjusting the read/write and inhibit currents solved this memory problem.

After a few days of operating the PDP-1B, it was found that when the computer was first turned on that TW 1 >AC during deposit would not put bit one into the accumulator. This problem was traced to defective 1201 flip-flop in the accumulator. Replacement of the flip-flop corrected the malfunction. It was also found on this service call, that during a jump instruction we were not clearing the program counter. Investigation revealed a shorted transistor in an 1105 module which was loading down the input to the clear the PC pulse amplifier. This module was used when an external control pulse from the drum would clear the PC. Replacement of the transistor in the 1105 module corrected this problem. A complete test was performed on the PDP-1B and its peripheral equipment. During this test it was found that there were low margins on hole number 2 in the reader. Adjustment of the hole number 2 amplifier corrected these low margins and all tests which were then run on the PDP-1B proved successful.

The PDP-1B is rapidly evolving into quite a system. Some of the recent additions to the PDP-1B are:

Automatic multiply and divide.
IOT Control flip-flops and minus one to the program counter logic.
Mag Tape Type 51.
Additional Memory and Field Extension Type 15.
Time Sharing Logic.
FIO-DEC and Parity Coding for the off-line typewriter and punch.
Magnetic Drum, with the storage capacity of 22 memory modules.*

* Installation Phase

ITEK

Service was required for the Teletype punch at ITEK. The punch had excessive oil and chad in the die block head. A thorough cleaning of the die block head and re-oiling of the head corrected the punch difficulties.

MIT

A service call to MIT was necessary when the Type 30A Display showed no deflection in the left quadrant. Removal of the deflection coil cable in the display and a continuity check from the right deflection amplifier to ground read 20Ω. This 20Ω reading was traced to a shorted 2N 1719 transistor in the heat sink unit of the Type 30A Display. It should be noted that this problem caused the plus 50 volt NJE power supply to go into an overload condition, and the supply output measured only 45 volts.

CRL

The light pen which is used with the Type 30A Display at the OAL installation was excessively noisy. An electrical tape used as an insulation around the sides and bottom of the light pen amplifier shield, eliminated most of the high frequency noise. A check of the light pen then showed its signal to noise ratio to be greatly improved.

GEOTECHNICAL CORPORATION

An intermittent trouble at Geotech would occur from time to time and it seemed to happen mainly when the computer was cold (i.e. for the first hour after turn-on). When we arrived at Geotech the computer had been left off all day so that the same problems would show themselves. The symptoms were that all types of programs would fail and the usual result was a cleared instruction register with the computer halting in an illegal op.

It was determined that a LAC instruction was also doing a partial add and a carry. The partial add and carry pulse amplitudes were inversely proportional to warm-up time. After a series of waveform checks and power ups and downs (to insure the computer stay cool), it was determined that the instruction register decoding for 10 and 00 was only going from ground to -1.5 volts. A shorted .01 m.f.d. capacitor in the -3 volt clamp circuit of an 1104 module was the cause of this problem.

I think that it should be noted that the .01 m.f.d. capacitor which failed is an Automatic Components capacitor, which has also shorted in other modules in two different installations. These capacitors are not up to DEC quality and are no longer used in DEC modules, however, there are some of this type in modules which are now in the field.

BECKMAN

Our service calls were necessary at Beckman for breakdowns of peripheral equipment. Two punch problems developed at the Beckman installation, one of which was caused by excessive oil and chad jammed in the die block assembly. Cleaning the punch and die block assembly solved the problem. The other problem was caused by the use of reel tape as the reel was hitting the tape guide. Adjustment of the tape guide solved this problem. A series of reader problems has seemed to plague Beckman during the past month. Some of the problems which developed were a defective feed hold amplifier, brake and clutch adjustments on one reader, two shorted SPA modules in an on-line and a spare reader, and a shorted -30 volt rectifier stack on still another spare reader.

INTEROFFICE MEMORANDUM

File

copy to Dick Mills

DATE July 9, 1962

SUBJECT Major Computer Components

TO Harlan Anderson
Ben Gurley

FROM Henry Crouse

In order to meet the projected computer production schedule the following components have been ordered:

10 - Digitronics Model 3500 readers delivery to begin in October at the rate of three a month.

10 - Soroban 16" typewriters delivery to begin in November at the rate of three a month.

10 - R. C. A. memory stacks delivery to begin August 20th with the rate to be established.

The availability of Teletype punches both on hand and on back-order is adequate for the quarter.

The Potter Tape Handlers on hand and on open order are committed for firm computer orders. The lead on handlers is three months and our requirements are to be reviewed constantly.

cc: Jack Smith

dec INTEROFFICE MEMORANDUM

DATE July 6, 1962

SUBJECT Revision of Tape Control 52 Pricing

TO
K. Olsen
H. Anderson ✓
S. Olsen
B. Gurley
E. Harwood
J. Koudela
R. Maxcy

FROM N. Mazzarese

The present scheme used in pricing Tape Control Type 52 has led to some confusion when two Tape Controls are purchased with a single computer, or when a Tape Control is purchased without a computer.

The problem arises due to the fact that the High Speed Channel Control Type 19 is included in the price of the Tape Control, and that one Type 19 can handle up to three Type 52's.

It is, therefore, recommended that the price of the first Mag Tape Control Type 52 for a given computer be:

$29,000	Mag Tape Control
+ 9,000	High Speed Channel Control
$38,000	Total

and that the price of a second Mag Tape Control on the same computer be $29,000.

This price schedule is presently being offered to ITT on ADX-5.

dec INTEROFFICE MEMORANDUM

Jule

DATE 7/6/62

SUBJECT Off-Line Tape Duplication

TO S. Olsen FROM John Koudela

In March of this year every DECUS installation member received a complete basic program library including write-ups and tapes. To accomplish this, approximately 750 tapes were duplicated necessitating a great deal of computer time. Since this first mass distribution of materials, many DECUS members have availed themselves of the library services and more tapes have had to be duplicated.

Due to the fact that so many customers, plus DEC employees, are using the Prototype, the amount of time needed to duplicate tapes is becoming very hard to obtain. However, if the following off-line duplication and verification machinery were purchased, this situation would be greatly improved:

Friden Punched Paper Tape Regeneration Unit (20 char./sec.)	$1,300
Soroban Model CR-1 Comparator (30 char./sec.)	$1,345 to $1,800

These off-line machines, besides alleviating computer time, would have the following advantages:

1. Clerical personnel could operate the machines.
2. These machines could be used all day with no priority problems as are encountered in using the Prototype.
3. The actual speed of duplication and verification is comparable to computer speed (i.e., since the computer either duplicates or verifies its speed of 60 char./sec. is cut in two). The fact that these off-line machines are independent of each other means the operations can be simultaneous with an average speed of 25 char./sec.

As our program library is enlarged, and more customers become aware of its importance, the need for off-line duplication and verification is definitely apparent.

I feel that to adequately fulfill the needs of our customers, who are growing in number, the purchase of the above named equipment be seriously considered.

dec INTEROFFICE MEMORANDUM

DATE July 5, 1962

SUBJECT

TO Harlan Anderson
George O'Dea
Dick Mills
Maynard Sandler

FROM Kenneth H. Olsen

For some time we have seen the need for strengthening our administrative staff. Jay Forrester has pointed out a number of areas in which we have been quite weak. It is very difficult to fill this job because it is so vague. Most of the administrative tasks are being taken care of now one way or another, but, indeed, they are not as thoroughly done as they should be. An example of one of the tasks which are not being taken care of is the recruiting of professional personnel. We get many inquiries and resumes, but we often let them slide and, indeed, are often impolite to the people.

Next Thursday morning, Mr. Hindle, who is on the Industrial Liaison staff at M.I.T. will come to visit us. He had had very general administrative experience at M.I.T., and has a very pleasant personality. He is one who Jay Forrester suggests might be very useful to us. If possible, I would like to have you talk with him when he comes at that time.

Kenneth H. Olsen

DATE July 3, 1962

SUBJECT Summary of Installation of Additional Memory and two extra Mag Tapes, Sequence Break Type 20 and Memory Extension Type 15 at JPL.

TO Benjamin Gurley FROM Ed Harwood

To accommodate these additional options on the JPL machine we also had to install a new type operator control panel and a new in-out indicator panel which included sequence break indicators. We spent Tuesday, Wednesday, and Thursday, full time, wiring in the additional memory and sequence break system, also installing the new operator control and in-out indicator panel. Before we could even start the additional wiring we had to remove a considerable bit of wiring so that we could make this system compatible with the newer cabling systems that are now used on all of the computers. We finished most of the wiring for the memory on Friday, and started to do some preliminary trouble-shooting on the memory connections and the memory. By Friday evening we had one memory running again and we shut down in preparation for wiring in the sequence break system on Saturday. All day Saturday was spent wiring in the cables for the sequence break system, mounting it, and getting all the indicators hooked up properly. We really started to check the machine on Monday.

The first thing that we noticed was that the two 1973 Memory Drivers, on memory one, were bad, and also the five 1982 Inhibit Drivers had shorted transistors. We found two possible causes for these troubles. One was that the cable running from the 735 supply to the memory logic had pins A and B swapped at the soldered end of the connector. This put +3 on the memory common instead of -3. The other possible cause for this trouble was that the cable which jumped the memory address and the memory buffer lines from memory to memory, had two - sixteen sections of the cable swapped so that the memory address was hitting the memory buffer lines and the memory buffer was hitting the memory address lines. We finally straightened out these troubles and came back on the air late Monday.

We managed to get the memory "one" to hold information but noticed one bit kept dropping a one. At this time we decided to check the currents on the memory and we noticed that read-write current was set at 200 and inhibit currents was set at 190. This was a TMI stack, and the currents for the stack were too high, so they were reset to the proper currents.

Just before we checked the memory we noticed something suspicious about the memory buffer lights, every other light would be on when we read all one's or all zeros. This trouble was traced to the memory buffer indicator driver in back of the console having every other transistor in backwards. This was removed and fixed. It is now Tuesday, and we are attempting to check-out the memory extension Type 15.

After checking the drawings we noticed that it was built from a 10,000 series ADX drawing which is slightly different from the 20,000 series drawing. We made the necessary corrections and continued on with our checking. We managed to get this working by Tuesday evening and the computer would swtich memories properly? We could write checkerboards in one memory and check them in the other and change the procedure. On Wednesday we started checking the sequence break system.

The first thing that we noticed was that there was no -15 connected to the orange wire from the power end panel on panel R1D. We ran this wire and were able to get the pulse amplifiers to operate. We were unable to get the sequence break system working and after fiddleing around, trying to trouble-shoot from the console I went over and took a look at the panel and noticed that all of the flip-flops were terminated with an 82 ohm resistor to ground. This was corrected and sequence break system started to limp along a bit. Further checking of the sequence break system revealed that we should change IOT 50 class from firing on time pulse 7 - 4 to time pulse 10 - 4. After making this change the sequence break system started to work. Further checking of the sequence break system revealed a couple of small wiring errors on the mounting panels which were on the drawings. These errors were corrected and we checked out all of the channels on the sequence break system and they all seemed to work properly.

While all this was going on, Roland was busily checking the Mag Tape 52 and straightening out all of the latest changes that have taken place on that. During this check-out period we were shocked to find that there were no common AC ground between the computer, the tapes, and the scopes. This took three days to correct because it takes that much time for an electrician to get down to the area and hook in a little ground wire.

It is now Thursday evening and the computer and mag tapes appear to be working a little. On Friday, Paul and I spent the morning cleaning up the loose ends of the computer and then we left the computer and mag tapes to Roland and Leo to tune up as best they could.

On the way back to the airport Paul and I stopped off at BBN to pay a business and social call and they all said they were quite happy with the machine and showed us some of the latest programs that they were using.

Paul has gone back up to Oregon to begin his two-weeks vacation and is due at work the week of the 15th. Leo will take a week's vacation in California then come back to help with the installation of the LRL machine and then he will take his second week's vacation.

Roland and I have returned to the factory.

cc: Ken Olsen
Stan Olsen
Harlan Anderson
Jack Smith
Robert Hughes
Bob Beckman