CONFIDENTIAL

OPERATIONS COMMITTEE MEETING

June 30, 1969

AGENDA

1. Additions and Corrections to Minutes of the June 9 and 23 Meetings, and the "Woods" Meeting of June 24 and 25
2. Marketing Review Committee Summary - (Ted Johnson)
   (See attached minutes of the June 9, 17, and 23 meetings)
3. Special Salary Review - (Ted Johnson)
   (See attached report from Jack Shields)
4. Proposed Transfer of Timeshared-8 from Nick Mazzarese to Win Hindle
5. Proposed Transfer of Display Products from Nick Mazzarese to Joe St. Amour
6. Proposed Repricing of the PDP-12 and 8/I
7. Proposed Shift Premium for Salaried Employees - (Win Hindle)
   (See attached report from Graydon Thayer)
8. Salary Administration for Wage Class 4 Employees - (Graydon Thayer)
   (See attached report)
9. Appointment To and Use of Supervisory Job Titles - (Ted Johnson)
   (See attached report from Bob Lassen)
10. PDP-8 and Secondary Education Marketing Proposal - (Richard May)
    (See attached report)
11. Leominster Public Relations Activities - (Mark Nigberg)
    (See attached report)
12. Fabrication Shop Capital Equipment Proposal - (Dave Knoll)
    (See attached report)
13. Proposal to Build PDP-14 Read-Only Memories Production Facility - (Dave Widder)
    (See attached report)
14. Proposal for Shared Development of Needed Data Acquisition Hardware - (Ron Noonan)
    (See attached report)
15. Engineering and Marketing Plans - (Bob Savell)
16. Information System Projects - (Dave Packer)
    (See attached report)
17. Proposed Use of Travelodge Credit Cards - (Nick LoRusso)
    (See attached report)
18. Schedule Review Product Status - (Steve Sobel)
    (See attached report)
19. Proposed Executive Dining and Assembly Area - (Al Hanson)
    (See attached report)

MINUTES OF THE OPERATIONS COMMITTEE

JUNE 30, 1969

Present: W. Hindle, N. Mazzarese, T. Johnson, B. Kopp, S. Olsen, K. Olsen, P. Kaufmann (Secretary)

1. The minutes of June 9, June 23 and the Woods Meeting of June 24 and June 25 were approved with the following exceptions:

   June 9 - #12 "Removal" in lieu of "Renewal".

2. Business Applications (Ken Olsen)

   Our system with peripherals may be as expensive as an IBM rental. Is it worth doing? Dave Packer will distribute his opinion and the Marketing Review Committee will review.

3. Special Salary Review (Ted Johnson)

   Approved

4. Engineering and Marketing Plans (Bob Savell)

   Bob presented hardware projects, software projects and marketing projects for Fiscal Years 1968, 1969 and 1970 indicating total costs and people.

   General discussion ensued. Ted suggested that software projects need further documentation emphasis. Some concern was expressed about our success in getting the PDP-10 marketing message across. The recent "management" advertising was felt too subtle to understand. Salesmen often have a clear simple message of what marketing efforts are needed to improve our market penetrations. The conclusion seemed to be that the PDP-10 seems to need a more simple direct marketing approach.

   Ken also emphasized the distribution of a large quantity of books having considerable advantages in the market place.

5. Repricing PDP-12 and PDP-8/I (Win Hindle, Nick Mazzarese)

   It was agreed that the PDP-8/I volume increase (4 million shipments; 5 million bookings) will yield a ± 25% pretax profit without raising the PDP-8/I Central Processor price. It was agreed that the PDP-12A price will be increased to just under $30K. The PDP-12 will increase volume and maintain percent profit levels. Win and Nick will get new budgets issued.

6. Shift Premium, Salaried Employees (Win Hindle)

   The proposal was approved.

7. Supervisory Job Titles (Ted Johnson)

Ted requested to use the definitions as a guideline. Win Hindle will issue as a guideline in the Personnel Supervisors Policy Manual.

8. Public Relations Activities (Mark Nigberg)

Mark Nigberg will propose a plan for any further public relations activities after the rezoning hearings.

9. Fabrication Shop Capital Equipment Proposal (P. Kaufmann)

This was approved pending P. Kaufmann and Brewster Kopp agreement. Brewster Kopp will make a proposal for capital equipment justification.

10. Proposal for R.O.M. (P. Kaufmann)

P. Kaufmann desires a second source capability. The PDP-11 R.O.M. should also be able to be produced on this equipment. The proposal was approved.

11. Executive Dining and Assembly Area

Can discuss a visitors dining room, not an executive dining room. P. Kaufmann stated that to use any space in Building 5-4 would seriously effect subassembly and module production and test facilities.

12. Data Acquisition Hardware (R. Noonan)

General discussion ensued on Ron Noonan's proposal. This hardware is for the PDP-15, PDP-8 and PDP-11. These projects will be only limited use for the Modules and PDP-10 Product Lines. The Product Lines are very oriented toward one year return projects. This proposal returns results considerably earlier than the DSI proposal. After the discrete components are designed, a DSI type proposal will be made, aimed to optimize their use with the PDP-11. (The proposal was approved tentatively. If we proceed, the funds will be drawn from the 2% but it will be set up as sub-product profit center).

Next week, a one page sales pitch by Ron Noonan will be made.

13. Secondary Education Marketing (Dick May)

The proposal was approved pending Bill Long's and Dick May's talking with the Operations Committee at 10:00 o'clock, Thursday, July 3.

14. Travelodge Credit Cards

We approved the use of Travel Lodge cards tentatively encouraging people to use these cards.

15. Postponed to next week's agenda:

1. Data Acquisition Hardware (Ron Noonan)
2. Proposed Transfer of Timeshared-8 from Nick Mazzarese to Win Hindle
3. Proposed Transfer of Display Products from Nick Mazzarese to Joe St. Amour
4. Salary Administration for Wage Class 4 Employees - (Graydon Thayer)
5. Information System Projects - (Dave Packer)
6. Schedule Review Product Status - (Steve Sobel)
7. Proposed Executive Dining and Assembly Area - (Al Hanson)

jb

CONFIDENTIAL

digital INTEROFFICE MEMORANDUM

DATE: June 23, 1969

SUBJECT: SPECIAL REVIEW

TO: Ted Johnson FROM: Jack Shields

SPECIAL REVIEW - HOURLY TO SALARY

Bill Freeman -- Presently in Product Support in the PDP-8 Family. Handles 8's, 8S's, 8I's and all peripheral. Bill has demonstrated that he is really a product Support Engineer and is without a doubt the strongest technical man in the 8 family product support organization. Bill moved up and took over Frank Eagan's role when Frank transferred to the West Coast. Proposing a 41.5% increase for Bill to bring his salary to 12064. Bill earned approximately 11.3K with overtime for 1968.

digital INTEROFFICE MEMORANDUM

DATE: June 19, 1969

SUBJECT: Shift Premium, Salaried Employees

CONFIDENTIAL

TO: Operations Committee

FROM: Personnel Committee
(G. A. Thayer)

Our present policy of requiring a minimum of four (4) weeks assignment to an evening shift before a salaried employee can receive shift premium has proven to be a problem in our training, field service, programming, and other departments since employees are frequently scheduled for repeated periods of one to three weeks.

A survey was recently completed with local companies to determine their practices, (attached) and results indicate that the general practice is to pay shift premium immediately.

The Personnel Committee has requested approval to incorporate the following change into our policy:

> ....evening shift premiums will be paid to both hourly and salaried full-time permanent employees (40 hours per week) who are assigned to a regularly scheduled evening shift which extends for a period of at least:
>
> (a) one week for hourly employees, and
> (b) four weeks for salaried employees. However, in unusual circumstances, exceptions may be made and shift premiums paid to salaried employees for scheduled periods of one week or more with the approval of an Operations Committee member.

GAT/lw

digital INTEROFFICE MEMORANDUM

DATE: 6 June 1969

SUBJECT: Results of Survey Conducted in Greater Boston Area Concerning Shift Premium for Exempt Personnel

TO: Peter Koch

FROM: John J. Henry

Ten companies in the greater Boston area were contacted by telephone and were questioned as to what their policies were regarding compensation of exempt employees who were transferred to a 2nd or 3rd shift indefinitely. The results can be broken down into three categories:

Group One: The following six companies payed exempt employees a shift premium immediately when they were transferred to a 2nd or 3rd shift.

Honeywell
Polaroid
Raytheon
R.C.A.
Sylvania
Western Electric

Group Two: E.G.&G. did not pay a shift premium immediately. If an employee was assigned for a period longer than one week, he would usually receive the shift differential.

Control Data needed the approval of a Group Vice President to pay the premium and this occurred infrequently.

Group Three: Itek and the Electronic Corporation of America had no shift work.

DIGITAL EQUIPMENT CORPORATION

digital INTEROFFICE MEMORANDUM

DATE: August 14, 1968

SUBJECT: APPOINTMENT TO AND USE OF SUPERVISORY JOB TITLES

TO: All DEC Managers

FROM: Bob Lassen

Frequently, managers have asked for guidelines regarding the assignment of people to supervisory positions within the Company.

To assist you in this area, we have prepared brief definitions of the three major levels of supervision common to all departments--Group Leader, Supervisor and Manager.

These guidelines also include the procedure for approving supervisory appointments.

Promotion to a supervisory position represents a major turning point in a person's career and directly affects DEC's future progress. Therefore, we urge you to think carefully about the qualifications of the person you are considering for a supervisory position. Remember also that once appointed, a new supervisor needs your help and guidance to succeed in his new role.

Members of the Personnel Department will be happy to assist you in your consideration of supervisory appointments and to provide you with information and guidance on the qualifications of employees who are being considered.

It is most important to inform the Personnel Department when a person has been designated as a Group Leader, Supervisor or Manager to insure that the appointment is properly recorded and official announcements are made.

Bob

jfr

GROUP LEADER:

1. Normally reports to a supervisor or manager;

2. Functions as a working leader with primary emphasis on monitoring work assignments and productivity of his group;

3. Has little or no responsibility for financial performance of his group or for policy interpretation;

4. Usually does not become involved in decisions that would commit the Company financially.

5. Interface with other supervisory personnel is minimal.

APPROVAL PROCEDURE:

A supervisor recommending an employee for a Manager, Supervisor, or Group Leader title must receive the approval of the managers as designated below prior to making any announcement of the appointment.

Upon final approval, the employee will be notified in writing by his supervisor, who will provide the Personnel Department with a copy for the employee's Personnel record.

In the case of an employee being hired into an established opening at one of these supervisory levels, it is the mutual responsibility of the supervisors involved and the Personnel Department to insure that the supervisory title appearing on the approved "Request for Personnel" follows the criteria outlined above.

TITLE	APPROVAL
Manager	Operations Committee Member managing the function.
Supervisor	a) Manager of the activity, b) Operations Committee Member managing the function.
Group Leader	a) Supervisor of the activity, b) Manager of the function.

The titles of Assistant Manager, Assistant Supervisor, and Assistant Group Leader are not authorized.

APPOINTMENT TO AND USE OF SUPERVISORY JOB TITLES

PURPOSE:

To establish uniform guidelines which:

1) Outline the distinguishing characteristics of supervisory positions within the Company,

2) Provide appropriate criteria for the determination of supervisory titles, and

3) Insure consistency in the use of titles.

LEVELS OF SUPERVISION:

Outlined below are the supervisory responsibilities and titles used within DEC:

MANAGER:

1. Accountable for managing the Company's performance in a product, functional area, or geographical area;

2. Responsible for preparing and proposing budgets and plans;

3. Responsible for performance against approved budgets, plans, and schedules;

4. Maintains close working relationships with members of the Operations Committee and members of their immediate staff;

5. Has the authority to commit the Company financially in his areas of responsibility, and to make policy interpretation decisions on his assigned personnel.

SUPERVISOR:

1. Normally reports to a manager;

2. Has responsibility for insuring performance of his organization against established schedules, budgets, plans, and policies;

3. Has authority to make day-to-day decisions necessary to insure effective operation of his group, however, functions in a recommending role on final policy interpretation decisions for his personnel;

4. Cannot unilaterally commit the Company financially;

5. Maintains close working relationships with other supervisors whose functions represent key interfaces with his own.

digital INTEROFFICE MEMORANDUM

DATE: June 24, 1969

SUBJECT: LEOMINSTER PUBLIC RELATIONS ACTIVITIES

TO: Members of the Operations Committee

FROM: Mark Nigberg

cc: Gabe D'Annunzio, Ed Schwartz

In a recent memorandum addressed to me, dated June 24, Pete Kaufmann indicated he would like to see all of our PR efforts stopped in regard to our Leominster and Westfield plants. We feel it is extremely important that our current PR activities in this area continue, with the approval of the Operations Committee. We thought this approval had already been received.

It was our impression that the Operations Committee had approved, 1.) a normal recruiting campaign in Westfield at the appropriate time (probably beginning in the fall or winter of this year), 2.) a similar campaign in Leominster, when appropriate, and 3.) a short term PR effort requested by Ed Schwartz to support our rezoning petition.

Pete Kaufmann was involved in discussions on all three campaigns. The specific campaign that currently appears to be of concern is the one which supports Ed's rezoning petition, which amounts to: 1) two releases that describe people we are employing from the Leominster area at our Maynard plant, and scholarships we are giving to students in a number of schools throughout this area, 2) an invitation to town officials and some concerned Leominster citizens to visit the Maynard plant, and 3) my accepting an invitation to participate in a radio program designed to tell the people of Leominster a little bit about us and the kinds of products Digital and Tucker manufacture.

Based on these facts, we are somewhat concerned that we have misinterpreted the direction given to us by the Operations Committee. We, therefore, recommend that we be put on the agenda of the next Operations Committee meeting on June 23 to discuss this matter in full.

MN/cjw

COMPANY CONFIDENTIAL

digital INTEROFFICE MEMORANDUM

DATE: June 19, 1969

SUBJECT: Fabrication Shop Capital Equipment Proposal

TO: Operations Committee FROM: D. Knoll

The FY 70 Capital Equipment Budget includes $766K for equipment to expand our production capacity at Maynard and $216 to initially equip the Westfield Metal Fabrication Shops.

This proposal covers the first $175K of the $766K and provides equipment which will allow 64K hours of work to be brought inside per year. R.O.I. on this equipment ranges from 55% to 150% and averages 61%.

The proposed equipment will increase our annual production capacity from $1670K to $2278K. This $608K of work brought inside would have cost us $760K if subcontracted.

In choosing this equipment, a major consideration has been to choose the equipment which can be most fully utilized considering the availability of skilled and unskilled people in Maynard. A schedule and the annual hours of utilization for all equipment is attached.

I have been wrestling with the question of how to measure whether we do what we say we are going to do, relative to savings on specific capital investments. The approach I am taking is to measure hours worked on each machine with the assumption that if we meet or exceed the utilization figures attached, we will have saved the money proposed. I am working with Data Processing to begin collecting utilization data by machine, early in FY 70, Q1. The backup attached includes a utilization commitment for each piece of equipment.

jkl

Att.

INTEROFFICE MEMORANDUM

DATE June 19, 1969

SUBJECT EQUIPMENT JUSTIFICATION

TO Dave Knoll FROM Dan Sullivan

An analysis has been made of the equipment the Fabrication Shops proposes to procurr at the start of fiscal year 1970 in order to justify this investment.

A ratio of depreciation to direct labor of the fiscal year '70 budget was determined, which is 14%. Each piece of proposed equipment was analized to determine the amount of hours the equipment would actually work, either due to the availability of work for it and/or the availability of manpower. From this information a depreciation rate was determined for each piece of equipment based on actual hours worked. This was used to develop an inside hourly rate to compare with outside cost where available.

Attachment A itemizes all the equipment with its related information in order to arrive at the actual hourly depreciation rate for that group of equipment.

Attachment B is a summary sheet of all groupings of equipment and the availability of the hours per year with its appropriate hourly rate for that group of equipment.

With the approval of this equipment, it would give the Fabrication Shops no less than 64,271 hours of additional manufacturing capability which would increase our in-house capability by 608K/year or about 36%. The outside equivalent cost of this production would have been about $760K.

This proposal covers 25% of the capital equipment expenditures for the year which will, in total, increase in-house production from $1,680K/year to $3,250K/year. While in-house production is doubling, requirements are planned to increase from $4,060K (fiscal '69) to $7,283K (fiscal '70). In-house production as a per cent of total production is given below:

	FY '68	FY '69	FY '70
Total Production	2,605K	4,060K	7,283K
In-House $ Production (including R/M in part)	897	1,680	3,940
In-House Per Cent	32%	42%	54%

R.O.I. has been calculated below:

Machine	Investment	Payback	R.O.I.
Grinding	33.6K	14 Months	80%
Sweco	4.1K	7 Months	150%*
Other	136.8K	19 Months	55%

* Based on sample parts which account for only 10% of the machine time.

General Purpose Equipment

59K hrs. @ $3.15/hr. = savings*	=$186K
Less Depreciation	35K
	$151K
Less Taxes - 51%	77K
	$ 74K
Plus Depreciation	35K
	$109K

$$\text{Payback} = \frac{\text{174K Investment}}{\text{9.1K/month}} = 19 \text{ months}$$

R.O.I. = 55%

* On general purpose equipment, savings have been calculated based on a sample of representative work which shows a savings of 25% inside versus outside or a savings of $12.60 - $9.45 = $3.15/hour.

ATTACHMENT A

COST CENTER 438

For fiscal 1970 depreciation is 14.0% of direct labor

Cost Center hourly rate less 7424 is $9.45/hr.

Hourly rate without depreciation ($9.45) (14.0%) = $8.15/hr.

Depreciation is $1.30/hr.

GRINDING EQUIPMENT

(1) Blohm Surface Grinder 14.6K

Five-Year Straight Line Depreciation is 2.9

		Hr./Yr.	Actual Hrly. Depreciation	Actual Hrly. Rate
Hrs. work of grinding equipment averages 8 hrs./day	=	2005		
Depreciation of Equipment / Hrs. Work 2900 / 2005	=		$1.42	
8.15 + 1.42	=			$9.57

-continued-

TAPE'S

(1) Model "C"	33.4K
(1) Model "A"	8.9K
(1) Model "B"	27.3K
	69.6K

Five-Year Straight Line Depreciation is 13.9

			Hr./Yr.	Actual Hrly. Depreciation	Actual Hrly. Rate
Hrs. work of tape average 48 hrs/day =			18,015		
Depreciation of Equipment / Hrs. Work	13,900 / 18,015	=		$ .77	
$8.15 + .77		=			$8.92

DRILLS

(1) Six-Spindle	2.6K
(1) Four-Spindle	1.7K
(1) Two-Spindle	.8K
(1) Turret	1.1K
	6.2K

Five-Year Straight Line Depreciation is 1.2

		Hr./Yr.	Actual Hrly. Depreciation	Actual Hrly. Rate
Hrs. work of drills average 48 hrs/day =		12,010		

-continued-

			Hr./Yr.	Actual Hrly. Depreciation	Actual Hrly. Rate
Depreciation of Equipment / Hrs. Work	1200 / 12010	=		$ .10	
$8.15 + .10		=			$8.25

VERTICAL MILLERS

(6) Vertical Millers 16.5K

Five-Year Straight Line Depreciation is 3.3

		Hr./yr.	Actual Hrly. Depreciation	Actual Hrly Rate
Hrs. work of vertical millers averages 72 hrs./day	=	18,200		
Depreciation of Equipment / Hrs. Work	3291 / 18200 =		$ .18	
$8.15 + .18	=			$8.33

PANTOGRAPH

(1) Pantograph 1.5K

Five-Year Straight Line Depreciation is .3

		Hr./Yr.	Actual Hrly Depreciation	Actual Hrly rate
Hrs. work averages 3 hrs./day	=	756		

-continued-

Depreciation of Equipment / Hrs. Work	300 / 756	=	$ .40	
$8.15 + .40		=		$ 8.55

SWECO

(1) Sweco 4.1K

Five-Year Straight Line Depreciation is .8

		Hr./Yr.	Actual Hrly. Depreciation	Actual Hrly. Rate
Hrs. work averages 12 hrs/day	=	3000		
Depreciation of Equipment / Hrs. Work	826 / 3000	=	$ .28	
$ 8.15 + .28		=		$ 8.43

BEHRENS

(1) Behrens 45.0K

Five-Year Straight Line Depreciation is 9.0

		Hr./Yr.	Actual Hrly. Depreciation	Actual Hrly Rate
Hrs. work averages 24 hrs./day	=	6000		
Depreciation of Equipment / Hrs. Work	9000 / 6000	=	$1.50	
$8.15 + 1.50				$ 9.65

-continued-

WELDING EQUIPMENT

(3) Wirefeed Welders 4.9K

Five-Year Straight Line Depreciation is .98

		Hr./Yr.	Actual Hrly. Depreciation	Actual Hrly. Rate
Hrs. work averages 10 hrs./day	=	3780		
Depreciation of Equipment 980 / Hrs. Work 3780	=		$ .26	
$ 8.15 +	=			$ 8.41

BLIND SPOT WELDER

(1) Blind Spot Welder 2.5K

Five-Year Straight Line Depreciation is .5

		Hr./Yr	Actual Hrly Depreciation	Actual Hrly Rate
Hrs. work averages 2 hrs./day	=	505		
Depreciation of Equipment 496 / Hrs. Work 505	=		$ .98	
$ 8.15 + .98	=			$ 9.13

ATTACHMENT B

EQUIPMENT	HR./YR.	HOURLY RATE
Grinding	2,005	$9.57
Tape's	18,015	8.92
Drills	12,010	8.25
Vertical Millers	18,200	8.33
Pantograph	756	8.55
Sweco	3,000	8.43
Behrens	6,000	9.65
Welding	3,780	8.41
Blind Spot Welder	505	9.13
	64,271 Total	
	Weighted Average Rate	$8.67

SUMMARY SHEET OF CAPITAL EQUIPMENT

MACHINE SHOP

Equipment	Delivery/Weeks	Cost
(1) Blohm Surface Grinder	4	$15,343.00
(6) Induma Milling Machines	6	16,455.00
(1) 6-Spindle Drill	4	2,639.40
(1) 4-Spindle Drill	4	1,664.96
(1) 2-Spindle Drill	4	785.90
(1) Burgmaster Turret Drill	4	1,072.25
(1) Tap-O-Matic Model "C"	4	33,436.00
(1) Tap-O-Matic Model "A"	4	8,950.00
(1) Pantograph Machine	6	1,945.00
(1) Tap-O-Matic Model "B"	4	27,318.00
	Sub-Total	$109,609.51

SHEET METAL

(1) Sweco Finishing Mill	6	$ 4,130.00
(1) Behrens Punch Press	12	45,000.00
	Sub-Total	$ 49,130.00

WELDING

(3) Wire Feed Welders	4	$ 4,886.10
(1) Blind Spot Welder	4	2,483.09
	Sub-Total	$ 7,369.19

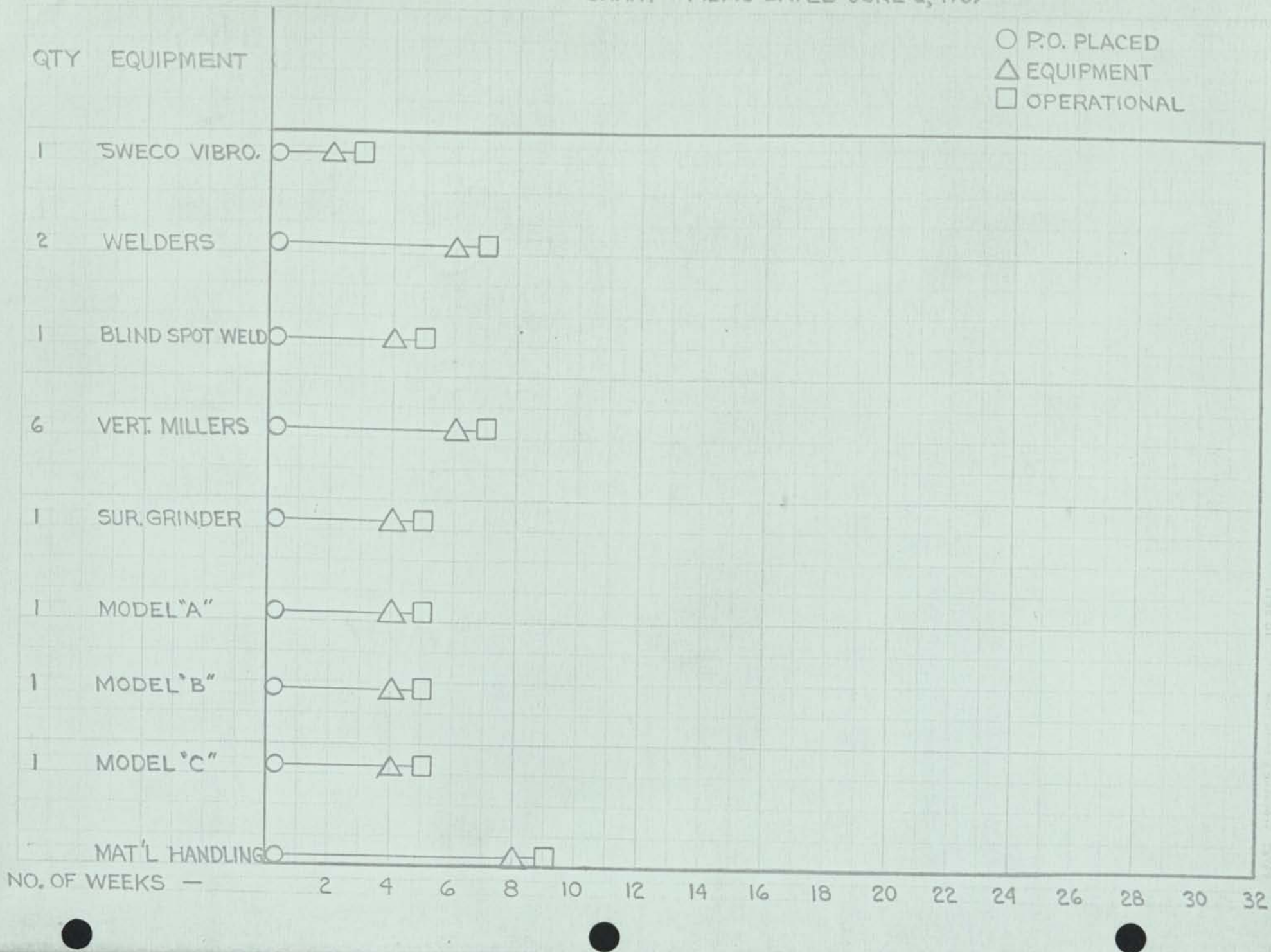
QUALITY CONTROL

(1) Set of Gauge Block	4	$ 505.00
Miscellaneous - plates & calipers	4	2,705.00
	Sub-Total	$ 3,210.00

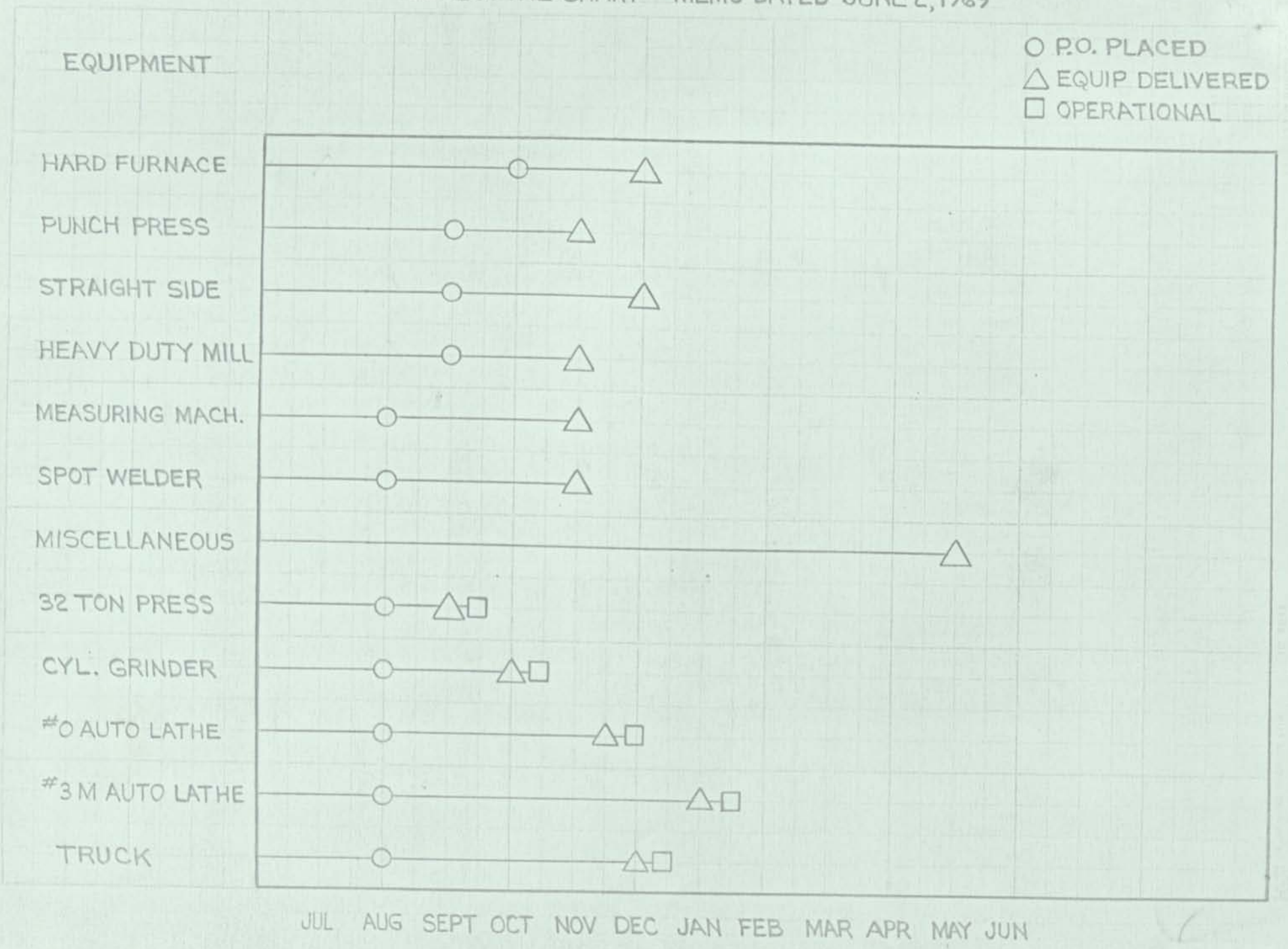
MATERIAL HANDLING

(2) Electric Hand Trucks	8	$ 5,094.00
	Sub-Total	$ 5,094.00
	GRAND TOTAL	$ 174,412.70

MILESTONE CHART – MEMO DATED JUNE 2, 1969



MILESTONE CHART MEMO DATED JUNE 2, 1969



PROPOSAL TO BUILD PDP-14 ROM PRODUCTION FACILITY

JUNE 26, 1969

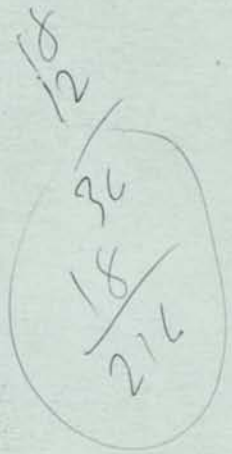
Dave Widder

1. I propose that a manufacturing facility be built to weave and assemble PDP-14 Read Only Memories in-house. (Plan II listed below) The facility will be operational by October 1969.

2. Such a facility will save Digital $51K by June 1970. ($180 x 430 units less facility cost)

3. The facility will cost Digital $26K.

4. Details follow.



digital INTEROFFICE MEMORANDUM

DATE: June 26, 1969

SUBJECT: ABSTRACT OF ENGINEERING COMMITTEE MEETING MINUTES - JUNE 26

TO: Operations Committee FROM: Tom Stockebrand

II. Dave Widder - "ROM Loom"

Dave presented a plan for an ROM loom. (attached) It involved a prototype by August at a cost of $20K and would yield a savings of $180 per memory. (430 built between now and next July).

Comments:

1. Only ½ the savings are atributable directly to the loom.
2. The breadboard needs to be tried at 128 wires to make sure of feasibility.
3. The volume numbers may not be real because MTI should get some business.
4. Pete Kaufmann wants the backup facility above all.

Conclusion:

No serious objections technically.

Tom

bn

PDP-14 ROM PRODUCTION FACILITY
JUNE 26, 1969

Dave Widder

Purpose

The purpose of this project is to develop in-house equipment for semi-automatic production of ROM's. Presently, all of DEC's read only memories come from MTI. They are a sole source and no other vendors can provide these units. With this production equipment we could produce ROM's at less cost than we can now buy them from MTI. Secondly, the equipment could be used as a backup facility for MTI if we decided to take that approach.

The latest figures from John Holzer for requirements for ROM's are as follows:

October 1969	10 units
November 1969	10 units
December 1969	10 units
January 1970	30 units
February 1970	45 units
March 1970	65 units
April 1970	75 units
May 1970	85 units
June 1970	100 units
Total	430 units

Based on a quality discount schedule obtained from MTI for 430 units a year, the cost breakdown is as follows:

Braidboard	$ 99.82
Sense Board	125.00
Assembly & Test	30.00
	$254.82

This is all labor except the sense cores which MTI provides with an estimated value of less than $10.00. We estimate our cost of labor for memories produced in-house as follows:

Braidboard	
Weave	$ 20.00
Test & Repair	5.00
Encapsulate	2.50
Clean & Trim	2.50
Sense Board	
Wind Cores	15.00
Place Cores	5.00
Insert I.C.'s	.75
Insert Resistors	.25
Assemble & Test	15.00
	$ 61.00

Extrapolation of in-house costs of weaving PDP-9 ROM's shows the cost of manually weaving a PDP-14 ROM braidboard would be about $360.

Cost Breakdown to Build an ROM Facility

Design Time	$ 5.0K
Machine Shop Time	2.5K
Interface & Tape Reader (Design time included)	3.6K
Cylinders & Valves	7.4K
Miscellaneous Hardware	1.5K
Total	$20.0K

The machine is controlled by an 8L computer and the automatic tester uses the same computer with a $300 interface and will utilize a program which will already exist for MTI. If the 8L computer must be capitalized, then add $6K to the total cost breakdown.

Schedule

June 13:	Breadboard model
July 20:	Design Review
August 15:	Prototype loom. (Build one ROM then get a go, no-go decision on future of project)
October 1:	Operational production system (if approved)

Plan I

Build the facility without the basic weaving machine which is 90% of the cost.

If MTI will agree, continue to buy braidboards from MTI and build the rest of the ROM in-house. This would constitute a savings of about $120 per unit. $120 x 430 units - 2,000 = $49,000 savings by June 1970.

This still leaves DEC dependant on a sole source for the braidboard.

Plan II

Build the entire system and realize a total savings of about $180 per unit or $180 per unit or $180 x 430 units - $26,000 = $51,000 savings by June 1970.

Ken

digital INTEROFFICE MEMORANDUM

DATE: June 26, 1969

SUBJECT: PDP-8 AND SECONDARY EDUCATION MARKETING PROPOSAL

TO: Operations Committee FROM: Richard May

Attached for your consideration is my proposed marketing effort to develop the market for small PDP-8 systems and secondary education.

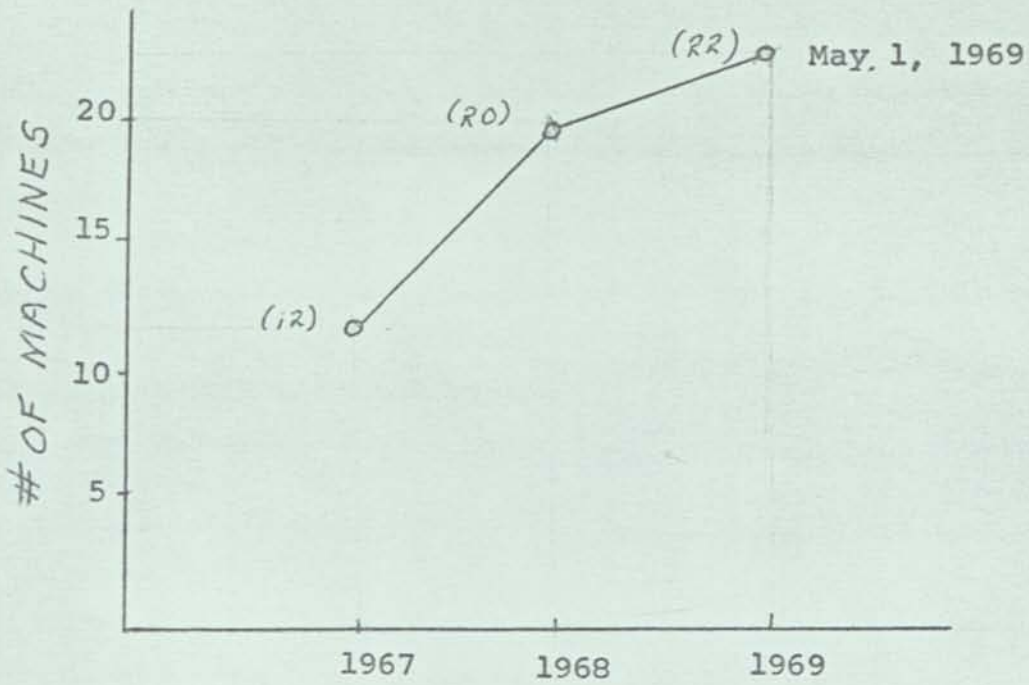
Richard

ecc

GENERAL:

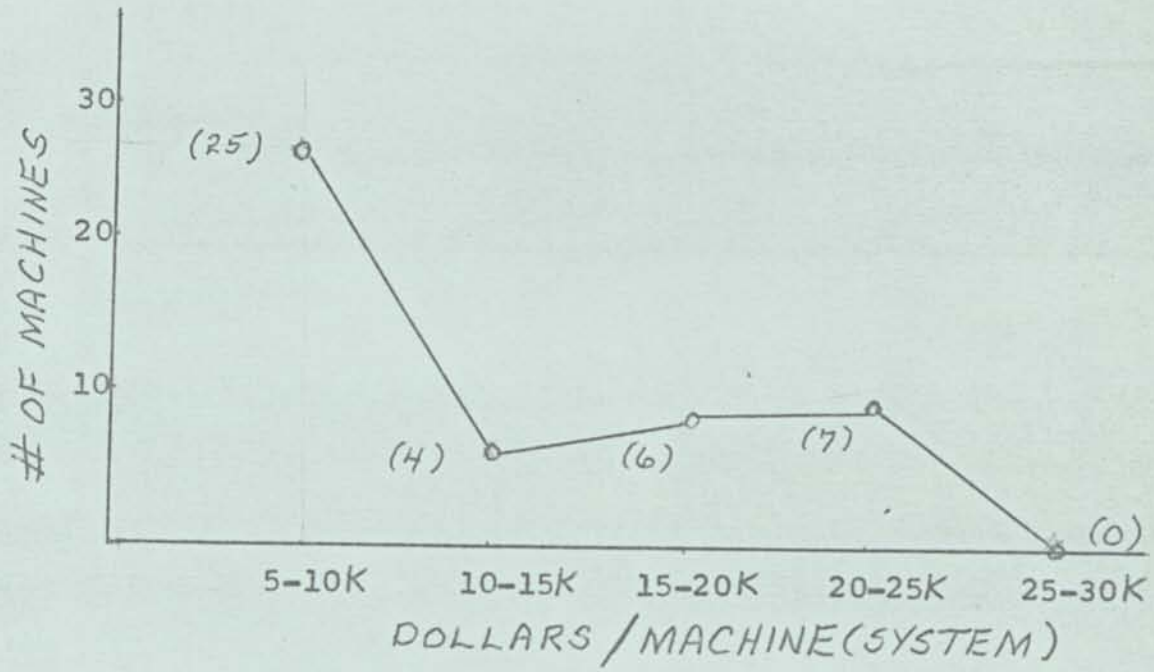
Over the past three years a market has been identified in the public and private secondary schools. During the past year a third market area has appeared. The third market area is the small college with an enrollment of 350 to 2,000 students.

During the last year under Ron Eisenhauer's direction, the Northeast Sales district has made an effort to effectively sell to this market area. This effort has resulted in the sale of eighteen (18) machines and a dollar volume of $331,225. The graph below illustrates the growth of the market in the secondary educational area over the last three years in the Northeast Sales district and nationwide:



Northeast Sales feels very strongly that we have definitely identified a rather large market in the public and private secondary schools which is mature and ready for further development.

Northeast Sales feels that it has identified a market for machines priced at less than $25,000 per installation in this market. The number of machines sold to date in this market nation wide is shown below:



CONCLUSIONS:

We are convinced there is a very large market for machines priced at less than $15,000 in the Northeast Sales district and nation wide. We feel that with minimum expenditure and effort 100 machines can be sold to this market nation wide during calendar year 1970. We feel this is a very realistic but conservative projection. To capitalize on this market will require the following expenditure:

Software	
8/L 4 User Focal 8/I 7 User Focal BPT Basic & CR	$8,000
	$8,000
Hardware	
8/L 4 User Focal (Demonstrator) BPT Basic & CR (Accessability Only)	$19,000
Remote Terminal Capability (Acoustical Couplers)	1,000
Remote/Local Capability	1,000
	$21,000

Promotion

Brochures	$7,000
NSF Institutes	3,000
Direct Mail to Prep Schools	
Direct Mail to Supts.	2,000
Sale Salesmen	3,000
Trade Shows	20,000
	$35,000

Publicity

Feature Articles (Newspapers & Magazines)	
DEC Newsletter Articles	
Speakers for Meetings	$3,000

Manpower

Three man years (Salesmen)	$ 75,000
Salary & Travel & Overhead	25,000
	$100,000

Total:	$167,000

These expenditures will result in an estimated $1,000,000 gross income. (50 states X 2 machines/state X $10K/machine).

To date very little interest in this market area, outside of the Northeast Region, has been shown and very little support has been given to us in developing this market area; in spite of lack of support we have successfully and rather effectively sold to this new market area.

The experience and knowledge gained in selling into this market during the past eighteen months, Northeast Sale's successful sales effort in penetrating a new market area, and my personal interest in the rapid development of this market prompts me to request that I be given the responsibility of further developing this market as a Corporate Effort.

Richard May

Richard May

digital INTEROFFICE MEMORANDUM

DATE: June 18, 1969

SUBJECT: Travel Accommodations

TO: Operations Committee

FROM: Nick LoRusso

Purpose:

To request approval for the issuance of Travelodge Credit Cards.

Reason:

The use of Travelodge credit cards will enable the Company to reduce business travel expense. It also guarantees a fixed rate for accommodations which will keep the cost of lodging down.

Recommendations:

I recommend we issue Travelodge credit cards to people with the Company who do a large amount of traveling on Company business. The systems would work in the following manner:

1. Credit cards will be issued by the Office Services Department upon request of the appropriate department head.

2. The employee will call toll-free a special number to make advance reservations.

Benefits:

1. Reduce Company expenses for lodging (see attached exhibit).

2. Allow travelers to budget their expenses with regard to pre-arranged lodging expense.

3. Guaranteed firm reservations for people traveling.

Nick

EXHIBIT

	No. of Locations	Avg. Cost Per Single	I.D. Cards	Guaranteed Rates
Hilton	66	$ 18.26	No	No
Travelodge	450	8.99	Yes	Yes
Holiday	Over 1000	10.90	No	No
Quality Courts	330	10.50	No	No

OPERATIONS COMMITTEE MEETING

June 23, 1969

AGENDA

1. Discussion on the Future of Our Products

2. Notes on Fiscal Year 1970 Budget - (John Jones)
   (See attached report)

3. PDP-8/I and 8/L Cost of Living Price Adjustments - (Howie Painter/Bill Long)
   (See attached report)

4. New Quantity (Blanket) Discount Plan - (Howie Painter/Bill Long)
   (See attached report)

5. Three-Year Facilities Plan - (Pete Kaufmann)

6. Allocation of Module Specialist
   (See attached memo from Al Devault)

CONFIDENTIAL

MINUTES OF THE OPERATIONS COMMITTEE

June 23, 1969

Present: W. Hindle, B. Kopp, T. Johnson, K. Olsen, S. Olsen, P. Kaufmann (Secty.)
N. Mazzarese, J. Jones, L. Portner, J. St. Amour, A. Devault, B. Savell,
B. Long and F. Gould

1. Discussion on the Future of Our Products

What is Happening to Costs?

1. The absolute manufacturing costs are rising.

2. The cost of bookings are expected to go up 9% by 1973. (6.4% - 7.2% of bookings.)

3. Much discussion ensued on engineering and marketing costs: Engineering can decrease as a percentage of Sales. (John Jones) Engineering will remain the same as a percentage of Sales due to increased competitive nature of small computer business. (B. Long) Module engineering costs will drop. Selling and Marketing costs will remain level. (Al Devault) Overall engineering costs will remain level as a percentage of Sales and Marketing expenses will remain constant. Sales costs are rising. (R. Savell) Incremental costs of new product development will rise. (J. St. Amour) Software might be sold separately in a few years. (L. Portner)

   Win Hindle suggested that the 10% of engineering now includes 2% peripheral development, 2% software development, 5% for central processors.

   The essential conclusion that was reached was:

   Product Line Management must decide what businesses they want to cover (OEM, Computer Pak etc). It is essential that the message that anyone may propose covering an area not covered by the Product Line Management is well understood in the organization at all levels.

DEC Competitive Advantages

1. Momentum
2. Customer base
3. Service
4. Applications package
5. Peripherals
6. Price
7. Manufacturing volume capability

New Areas Planned to Improve our Competitive Position

1. Low cost printer
2. Low cost disks
3. Low cost terminal
4. Application packages

    Spark Chamber Packaging (15)
    Hybrid Computation Packaging (15)
    Real-time NC (8)
    Business Package (8)
    Message Concentration (8)
    Batch Terminal (8)
    Small Educational (8)
    Real-time Software (10)
    Batch Processing Software (10)
    Cobol (10)
    Communication (10)
    Programming Services Dollars
    New Time-Sharing (10)
    Wire Wrap Centers (M)
    Custom Boards (M)
    Data Communication (M)

New Areas Not Properly Covered

1. Business Applications and Management Information Services

*2. Displays and Terminals

*3. Communications

4. Rental
5. Service Bureaus
6. Special Manufacturing and Systems
7. Teaching
8. Military - Aerospace
9. A/D - D/A
10. Oceanography

2. Fiscal 1970 Budget PDP-9/15 (John Jones)

Based on today's backlog, shipments will be higher than budget for the first quarter, as will profits. John suggested that, if bookings and shipment budgets were raised, he could hire some replacement marketing personnel to make a Hybrid Computer Pak etc. The conclusion was to control total Fiscal 1970 dollars and to invest dollars in the PDP-15 to optimize the next two years.

3. PDP-8/I and 8/L Price Adjustments

A proposal was made to raise prices in order to raise our pretax profit for the Eight Product Line from 22% to 25%. The price increases on common products are consistent with all product lines. Bill Long will discuss with Brewster Kopp and a decision will be made at the conclusion of discussion.

4. Quantity Discount

The new quantity discount proposal was discussed. Our legal staff approves and the basic discount policy will be utilized by all product lines. The proposal was approved.

5. Three-Year Facilities Plan

The plan was recorded.

6. Allocation of Module Specialists

The question raised was "How can we control salesmen time and their goals (sales by product line vs total sales goals)?" Ted needs to use general salesmen due to budget freeze vs module specialists desired by product line. The same is true of PDP-10 software specialists. After much discussion the conclusion was that Ted will come up with a simple contract which will be reviewed by the Product Line and the Operations Committee.

jb

digital INTEROFFICE MEMORANDUM

DATE: June 16, 1969

SUBJECT: AGENDA FOR JUNE 23RD OPERATIONS COMMITTEE MEETING

TO: Operations Committee
Bill Long
John Jones
Al Devault
Bob Savell
Joe St. Amour
Larry Portner

cc: Ed Savage

FROM: Ken Olsen

There is a tendency for prices to get lower and services increase as the Corporation ages. I would like to discuss and predict the future of our products during the Operations Committee meeting next Monday, June 23rd.

Will you prepare a chart of the product lines you are responsible for, showing how expenses have changed and how you predict they will change in the next two years (1967 - 1971).

I would like to know how they break down between new product development, software development for new products, new product marketing, software for old products, engineering for old products, and overhead. I would also like a statement as to what limits our taking a larger portion of the total market for that product. Sometimes I think people feel limited by Corporate decisions, such as the slow start of PDP-10 production.

I would like Ted Johnson to chart (or plot) how expenses have changed and how he expects them to change in sales. I would like to see the yield per man and where the overhead total is going.

It would be good to discuss these with Brewster Kopp before our next meeting because we may develop some consistent way of presenting them, and it would be a fast way to introduce him to the operation of the Company. I am sure there are other items that should be included in this that I haven't thought of.

Ken

ecc

digital INTEROFFICE MEMORANDUM

DATE: 23rd June, 1969.

SUBJECT: Analysis of Sales Costs

TO: Ted Johnson

FROM: Ron Smart

The following material summarises historical costs as a basis for future planning. It indicates the movement of the average value of our primary budgeting and control parameters. It also shows the variation about the average for the more statistical factor "yield per man", and it shows the composition of the relatively stable parameter "cost per man".

The effect of software support and of the training necessitated by our rate of growth of manpower are illustrated.

Software support, which is a relatively new phenomenon, is discussed briefly in relation to the level to which it has been raised, and at which it can stabilise, depending on our marketing planning.

The sections included are:

1. Fiscal Year Averages over all products and regions.
   Raw data and major budget/control parameters.

2. Separating the effect of software support from account salesman cost.

3. Analysis of variation in sales yields.

4. Expenses.
   Analysis of overheads and into expense categories.

5. Percentage cost of bookings.
   Analysis into major variables of software support and training.

6. Analysis of software support.

jr
encl.

Ted Graff/Ron Smart
6/23/69.

SALES COST ANALYSIS

1. Fiscal Year Averages Over All Products and Regions

1.1 Raw Data

FY	'67	'68	'69	'70	'71	'72	
(a) Booking	44.8	65.7	106	144			$M
(b) Manpower	66	110	200	287			Avg. sales and software men.
(c) Expense	2.27	3.77	6.55	9.21			$M, total department.

Note 1: '67, '68 are actual, '69 estimated, '70 budgeted

1.2 Major Budget and Control Parameters

FY	'67	'68	'69	'70	'71	'72	
(d) Bookings Yield/Man Year	680	596	530	503			$K per man year on payroll.
(e) Expense/ Man Year	34.5	34.2	32.8	32.1			"
(f) Expense/ Bookings	5.06%	5.74%	6.18%	6.40%			(f) = (c)/(a) = (e)/(d)

Note 2: Yields have decreased, costs have decreased (however it is not clear that the cost decrease can be maintained), overall the % sales cost relative to bookings has increased mainly due to software support (see Section 2 and 6).

2. Separating the Effect of Software Support from Account Salesman Cost

FY	'67	'68	'69	'70	'71	'72	
A/c salesmen	60	99	165	232			Average a/c salesman
Software support men	6	11	35	55			Avg. software support man
A/c salesman yield	750	664	640	625			$K/man year
A/c salesman % cost of bookings	4.60%	5.18%	5.11%	5.15%			Expense/ bookings
Software support % cost of bookings	0.46%	0.56%	1.07%	1.25%			Expense/ bookings

Note 1: Software support accounts for most of the increase in the % sales cost relative to bookings. However there is a residual drop in bookings yield per account salesman (see Section 3).

Note 2: The software support figures above are software trained and classified bodies. In fact these people do on average 20% to 30% pre-sales work. However some salesmen do post-sales software support work, and the net effect is a small increase in sales costs relative to the above figures (i.e. perhaps 0.20% relative to bookings sales expense increase in FY70).

Note 3: Section 5 graphs out these % expenses, separating software and sales.

Note 4: See Section 6 for discussion and analysis of software support.

3. Analysis of Variation in Sales Yields

3.1 Stability of Sales Yields

Sales Yield is a convenient average parameter, which quickly loses its significance in too short a time span because current bookings on which yields depend are largely generated by manpower in an earlier time period, although the yield is calculated for current manpower. For example, a few good PO's will change yields dramatically. Suitably averaged however, the yield is a very useful parameter.

Figure 1 shows how the average yield (all products based on account salesmen only) has varied for the sales organization as a whole, and for each region. The regional differences and variations are considerable, however the overall average is fairly stable.

Figure 2 shows how these same yields have varied for each product individually.

Note: Yield variations will occur, particularly at regional level. A flexible, responsive sales organization is necessary to be able to keep the overall result tracking the budget adequately.

It is tempting to examine how yields vary by region for each product. The variation is so great and so liable to change that finely tuned conclusions are not easily reached. As an example of such an analysis however, the FY69 YTD account salesmen only yields are given below. It is to some extent an indication of variation of bookings and/or manpower levels relative to budget, since "reasonable" yields are budgeted for each product for each region.

	Modules	8 Family	L-8/12	9/15	PDP-10	TPL
Western	233	587	115	425	855	1115
Central	597	985	705	390	1405	1350
MAR	254	1112	1740	980	121	1990
NE	334	915	370	460	1920	2050
Europe	204	385	480	334	595	950
Canada	151	900	250	534	2860	0
Aust/Japan	453	260	440	280	-	810

FIGURE 1: ACCOUNT SALESMAN YIELDS OVER ALL PRODUCTS WITH REGIONAL VARIATIONS

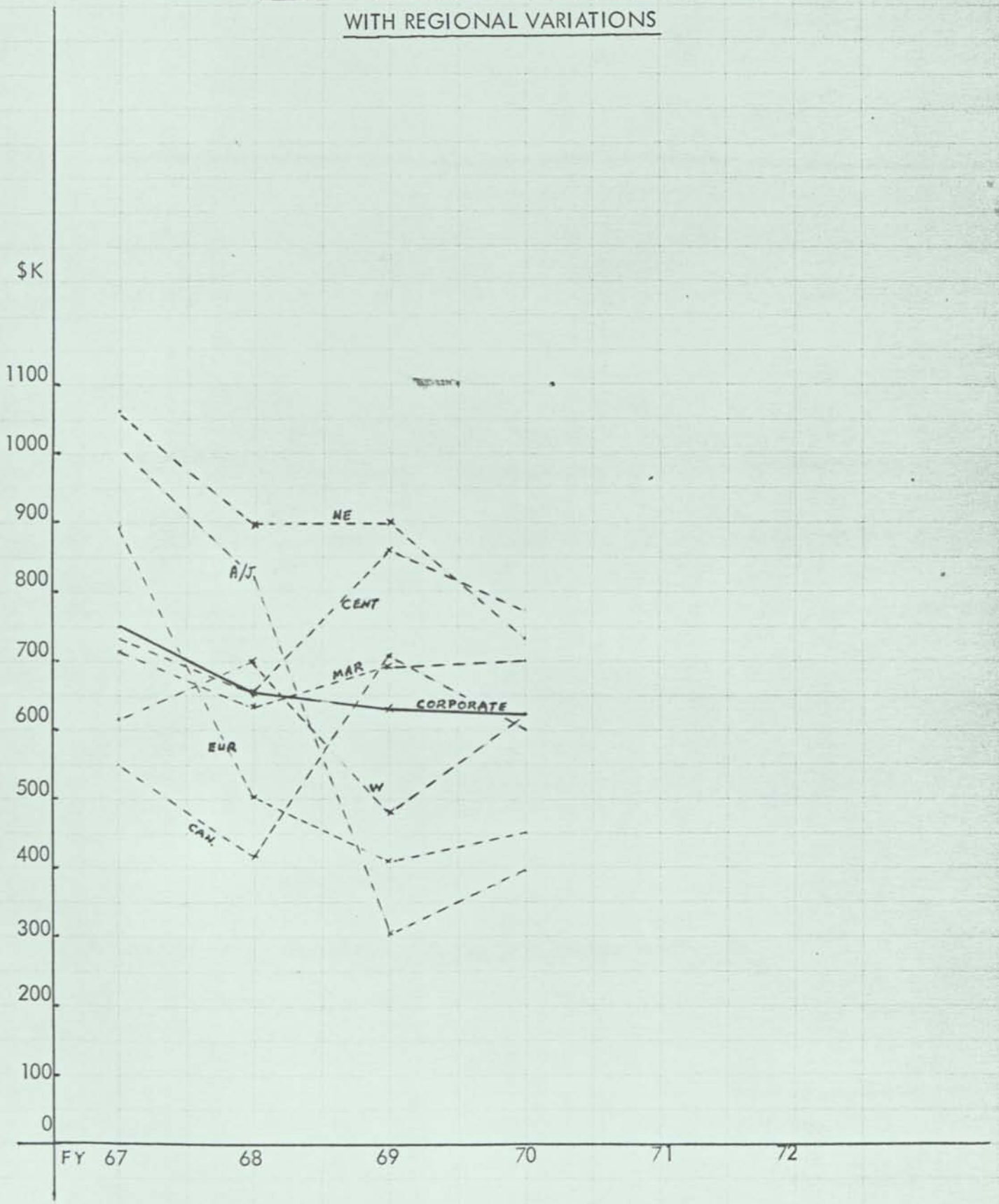
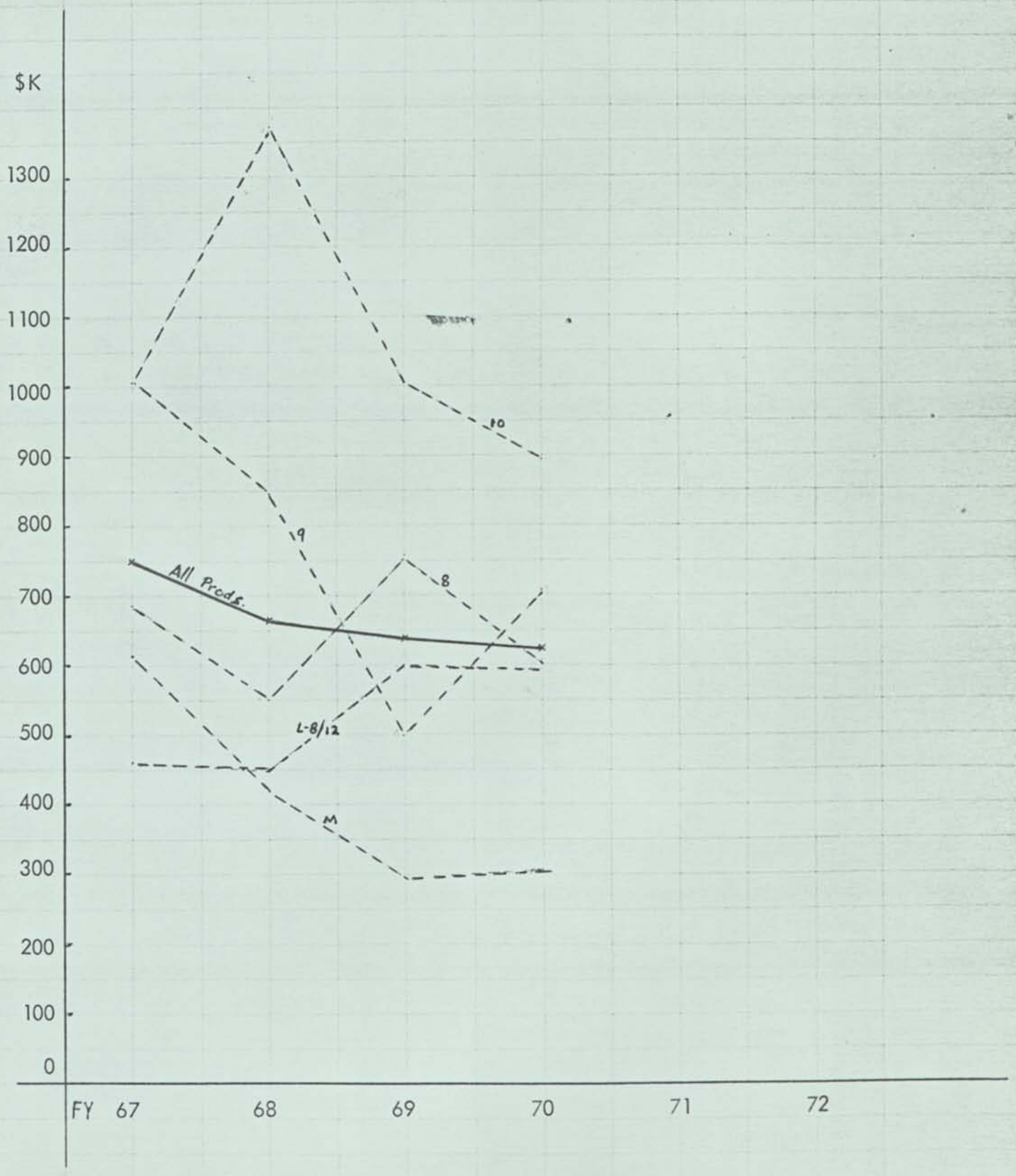


FIGURE 2: ACCOUNT SALESMEN BOOKINGS YIELD FOR EACH PRODUCT



3.2 Forecasting Sales Yields

In our budgeting, we mainly plan yields based on historical data and the expected effect of new situations expected or produced. The Sales Activity File provides data which enables us to analyse "yield" into three other factors, about which we can probably make some estimates more easily than we can looking simply at the yield itself. To date these analyses have not been done in depth.

$$\text{Yield} = \frac{(\$ \text{ Business being worked on per man}) * (\text{Average probability \%})}{(\text{average time to close measured in years})}$$

$$= \frac{B*P}{Y}$$

These three factors are affected by the following:

B: Our % penetration into the sales territory (skimming gives us plenty of leads), this factor should normally be adjusted, taking P and Y into account, so that the expected yield is high enough. A limit is reached when the salesman does not have time to keep all his leads active. Promotional effort increases this factor.

P: Competition, salesman's closing ability, salesman's business management and understanding of his accounts affects the estimated % he assigns.

Y: Technological maturity of the customers, availability of tutorial material on our technology, $ value of the individual commitments, initial familiarity with DEC (old customers spend less time evaluating us), availability of funding in the market, OEM's own development program.

4. Expenses

4.1 Reliability of Data

Overall, expenses have dropped slightly on a per man basis, over the last few years. The available records are to some extent in question however, and there is some possibility of year end adjustments changing the expected FY69 figure, and therefore invalidating the FY70 plans to some extent. The separation of sales and field service expenses may have accounted for some of the reduction from the FY68 to the expected FY69 figure. Also there are expenses now in selling which were not previously present (Direct Mail and earlier computer order processing). The FY69 year to date figure is $33.1K per man year, but is expected to drop to $32.8K by year end.

4.2 Analysis of Expenses

To show how the total expenses are made up for FY69 year to date, Figure 3 shows the Office, Regional and Maynard components of the sales expense for each region and for all regions. The overall result is:

	Per Man Year	% Total	% Bookings (expected)
Office level	$25.0K	75.5	4.66
Regional Overhead	3.5K	10.6	0.66
Maynard Overhead	4.6K	13.9	0.86
	$33.1K	100.0%	6.18%

Note again that the % of bookings is based on "expected" year end figures.

4.3 Analysis of Maynard Overhead

Figure 4 shows how the Maynard overhead is made up and how it is budgeted for FY70, relative to FY69, on a per man basis. Note that a drop in expenses per salesman is budgeted. This also reduces the cost of Maynard overhead as a % of bookings by about 12%. Note also that 0.5K per man year in the accounting records is to be billed out to field offices, mainly subsidiaries. This is shown as "Transferable".

4.4 Analysis of Office Expenses

Figure 5 shows how the field expenses, without Maynard, are made up. The purpose of this chart is to show what variation exists between regions (data

is FY69 YTD at 11 months). This will help in extrapolating to the future, by comparing expense components relative to the geographical coverage for example.

Note that large variations occur within Europe. The subsidiary data is slightly in question, but was the best currently available. An appreciable part of "other" for Australia, is freight on promotional material (literature).

In general, salaries will increase since the job we have to do requires better people on the average. Australian salaries are increasing by 10% to 20% over this year according to industry reports. Travel and Telephone will tend to decrease in all areas where we have established better coverage by opening new offices. To the extent that telephone costs are primarily for calls to Maynard, we should be able to develop a strategy (e.g. in order processing) to reduce this cost.

FIGURE 3.

EXPENSES PER MAN-YEAR

AT OFFICE LEVEL + REGIONAL & MAYNARD OVERHEAD

(FY69 11 Month)

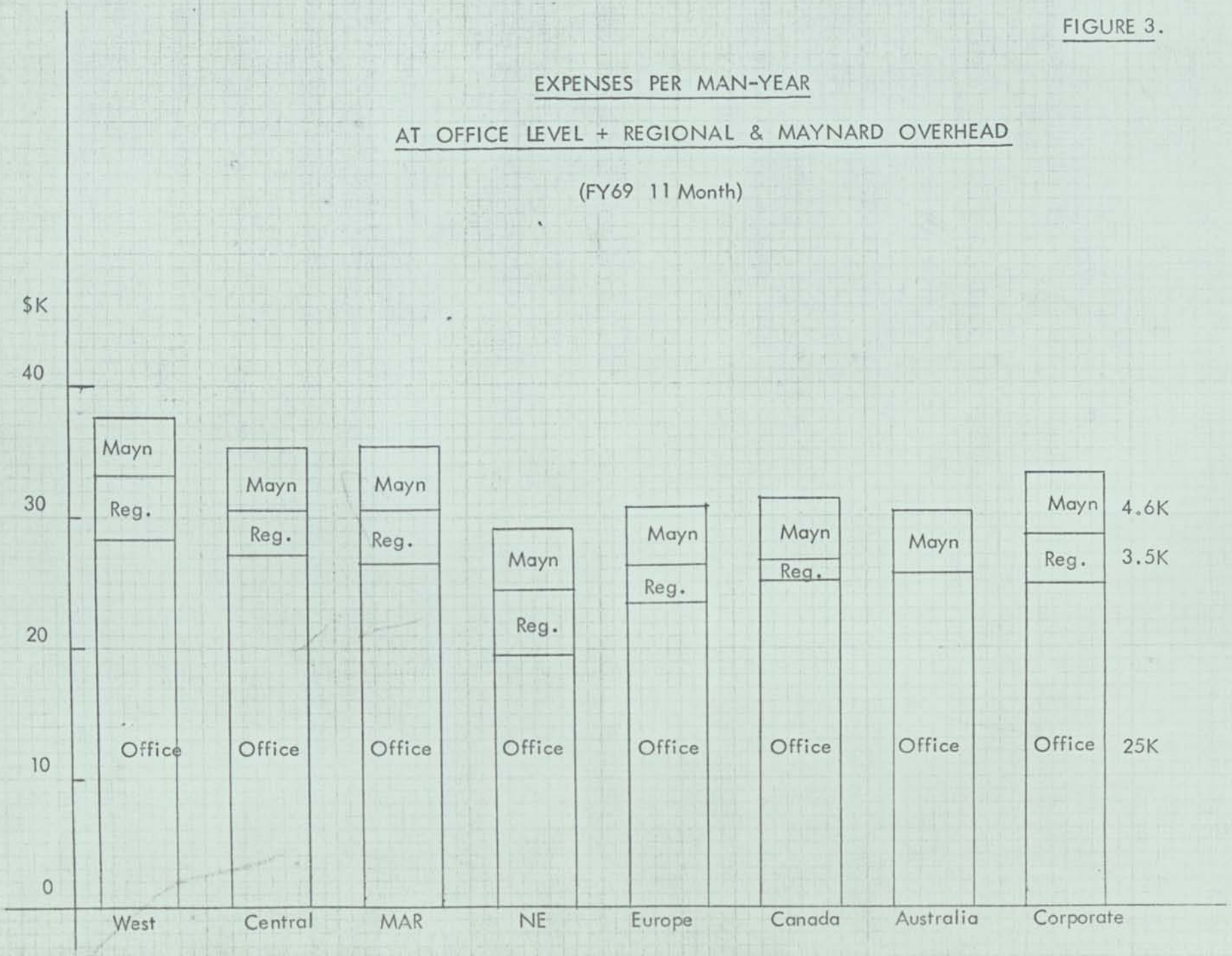
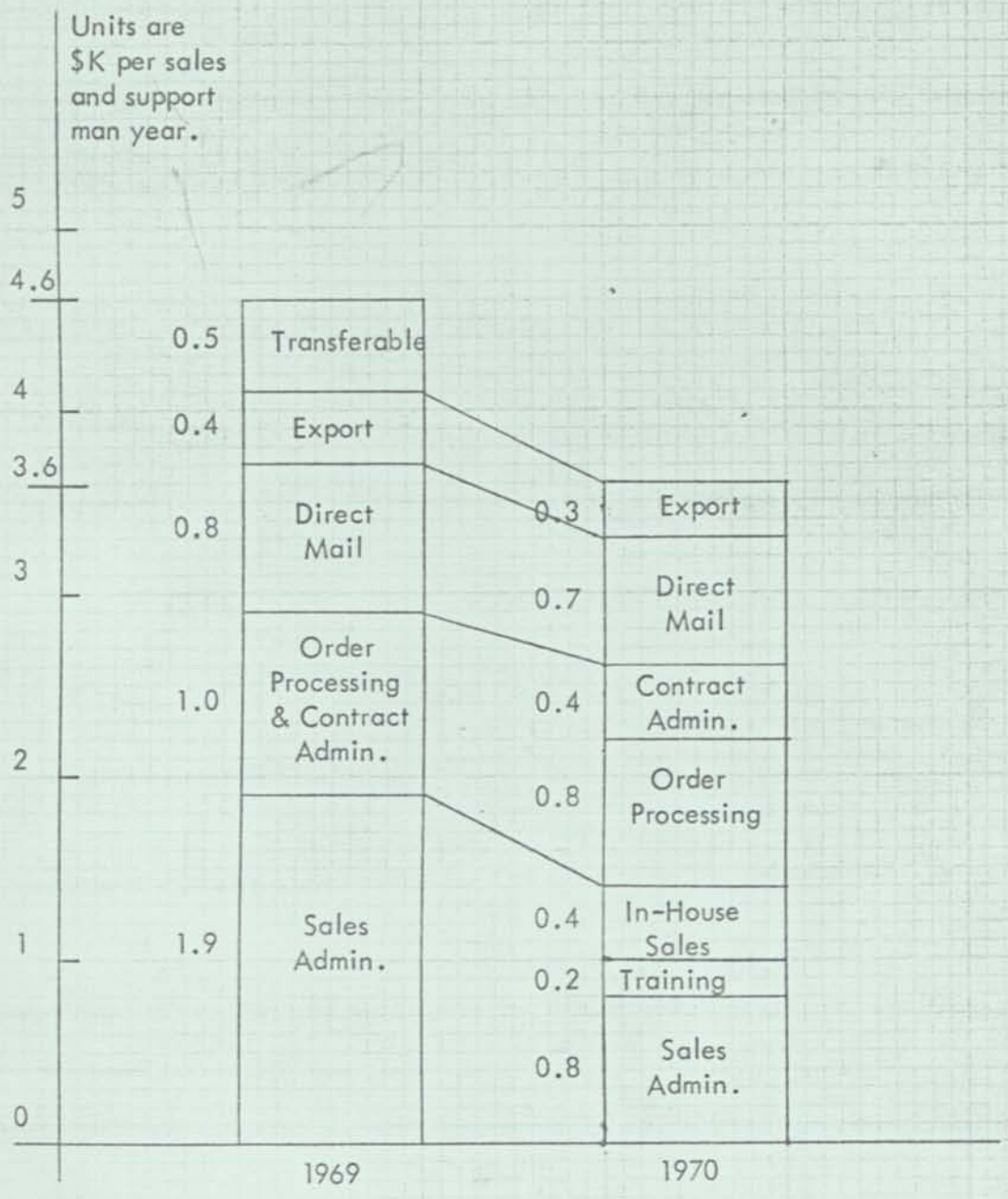


FIGURE 4.

ANALYSIS OF MAYNARD EXPENSES PER SALESMAN

(FY69 11 Month)



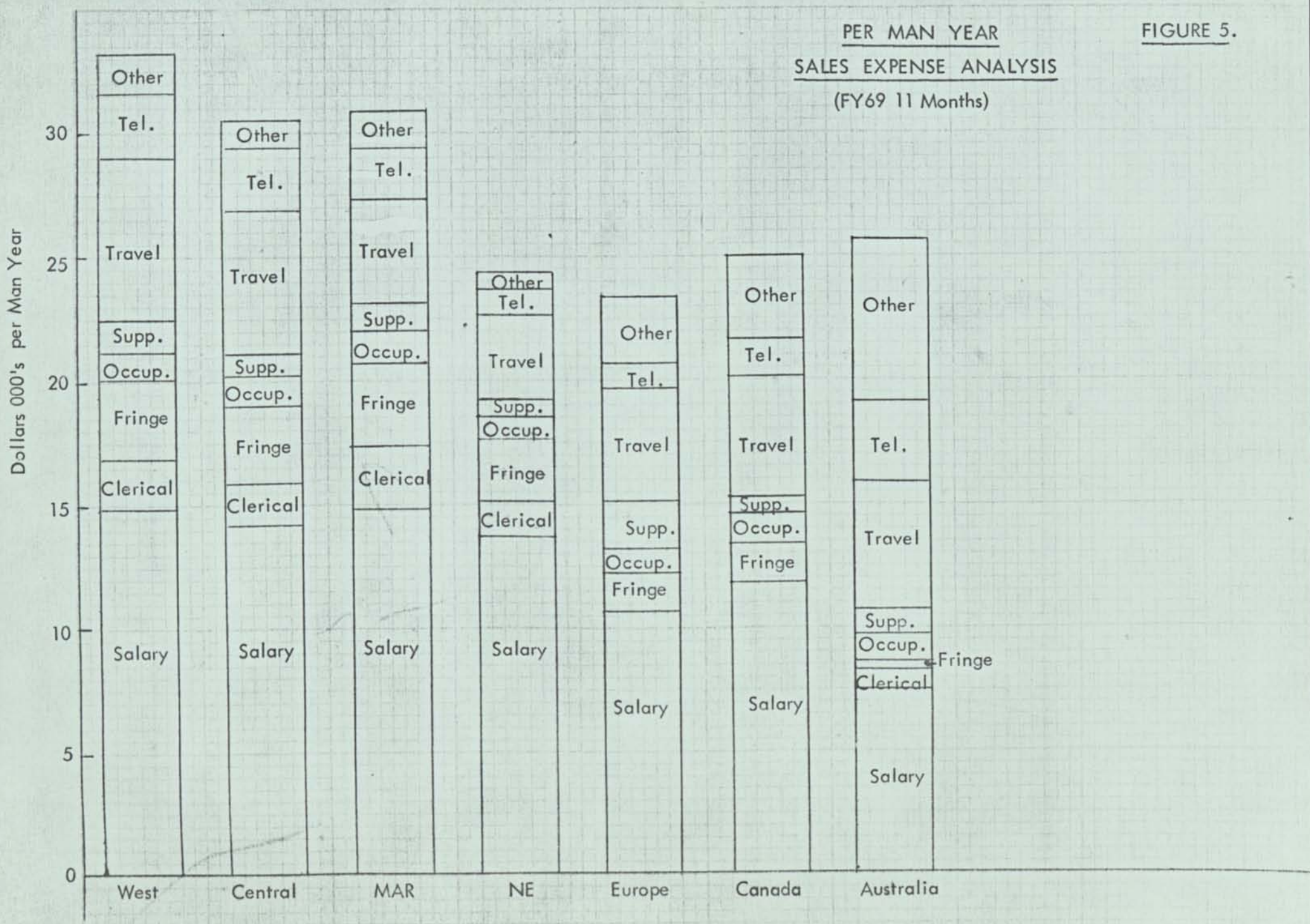
Yield/man year (Sales and Support)	520K	500K
∴ Cost =	$\frac{4.1}{520} = 0.8\%$ of bookings	$\frac{3.6}{500} = 0.7\%$ of bookings

FIGURE 5.

PER MAN YEAR

SALES EXPENSE ANALYSIS

(FY69 11 Months)



5. Percentage Cost of Bookings

The cost of sales can be analysed into a number of key components. This is shown in the table below and in Figures 6 and 7. Note that these are average costs inclusive of all products. All products do not share all the components equally. This analysis is then relative to our present product mix. The figures are % cost of bookings.

FY	'67	'68	'69	'70	'71	'72
Total sales expense	5.06%	5.74%	6.18%	6.40%		
Account salesmen on payroll	4.60%	5.18%	5.11%	5.15%		
Software support men on payroll	0.46%	0.56%	1.07%	1.25%		
Account salesmen in training	0.97%	0.88%	1.18%	0.83%		
Software support men in training	0.15%	0.22%	0.54%	0.13%		

For these figures, an average salesman is assumed to take 4 months in trainee status and a software support man to take 6 months. These calculations are based on staff counts, plus an assumed 15% turnover (25% in FY70).

Note the large training component in FY69 because of the rapid staff hiring rate, even more emphasised in software men than salesmen. A similar increase in training expense is expected in FY71 (approximately 22%).

Figure 6 shows the increase in the software support cost and how much of this went into trainees (approximately half in FY69). Figure 7 shows the account salesman cost only, and how much of this was for men in trainee status.

FIGURE 6: ANALYSIS OF TOTAL SALES EXPENSE AS % OF BOOKINGS

Showing Software Component

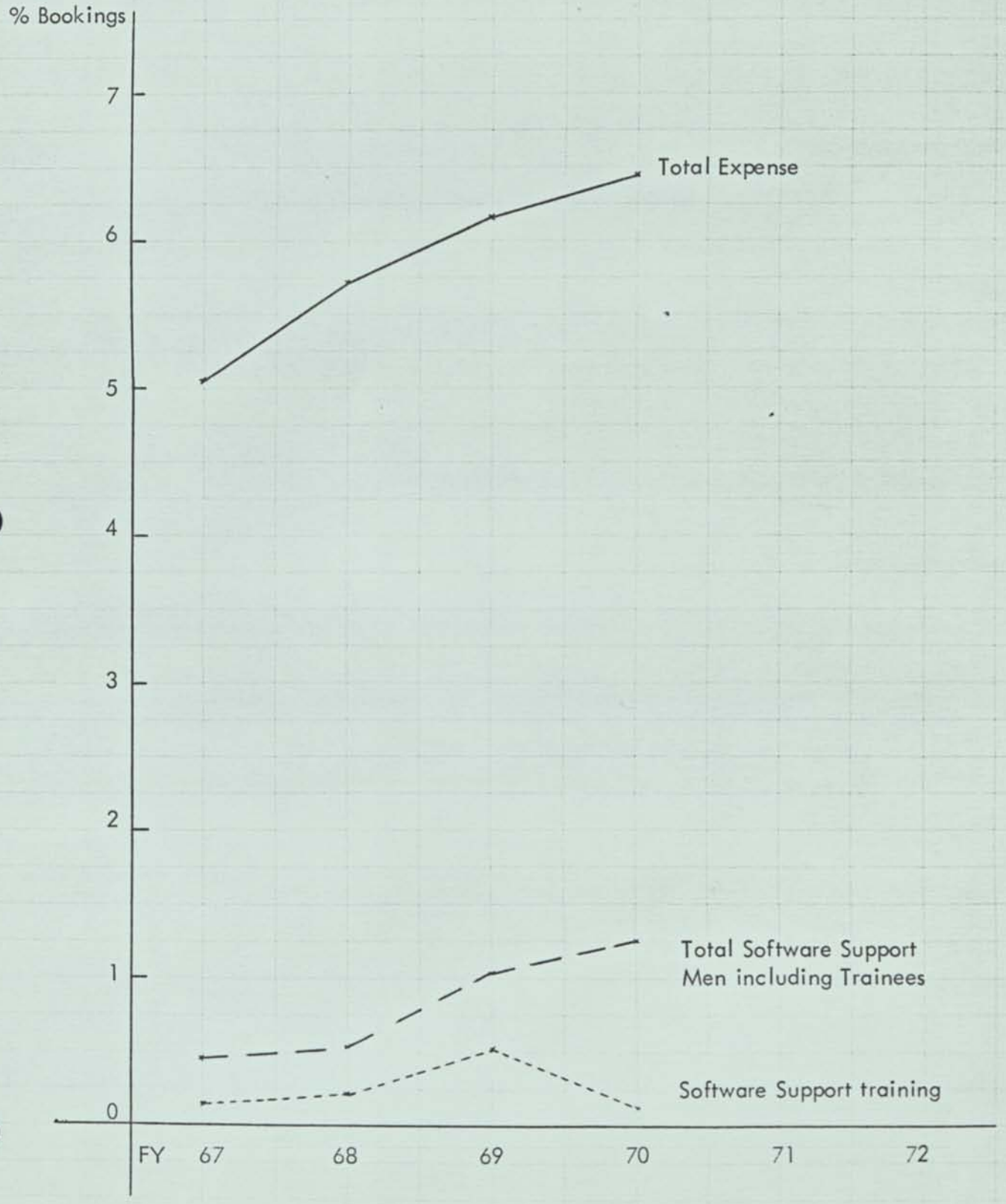
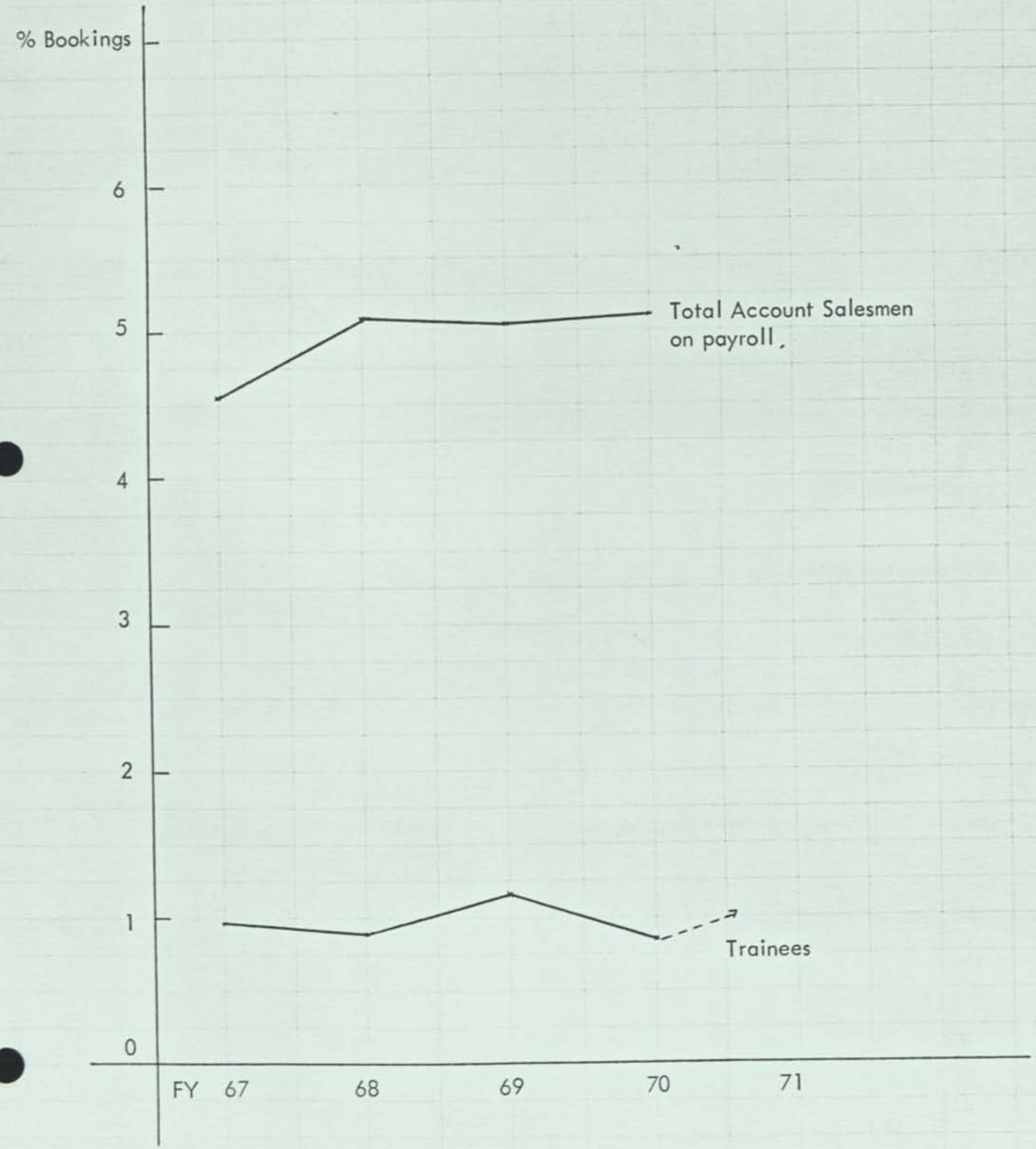


FIGURE 7: ANALYSIS OF TOTAL SALES EXPENSE AS % OF BOOKINGS

showing average manpower in trainee status



6. Analysis of Software Support

6.1 Historical Summary

Account salesmen did most of the software support prior to FY67, except on PDP-6 for which specialists (Peter Watt, June '64) were used mainly in flying squad mode, e.g. from Maynard. The few small and large machine field specialists did both pre and post sales, as well as customer training. Their training function included formal customer programming instruction, as well as prospect education and systems design tutorials, with the new real-time computer technology (especially in Europe and Australia).

Throughout FY67 and FY68, 10% of the sales force were software specialists. This was proving an inadequate level of support for the Maynard Programming Department, which was being seriously deflected from its in-house work by calls for help from the field, both customers and salesmen. The help was needed because the software was becoming too sophisticated for the average customer and the level of and persistence of software troubles were excessive in the software as delivered.

A crash program was set in motion, which raised the software support content from 10% to 20% of the Sales Department manpower. Because of the training delay (up to 6 months) caused by the necessity to give these specialists a thorough technical training and proper orientation, the effective support level "on the job" through FY69 was little more than 10% of the sales force, however.

The 20% level will be reached "on the job" by about the second quarter of FY70. This, combined with the decided improvement in the quality of the software now being shipped, makes the software support prospect for FY70 generally good, apart from the problems of properly distributing this manpower.

6.2 FY69 Position

The level of software support has been estimated in terms of the number of weeks (or days) for which an average system will require support. This varies considerably with the capability of the customer, however averages were arrived at for planning purposes while budgeting FY69. The figure transforms into $3,000,000 of bookings per post sales man year of support, for all computer product lines. In fact, the PDP-10 manpower was budgeted as half time pre sales and half post ($1,500,000 per pre/post man year). The PDP-10 hiring program was more successful than the bookings program, resulting in a good support situation within the constraints of the training delay. The PDP-10 FY70 position is good. The

small machine program appears to have done the job, although the budgeted level was not reached in all areas. Problem areas are mainly with computer paks which tend to have software troubles when first released (better quality control on software and documentation needed).

6.3 Software Support Functions and Future Levels

Software support is done for the following reasons:

(a) To "install" and "warranty" our software as part of the product, and to provide a continuing field located communications path to Maynard.

(b) To enhance the product by supplying a highly specialised consulting service, plus an on-the-spot tutorial service.

(c) To provide specialised assistance to the salesman and thereby increase or maintain his bookings yield with a complex product.

The big increase in software support level was triggered in the interests of our image as a reputable supplier of computer systems. This is reason (a) above. The need for this has decreased for PDP-10, and can be controlled by good Q.C. in our software development. Computer paks have to be watched.

To be competitive or in some cases to be practical (with a computer pak, if not an "entirely black box" system for example), we may need to spend more in providing specialised consulting service, and to put this in the price (e.g. increased European PDP-10 prices). This is reason (b).

Depending on the relative sophisitication of the customer and our salesman, we need to supplement the salesman with specialised support. This is reason (c). The level of support can be allowed for in the pre sales yields, since the extent to which we do this would be decided on the basis of what manpower capability is optimum to maximise the yield.

We control the field cost of (a) by controlling quality at the source of the software. (b) is a business decision where we allow for the support necessary to sell the budgeted bookings in the market place as it exists (e.g. the sophisticated customers don't need our help but as we go for deeper penetration, we get more naive customers needing help as part of the product).

The ratio of bookings to support manpower of $3,000,000 per man year, covers (a) with reasonable quality software, leaving a small residual for (b) and (c). This covers the needs of small computers with special attention for the more difficult software and customers. For PDP-10, we need more effort for (b) and (c). A ratio of $1,600,000 per man year is a reasonable number, giving an average "yield" over all computers of $2.3 million of bookings per software support man on the payroll. This would stabilise the support cost at about 1.5% of bookings.

CONFIDENTIAL

digital INTEROFFICE MEMORANDUM

DATE: June 23, 1969

SUBJECT: THE COST OF SELLING

TO: Operations Committee FROM: Ted Johnson

This memo summarizes an analysis of selling costs past, present and future.

An analysis of selling costs involves three basic parameters:

1. The costs of each salesman and support specialist (Cost per Man), including all associated overheads.

2. The yields (bookings) per account salesman.

3. The amount of software and support specialists.

Summary of Conclusions

Selling costs are projected to rise approximately 9% to 7.2% of bookings by 1973. The major components of change are: 1. Some drop in yields per account salesman based on product mix, competitive pressure and a greater percentage of end user business, and 2. Some increase in software support.

The actual cost per salesman has varied relatively little, and it should hold between $32K and $34K per year.

The actual amount of software support shown reflects on the policy that we need this to sell products and maintain a reputation for good software. We could change the rules and decide we need more support, depending on the help we feel is necessary in certain market areas or on the characteristics of future hardware/software packages. (A description of the software specialist role is provided and is used in examining the needs of each product by relating to the individual parts. It is not anticipated that the cumulative effect of installed computers will be very significant, i.e., that we are tied to an increasing support load as computers build up.

In the cost per man figure

FY 1970 Budget

There are two general problems in the FY70 Sales budget:

1. Structural imbalances, particularly in the module specialist, PDP-10 sales and support areas. (Also some restrictionson management flexibility and development.)

2. The training component (preparation for the future (FY71).

Taking the first 4 months of a new man as trainee (non-productive) time, the percentage of man time that is trainee time each year is:

68	69	70	71	72	73
20%	25%	12%	22%*		

* assumes 43% increase in bookings over FY1970, or $205M.

20% is probably a good average for our projected rate of growth. 12% in FY70 is low. Our yields should easily be attainable for FY70 and we will reach this budget, but concern is registered for FY71.

	67	68	69	70	71	72	73
Cost per salesman ($'000s)	$34.5	34.2	32.8	33	33.5	33.6	34.0
Yields/Account Salesman (Bookings)							
($'000s)							
PDP-8	$680	550	750	600	580*	540	500
PDP-11				750	680	600	550
PDP-12	460	450	600	600	450	540	500
PDP-15	1000	850	500	700	550	300	
PDP-10	1000	1360	1000	900	900	900	900
Modules	610	425	300	300	300	300	300
All Products	750	660	640	625	600	600	600

(* New Product assumed)

Sales Expense (% of Bookings)							
Account Sales	4.60	4.18	5.11	5.30	5.60	5.60	5.70
Software Support	.46	.56	1.07	1.28	1.46	1.46	1.48
Total	5.06	5.74	6.18	6.58	7.06	7.06	7.18
		+11%	+8%	+3%			
Yields/Software Support Man**							
($'000,000)	7.5	6.0	3.1	2.6	2.3	2.3	2.3

** Again, assumes present policies of support and assumes equal mix of PDP-10 and 8 Family bookings in future.

Cost of Sales (FY69)

Maynard OH	13.9%
Regional OH	10.6
Office levels	75.5

Office Level Expense Mix (only domestic here)

Salaries	49% (rounded percentages)
Clerical	8
Fringe	9
Occupancy	4 (actually 3.6)
Supplies	3
Travel	16
Tel & Tel	6
Other	5
	100%

Productivity - Factors Involved in Yield per Salesman

1. Unit price (units/dollar volume)
2. Size and characteristics of market relative to DEC.
3. Experience and characteristics of sales force.
4. Support given customer and salesman.
5. Price position versus competition.
6. Buying practices of customers (particularly International)
7. Language
8. Geographical and natural preferences.

T. G. Johnson
DIGITAL EQUIPMENT CORPORATION

mr

SOFTWARE SUPPORT

Outline of Responsibilities and Functions

I. Pre-Sales

A. Presentations
(active customer selling assistance to account salesman)

B. Proposal help

C. Giving demonstrations
(This pre-sales work is necessary to the extent the salesmen help in selling to programming (computer) people. In addition to expert sales help, he assures that the customer understands what he is getting. (This pre-sales help should not be required to a significant extent in turn-key computer paks.)

II. Post-Sales

A. Tutorial (How to use the system)

1. Developing (modifying) DEC software
2. Operating the system

B. Getting machines installed and accepted

1. Debugging help (systems or the software)
2. Running routine acceptance procedures

C. Maintenance Service, responding to:

1. Complaints about design of DEC software
2. Complaints about malfunctions of DEC software

D. Software communications (developments) between DEC programming and the customer

E. Analyzing customer complaints to determine whether the customer or DEC (hardware, software) is responsible for system malfunctioning. (Both a service and a customer relations role.)

III. General and Other

A. DECUS

B. Possibly (or sometimes) give customer training courses

C. Help sell add-ons through consulting and follow-up service

DIGITAL EQUIPMENT CORPORATION

T. G. Johnson 6/20/69

digital INTEROFFICE MEMORANDUM

DATE: 6th May, 1969.

SUBJECT: DEC vs IBM BIG MACHINE BUSINESS (?)

TO: Operations Committee FROM: Ted Johnson

I have plotted the comparison of overlayed costs on a common manufactured cost base of an IBM computer versus the PDP-10.

Note the costs are partitioned against a rental dollar. I assumed this was a good approximation of a purchase dollar.

We might discuss this to see if we can develop a clear perspective of comparison. There may be a major fallacy in this comparison. Also, the IDC data may be wrong.

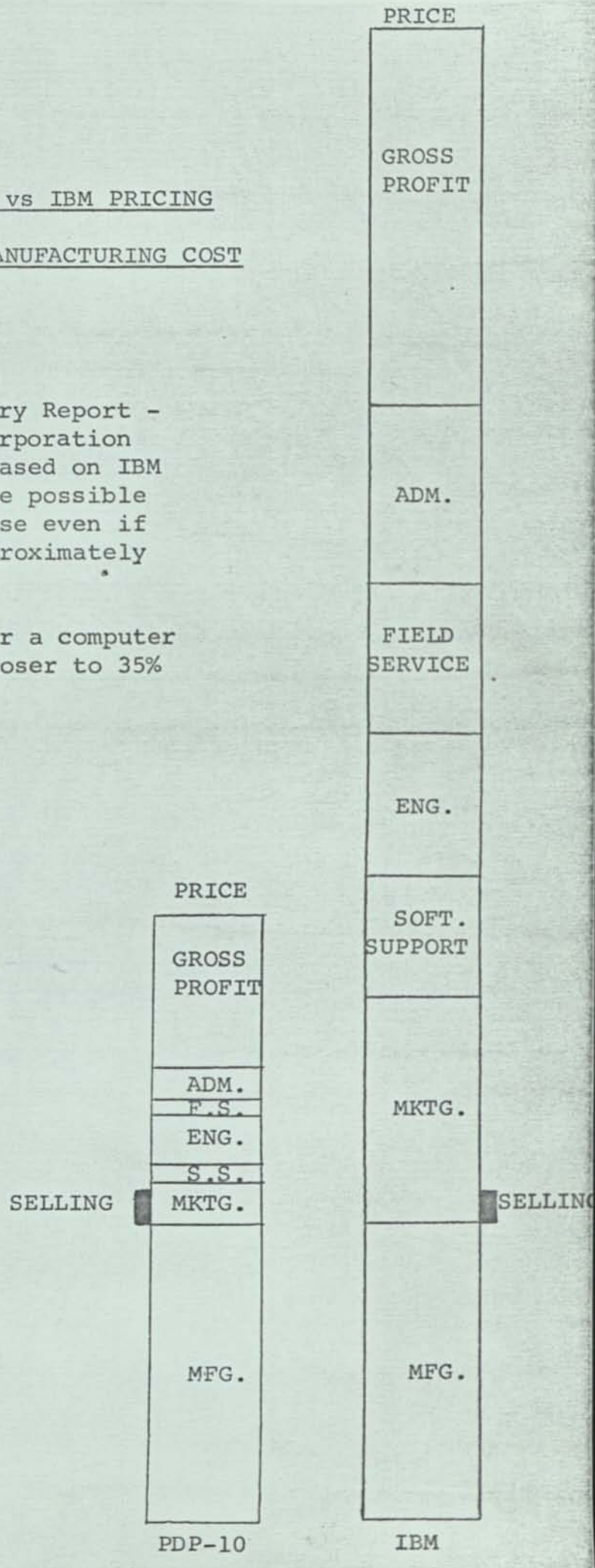
jr
encl.

COMPARISON OF DEC vs IBM PRICING

BASED ON EQUIVALENT MANUFACTURING COST

(Data from EDP Industry Report - International Data Corporation figures. IBM costs based on IBM rental dollar, so some possible discrepancy vs purchase even if this breakdown is approximately correct.)

Manufacturing cost for a computer <u>system</u> is probably closer to 35% than 25% for IBM.



I. ESTIMATED INTERNAL DISTRIBUTION OF IBM RENTAL DOLLAR (in cents)

a. Manufacturing (as low as 8¢ to 9¢ for central processor to as high as 25¢ to 30¢ on electro/mechanical equipment, such as peripherals, where high assembly cost is involved) . . . . . 20.0¢

b. Marketing (including systems analysis before a sale). . . . . 15.0¢

c. Customer Support-Custom System Analysis (such as performed by IBM's systems engineers) . . . . . 4.5¢

d. Customer Support-Software (includes market-oriented software such as applications packages and the field maintenance of standard utility routines and compilers) . . . . . 3.5¢

e. Customer Support-Education (not including internal training of IBM employees) . . . . . 1.0¢

f. Administration (includes overhead and internal training). . . . . 11.0¢

g. Engineering Development (the reduction of technology from research laboratory into the hardware product). . . . . 3.0¢

h. Software Development (system software only, such as operating systems, compilers, and other software common to a product line). 3.0¢

i. General R&D (basic technology research and investigation into new component technology) . . . . . 4.0¢

j. Maintenance . . . . . 10.0¢

k. Profit . . . . . 25.0¢

II. ESTIMATED ALLOCATION OF COSTS TO CUSTOMERS

	Direct	R&D	Marketing	Admin	Total	% of Total
Equipment (Manufacturing and Engineering + 1/2 Software Development)	24.5	3	10.5	6	44	58.5
Software (Customer Support-Software + 1/2 Software Development)	5		2	1.25	8.25	11
Customer Support-Custom System Analysis	4.5	1	2	1	8.5	11.5
Customer Support-Education	1		.5	.25	1.75	2.5
Maintenance	10			2.5	12.5	16.5

THESE FIGURES ARE ESTIMATES PREPARED BY THE INTERNATIONAL DATA CORPORATION

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digital INTEROFFICE MEMORANDUM

DATE: June 16, 1969

SUBJECT: Notes of FY '70 Budget

TO: Operations Committee

FROM: J. A. Jones

PDP-15

1. The budget is mostly reasonable.

2. Bookings were increased from 15 to 18 million based on an increased number of salesmen. This has not yet been substantiated by the Marketing Plan but is probably okay since yield/salesmen was not increased.

3. The budget is designed to maximize short term profits at the expense of long term sales.

4. No development project has been undertaken which takes longer than 15 months to produce revenue.

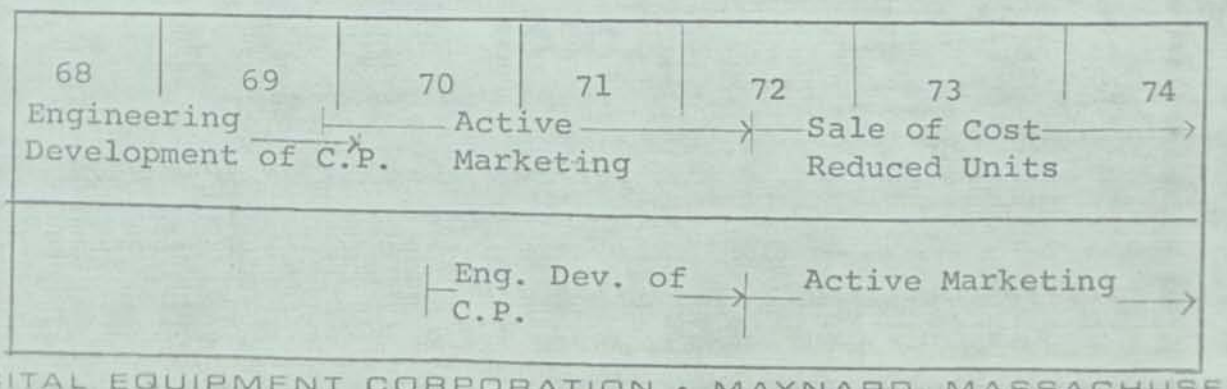
5. Active market development on PDP-15 to cease in 27 months.

6. Cost reduction of PDP-15 (with a small team of engineers) will continue until unit volume no longer justifies production (6 years?).

PDP-K

1. Work on this project has been delayed until Q2 of FY '70.

2. The major problem is to gain clear insight into a product concept that will fit between the PDP-11 and PDP-10 and produce a 30% P.B.T.



nb

digital INTEROFFICE MEMORANDUM

DATE: June 18, 1969

SUBJECT: PDP-8/I AND PDP-8/L COST OF LIVING PRICE ADJUSTMENTS

TO: Operations Committee FROM: Howie Painter/Bill Long

As we all know, inflation has been taking its toll everywhere we look. Costs of both materials and labor have been advancing rapidly. DEC and the PDP-8 product line has attempted to weather the storm, but the pressures continue.

There is no other solution but to increase the basic 8/I price by $500, and selectively advance prices of certain PDP-8 family peripherals that have proven to be underpriced. Please note that the price increases are indeed modest; increases are typically in the 6% range. For typical systems, the increase will be 5% or less.

Announcement of Price Adjustment

July 1, 1969

Effective Date of Price Adjustment

From orders received after August 1, 1969. During this grace period, we will accept firm, scheduled orders at the old prices.

The rules are as follows:

1. All firm orders received by August 1, 1969 will be honored at the old prices, if they are definitely scheduled for delivery and subsequently acknowledged by Sales Administration. Cancellation of orders received during the grace period will be subject to cancellation charges of up to 50%.

2. All current LOI's, regardless of when placed, must be converted to firm P.O.'s by August 1, in order to receive the old prices. This applies also to OEM delivery slots that are not covered by firm P.O.'s.

3. Any quotes issued during the month of July at the old prices must state that an order has to be received by August 1, 1969.

When discussing the price increases with customers, please keep in mind that:

1. There is no need to apologize for this modest price increase;

2. DEC has provided the leadership in price/performance for the small computer business; we will continue to do so.

3. PDP-8 family customers will still be getting the most for their money, including a wide range of peripherals, the best and most complete software, excellent applications assistance, and by far, the best service in the business.

Key price changes are as follows:

ITEM	NEW PRICE	AMOUNT OF INCREASE
PDP-8/I	$ 13,300	+ $500
H960-B	$ 650	+ $150
PDP-8/I-D	$ 13,950	+ $650
MC8/I-A	$ 4,000	+ $500
MC8/I-B	$ 4,500	+ $500
MM8/I-A	$ 5,600	+ $600
MM8/I-C	$ 6,000	+ $500
PR8/I	$ 2,400	+ $400
PC8/I	$ 3,900	+ $600
RS08	$ 9,000	+ $2000
DS32	$ 3,500	+ $500
KSR-33	$ 1,200	+ $300
ASR-33	$ 1,500	+ $300
KSR-35	$ 3,000	+ $500
ASR-35	$ 4,500	+ $500

Please check new PDP-8/I Price List dated July 1, 1969 for complete information.

ITEM	NEW PRICE	AMOUNT OF INCREASE
PDP-8/L-E	$ 9,150	+ $150
KD8/L	$ 500	+ $250
KP8/L	$ 500	+ $250
MC8/L-A	$ 4,000	+ $500
MC8/L-B	$ 4,500	+ $500

In addition, prices of common options used on 8/L and 8/I (paper tape reader/punch, disks, teletypes) have increased as reflected above. Check PDP-8/L Price List dated July 1, 1969 for details.

mg

digital INTEROFFICE MEMORANDUM

DATE: June 18, 1969

SUBJECT: NEW QUANTITY (BLANKET) DISCOUNT PLAN

TO: Operations Committee FROM: Howie Painter/Bill Long

Effective immediately, a new Quantity Discount Plan for DEC computers will be implemented.

There are three major differences in this agreement:

1. The percentage discount and break points have been adjusted;

2. We are implementing the concept of earned discounts;

3. The discount period now begins with the date first order is received.

PERCENTAGE DISCOUNTS AND BREAK POINTS (SCHEDULE A)

Frankly, we have been overly generous with our discount agreements, particularly at the low end of the scale. The new schedule brings our discounts more in line with the reality of cost savings realized at various levels of business with a particular customer. The new schedule is generous and extremely competitive; we still provide the best package in the industry.

EARNED DISCOUNTS (Refer to Paragraph H)

Most customers who have signed discount agreements in the past have been overly optimistic. Others have used DEC as a bank to improve their own cash flow positions. Collection of unearned discounts at the end of the discount period has been messy, difficult, and impossible in several cases.

Now, we will split the difference with all customers and put the agreements on a more business-like basis.

1. For customers who have had a previous discount agreement with DEC, the new agreement allows him to take the discount level earned in the previous year on all new agreement orders.

Example

Customer X had earned a 10% discount during his last agreement year. He has now signed an agreement for 15 units, entitling him to a 13% discount. Each order placed under the new agreement will receive a 10% discount. As soon as he takes delivery on his 15th unit, he is entitled to a credit of the difference between 13% and 10% on all 15 machines. Each additional machine ordered during the year will then receive a 13% discount.

2. For customers with no previous discount history with DEC, a discount of ½ of the face amount of the agreement will apply for early orders until the face value discount level is reached.

Example

Customer Y, with no previous discount history, signs a discount agreement for 10 machines, at a 10% discount level. Each order placed will receive a 5% discount, until he takes delivery of his 10th machine. At that time, he will be credited with the difference between the 10% and 5% levels, toward future purchases, on all 10 machines. Each additional unit ordered during the contract year will receive a 10% discount.

DISCOUNT PERIOD (Paragraph C)

In response to requests from customers and salesmen, we have changed the effective period of the agreement to begin with date of first order, rather than first delivery. Orders for additional machines may be placed at anytime during the year from the date of first order.

The only stipulation is that orders placed near the end of the discount year must specify as soon as possible delivery (i.e., the customer cannot request a delivery longer than that available from DEC at that point in time).

DISCOUNTABLE ITEMS (Paragraph F)

The rules are essentially the same, except that field installed add-ons will no longer receive a discount.

CLARIFICATION OF DISCOUNT ON THE BASIC (CONSOLE) TELETYPE (Paragraph F)

There has been some confusion concerning discounts on the standard (console) teletype supplied with each machine. Simply stated, the standard (console) teletype is discountable, but the incremental amount of money necessary to purchase a substitute teletype is not discountable.

Example

1. PDP-8/L purchased with ASR-33 $ 8,500
   (Total amount is discountable)

2. Substitute ASR-33 for ASR-35:

List price of ASR-35	$ 4,000
List price of ASR-33	1,200
Difference	$ 2,800

Therefore:

Total Order =	$11,300
of which	$ 8,500 is discountable
and	$ 2,800 is not discountable

SUMMARY

These new discount agreements are effective immediately. They have been carefully thought out over the past few months, and represent the best possible solution, taking the needs of both customers and DEC into account.

SCHEDULE A

DISCOUNT SCHEDULE

Systems ordered within one year

Quantity	Discount	Training Courses Available
1	0%	
2 - 4	4%	One course per machine
5 - 9	7%	
10 - 14	10%	10
15 - 24	13%	11
25 - 49	16%	12
50 - 99	18%	13
100 - 199	20%	14
200 - 499	21%	15
500 - 999	22%	16

DIGITAL EQUIPMENT CORPORATION

Discount Agreement

with

_____

BUYER

A. Digital Equipment Corporation (hereinafter called "DEC") does hereby agree to grant to Buyer, as indicated hereinafter, a _____(%) percent discount on discountable components of a _____ computer system(s) (hereinafter called "system"), providing Buyer shall during the effective period of this Agreement:

1. Purchase _____ of such systems; and
2. Take delivery of all of such systems (except as provided in Paragraph C below); and
3. Comply with all of the terms and conditions of this Agreement.

B. The effective period of this Agreement commences on _____ and terminates one (1) year thereafter except as otherwise provided below.

C. Purchase Orders for all systems to be discounted under this Agreement must be received by DEC during the effective period of this Agreement and must specify either delivery within the said effective period or must specify delivery "as soon as possible". If a Purchase Order specifying delivery "ASAP" is amended by Buyer without DEC's prior written consent to specify delivery other than "ASAP", any system ordered thereunder will be automatically removed from the terms of this Agreement. All Purchase Orders for systems to be discounted hereunder are subject to acceptance by DEC.

D. A system for all purposes of this Agreement is one that contains at least a CP Section and a Memory.

E. The prices for the components of the system to be discountable under this Agreement, as well as the prices for the nondiscountable components, shall be found either on the standard DEC price list prevailing at the time DEC accepts the Purchase Order for each system or component, or on an authorized quotation applicable thereto in force at the time DEC accepts the Purchase Order for each system or component.

F. All components of the system are subject to discount with the exception of the following:

1. Components not manufactured by DEC (normally indicated on DEC's price lists) except that one (1) standard teletype purchased with each system shall be subject to discount.
2. Field installed add-ons (unless field installation is necessitated by DEC's inability to deliver the complete "system").
3. Spare Parts.

G. If Buyer requests a slippage of the scheduled delivery of a system, such slippage shall constitute a cancellation of the Purchase Order only for purposes of this Agreement. Assignment of a new delivery date will be made on the same basis as a newly received Purchase Order. If such new delivery date causes the system to be delivered after the time period specified in Paragraph C above, such system shall not be discountable. In addition, if the Buyer submits and DEC accepts a Purchase Order for additions to configurations already on order more than ninety (90) days prior to the scheduled date of delivery of such system, any slippage of such delivery date beyond the effective period of this Agreement shall not cause such system to be removed from the provisions of this Agreement.

H. The discount granted to Buyer in Paragraph A above shall be made available as follows:

1. Buyer shall receive on all Purchase Orders placed hereunder the percent of discount specified in a) or b) below, whichever is greater, on discountable components of the system (but in no event greater than the percentage set forth in Paragraph A above).

   a) One half of the percentage set forth in Paragraph A above. i.e., _____%
   b) The discount level earned in the preceeding year (systems ordered and delivered) converted to the current discount percentage. i.e., _____%

2. The difference, if any, between the discount received by Buyer in accordance with the preceeding Sub-Paragraph 1 and the discount granted in Paragraph A above shall be remitted to the Buyer at the expiration of this Agreement or whenever he takes delivery of the number of systems specified in Paragraph A, whichever is sooner.

I. In the event that Buyer orders more than the number of systems specified in Paragraph A above, the quantity discount level will

be increased in accordance with Schedule A hereof. The aforesaid possible resultant higher discount level shall apply only to such Purchase Orders accepted after the upward revision. However, if Buyer takes delivery of less than the number of systems specified in Paragraph A above, the quantity discount level will be decreased in accordance with Schedule A, retroactively, and the unearned discount shall be offset against any sums due Buyer under the provisions of Sub-Paragraph H.2 above. If the unearned discount exceeds the sums due Buyer under the provisions of Sub-Paragraph H.2 above, such excess shall be forthwith due and payable by Buyer to DEC.

J. DEC's standard terms and conditions prevailing at the time DEC accepts the Purchase Order for each system or component shall apply to all systems or components purchased during the effective period of this Agreement, whether discountable or not, notwithstanding any variation from DEC's standard terms and conditions as may appear on any Purchase Order submitted by Buyer. The standard DEC warranty and services apply to all machines sold under this Agreement with the exception of training. Free training courses will be available in accordance with Schedule A. DEC reserves the right to change the prices of any system or component sold hereunder prior to DEC's acceptance of the Purchase Order therefor.

K. DEC shall have the right to terminate this Agreement upon the occurrence of any one of the following events:

1. DEC does not accept a Purchase Order for a system within six (6) months from the effective date of this Agreement; or
2. Buyer assigns this Agreement or any of its rights hereunder, the word "assign" to include, without limiting the generality thereof, a transfer of a majority interest in Buyer; or
3. Buyer shall neglect or fail to perform or observe any of its existing or future obligations to DEC, including, without limiting the generality thereof, the timely payment of any sums due DEC on any Purchase Order or purchase and sale agreement concerning the sale of equipment from DEC to Buyer; or
4. Buyer shall neglect or fail to perform or observe any of its obligations hereunder, or if any assignment shall be made of its business for the benefit of creditors, or if a receiver, trustee in bankruptcy or similar officer shall be appointed to take charge of all or part of its property, or if Buyer is adjudicated a bankrupt, and such condition or conditions are not remedied to the satisfaction of DEC within twenty (20) days after written notice thereof has been given to Buyer.

L. This Agreement supersedes all prior agreements and understandings between the parties and may not be changed or terminated orally, and no change, termination or attempted waiver of any of the provisions hereof shall be binding unless in writing and signed by the party against whom the same is sought to be enforced.

M. Buyer agrees that all systems considered as coming under the terms of this Agreement shall be used only by Buyer and shall not be the subject of a third party leasing agreement, except when such leasing agreement is for the purpose of enabling Buyer to finance the acquisition of the system. The phrase "systems used only by Buyer" as used in this paragraph shall include a use by Buyer's Customer of Buyer's system which incorporates a DEC system purchased hereunder.

_____	DIGITAL EQUIPMENT CORPORATION
BUYER	
BY_____	BY_____
_____ 19____	_____ 19____

SCHEDULE A

Discount Schedule

Systems ordered within one year

Quantity	Discount	Training Courses Available
1	0%	
2 - 4	4%	One course per machine
5 - 9	7%	
10 - 14	10%	10
15 - 24	13%	11
25 - 49	16%	12
50 - 99	18%	13
100 - 199	20%	14
200 - 499	21%	15
500 - 999	22%	16

COMPANY CONFIDENTIAL

digital INTEROFFICE MEMORANDUM

DATE: June 16, 1969

SUBJECT: THREE-YEAR FACILITIES PLAN

TO: Operations Committee FROM: Pete Kaufmann

Attached are three charts showing summary personnel and space requirements through 1974. Also attached is a Three-Year Building Schedule through Fiscal 1972 and Dollar Capital and Extraordinary Expense Commitments by quarters through Fiscal 1972.

ASSUMPTIONS

1. Sales dollars as shown.
2. These numbers exclude Sales and Field Service personnel in foreign offices.
3. Manufacturing personnel levels at 48% of total personnel.
4. Manufacturing space levels at 55% to 60% of total company space.
5. Space utilization improves from 300 ft^2/person to 270 ft^2/person.

CONCLUSIONS

1. Standard manufacturing other than new product introduction, short run shops, process engineering, production engineering and drafting will be out of Maynard between June 1971 to December 1971.
2. Engineering, Marketing and Administrative and remaining manufacturing cost centers will have 4,000 people at that time at 250 ft^2/person will utilize the entire Maynard complex.
3. On June 30, 1971 standard manufacturing will be accomplished as follows:

Location	Item	Ft^2
Canada	Power Supplies Computer Labs Wire Wrap	100,000
Puerto Rico	Modules Cables	150,000
Leominster	Computer Production Systems Peripherals Basics	500,000

Location	Item	Ft^2
Westfield	Printed Circuit Boards Metal Shops	500,000
Maynard	Corporate Manuf. Services New Product Introduction (all Manuf. functions such as PC facilities, modules, metal shops, computer production)	350,000

4. A commitment to build a 500,000 ft^2 plant in California on land purchased (Jan. - Mar. 1971) will be made April 1971.

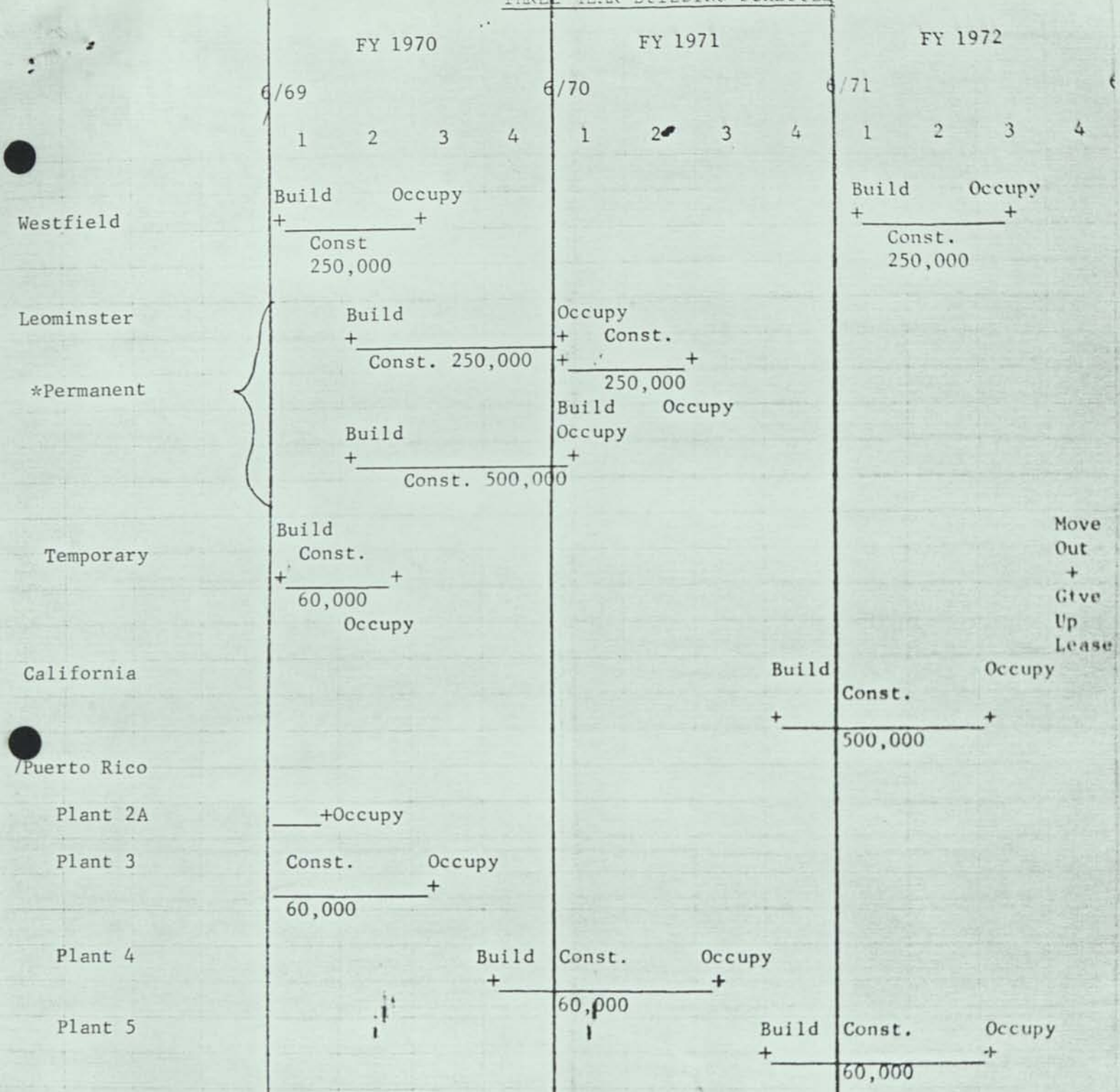
/jb

SUMMARY

SALES, PERSONNEL, SPACE

	1966	1967	1968	1969	1970	1971	1972	1973	1974
NET SALES									
HIGH					150	205	285	385	500
LOW					138	186	225	275	350
ACTUAL	23	39	57	90					
PERSONNEL TOTAL									
MANUFACTURING	550	800	1118	1533	2400	3250	4400	5750	7200
TOTAL	1105	1658	2289	3200	5000	6800	9200	12000	15000
$ SALES/PERSON	20.5	23.5	25.3	26.5	25.0	25.0	25.0	25.0	25.0
SPACE TOTAL									
MAYNARD	300	365	870	870	900	900	900	900	900
WESTFIELD					150	300	500	500	500
LEOMINSTER					250	500	500	500	500
CALIFORNIA							400	500	500
MIDWEST								500	500
SOUTH									500
OTHER	30	30	65	90	150	200	250	350	650
TOTAL	330	395	935	960	1450	1900	2550	3250	4050
$ SALES/ft^2 (2 year moving average)	-	$84	$80	$75	$86	$86	$87	$87	$87

THREE YEAR BUILDING SCHEDULE



*This frees 170,000 sq. ft. of space available for Engineering, Marketing and Administration expansion in Maynard.

CAPITAL REQUIRED FOR FACILITIES EXPANSION

	FY 1970				FY 1971				FY 1972			
	6/69				6/70				6/71			
	1	2	3	4	1	2	3	4	1	2	3	4
CAPITAL COMMITMENT												
Westfield	2500K								2950K			
$10/ft^2$ Leominster	3560K				1500K							
Puerto Rico	640K							300K				
California								6000K				
Land	730K						1250K					
TOTAL	7430K				1500K		1250K	6300K	2950K			
EXTRAORDINARY EXPENSE COMMITMENT												
Westfield			50K									
Leominster		10K			100K							
Puerto Rico		30K				30K				30K		
California												100K
TOTAL		40K	50K		100K	30K				30K	100K	
GRAND TOTAL	7430K	40K	50K		1600K	30K	1250K	6300K	2950K	30K	100K	

digital INTEROFFICE MEMORANDUM

DATE: June 19, 1969

SUBJECT: EVALUATION OF SALES PERFORMANCE

TO: Stan Olsen

FROM: Al Devault

As you know, Downey Overton and I attended the Canadian District Managers' meeting on Friday, the 13th of June. Our intent was to understand the Canadian problems and to find ways to improve the situation for next year.

We received a perfunctory welcome and discussion of problems unique to our product line. All interest seemed to be of a very superfluous nature regardless of the suggestions or questions raised. This session was followed by lunch where the tone of the meeting was defined for us.

We were told by Dave Whiteside that he, and the other office managers, were measured on total dollar performance, and as long as that was met, they were successful. Denny reinforced this point by saying that he was to cut 3 men from his regional budget for the first quarter of this year. No guidelines were given for this cut.

Returning to the office we heard that the Canadian Subsidiary was within $60,000 of being on budget for the year. All present were happy to hear this except Downey and I since modules was at approximately 60% of budget out of $1.1 million.

That is hardly anything to be proud of and significantly less than the $880 K performance last year. We were told that the budget would be reduced to $1 million next year and were promised that they would meet it.

I submit that with these feelings, which I believe are far from unique in Canada, the Module Product Line and the PDP-14 can never reach budget. Those products which produce the highest yield or are the easiest to sell, will be sold by the sales force. These facts have convinced me that next year 's budget is a farce when viewed from the sales budget and bookings dollars viewpoint. The product line has no control over the sales time nor any method of enforcing prior agreements with the sales force on this basis. Since modules are the low dollar items, and incidentally the highest percentage contributor to sales time, we don't stand a chance of making our fiscal 1970 budget.

I believe that this subject should be brought up before the operations Committee for a complete discussion since my product line has its future controlled by these attitudes.

If the Control Products (Modules, PDP-14, etc.) is to survive as an agressive growing business, this situation must be corrected.

cc

COMPANY CONFIDENTIAL

OPERATIONS COMMITTEE MEETING

June 9, 1969

AGENDA

1. Additions and Corrections to Minutes of the June 2nd Meeting
2. Marketing Review Committee Summary - (Ted Johnson)
   (See attached minutes of the June 2nd meeting)
3. Market and Business Plans - (Ted Johnson)
   (See attached report)
4. Rochester Office Space - (Ted Johnson)
   (See attached report)
5. Proposal to Review Hourly Employees in Puerto Rico by Anniversary - (Paul Chambers)
   (See attached report)
6. Work Hours and Vacation Policy for the U. K. - (Graydon Thayer)
   (See attached report)
7. Proposed Annual Report/Products and Services Brochure - (Gabe d'Annunzio)
   (See attached report)
8. Biomedical Brochure - (Gabe d'Annunzio)
   (See attached report)
9. Property Removal Authorization and Procedure - (John Kulik)
   (See attached report)
10. Saturday Morning Work Schedule

COMPANY CONFIDENTIAL

digital INTEROFFICE MEMORANDUM

DATE: June 12, 1969

SUBJECT: MINUTES OF THE OPERATIONS COMMITTEE MEETING OF JUNE 9

TO: Operations Committee FROM: Pete Kaufmann, Secretary

Present: Ken Olsen, Stan Olsen, Nick Mazzarese, Win Hindle, Ted Johnson

1. The minutes of the June 2, 1969 meeting were approved.
2. Saturday Morning Work Schedule - The concensus was that the tours were worthwhile and worth continuing.
3. Marketing Review Committee - Costs of bookings were discussed. Ted will make an analysis (direct vs. overhead costs) of past, present, and future sales costs by product line.
4. Market and Business Plans - Ted's proposal for making and reviewing business plans was discussed. Ted Johnson and Brewster Kopp will work up a standard format for business planning, and we will discuss it further at the "Woods" meeting this month.
5. W. Brewster Kopp - Win Hindle will meet with Brewster next Monday.

   The following groups will work for Brewster Kopp initially:

   Bob Dill - General Accounting
   Ed Simeone - Cost Accounting
   Ed Savage - Financial Analysis
   Ed Schwartz - Legal
   Dave Packer - Data Processing

6. "Woods" Meeting June 24-25

   (a) Product & Market Planning - we will make the same chart for markets as we made for products at Frank Kalwell's cottage. We will also review the product chart.

   (b) Wage Class 4 Salary Review.

   Ed Schein will attend the June 24 session.
7. Rochester Office - The Rochester office was approved. Stan and Ted will make a comparison of rentals vs. building standard sales offices for long term.
8. Proposal to Review Hourly Employees in Puerto Rico by Anniversary - Paul Chamber's proposal was approved with the philosophy NOT to be the highest paying employer or benefits plan.

9. Work Hours and Vacation Policy for U.K. - Ed Jaferian's proposal was approved.

10. Annual Report/Products and Services Brochure - Gabe d'Annunzio will propose a more detailed Products and Services catalog with more detailed specifications, pictures, prices, etc.

    Gabe will also repropose the Annual Report.

11. Biomedical Brochure - There is no technical content in the brochure. This brochure should be short, concise, and specific about applications of what DEC can do.

12. Property Removal Authorization and Procedure - The procedure was approved pending approval of the Security Committee.

Pete Kaufmann

lm

digital INTEROFFICE MEMORANDUM

DATE: June 5, 1969

SUBJECT: MARKET AND BUSINESS PLANS (Review System For These Plans)

TO: Operations Committee FROM: Ted Johnson

Part of the problem in working against marketing and business plans is that we have not established the basic cycle and period for the plan. I believe this causes so much confusion, we never establish a satisfactory reference base for planned programs.

Since the budget requires a plan, I propose that we do the following:

1. Require a 2 year plan written at the time of budget submission (Spring).

2. The Marketing Review Committee read and review these plans (which are as concise as possible and spell out the marketing strategy) and:

   A. List specific remarks, points by individual members and file these with the plans.

I think we should put all of these plans, which include projects to be done, in one bound notebook. I propose we list these plans today and have Steve Sobel collect them.

I think sub-products under a major product (like the computer paks under the 8), should also be done as attachments to the major product plan.

STEPS:

1. Operations Committee list all business plans (including services?)

2. Schedule reviews of each plan (a date).

3. Distribute the plan to Marketing Review Committee two and a half weeks prior to the above date (2).

4. At following review meeting:

   A. Discuss the marketing aspects of the plan.
   B. Sample each member of the committee for his summary comment on the plan. Record those comments.
   C. Attach the above comments to the plan and distribute with the Operations Committee agenda (1).

mr

digital INTEROFFICE MEMORANDUM

DATE: June 5, 1969

SUBJECT: ROCHESTER OFFICE SPACE

TO: Operations Committee

FROM: Ted Johnson

This memo is to present the situation in Rochester regarding office space. As you know, Phil Markell and Bill Farnham do extensive research in finding space within the range of our guidelines. After an extensive survey of the Rochester area, this search being precipitated by our need for expanding the current office, which is 2,000 square feet, they have presented me with the problem that Rochester is an unusually highly-inflated area where the minimum cost for any reasonable space is $5.75 - $6.25 per square foot. We have looked in every possible area surrounding Rochester .

I would like to have permission to go ahead on any space plans in the neighborhood of $6.00 per square foot with the assurance we are making every effort to get the minimum amount of space necessary to meet our needs. We are intending to get space by January of 3,500 square feet with an option for some minimal expansion. At this point, I think we should limit the size of the office to 4,000 square feet.

mr

digital INTEROFFICE MEMORANDUM

DATE: June 4, 1969

SUBJECT: Proposal to Review Hourly Employees in Puerto Rico by Anniversary

TO: Operations Committee

FROM: Personnel (Paul Chambers)

Cy Kendrick, Phil Wood and myself strongly feel that we should adopt an anniversary wage review policy for our hourly employees in San German for the following reasons:

1. It will continue to foster the philosophy of individual reward and provide management with another technique for more effective individual counseling.

2. Unlike Maynard, San German wage rates are quite stable and reviews will not be influenced by new graduate rates, constantly changing vocational trends, etc.

3. Increases to payroll can be spread over a 12 month period.

FY 1970 PROPOSAL

As of November 1968 the average rate of the local electronics companies (Sprague Electric, Dynamic Instruments, Fusite Corporation) was $1.66 to $1.68 per hour. These companies are scheduling wage reviews in June 1969 for an additional 5-6 cents per hour which will bring the average rate to $1.70-$1.72 per hour. Our current average rate is $1.60 per hour.

We are confident that the following wage increase ranges will place Digital in a more competitive position.

GENERAL PRODUCTION EMPLOYEES	0-10¢ per hour	(235 employees)
GROUP LEADERS	0-15¢ per hour	(9 employees)
OFFICE AND CLERICAL EMPLOYEES	0-15¢ per hour	(6 employees)

For your information, as of June 1, 1969, an employee count by month of hire and an estimated addition to payroll (based on an average increase of 10¢ per hour) is as follows:

	# OF EMPLOYEES	EST. ADDITION TO PAYROLL
JULY	19	3.6K
AUGUST	14	2.5K
SEPTEMBER	4	.6K
OCTOBER	22	3.2K
NOVEMBER	3	.5K
DECEMBER	17	2.0K
JANUARY	59	5.7K
FEBRUARY	13	1.1K
MARCH	9	.7K
APRIL	34	1.6K
MAY	60	2.0K
TOTALS	254	23.5K

Cy, Phil and myself would like to act as a committee of three to review wage increase proposals on a monthly basis and report costs and recommendations to Pete Kaufmann for final approval.

PFC/gl

digital INTEROFFICE MEMORANDUM

DATE: June 3, 1969

SUBJECT: Work Hours and Vacation Policy, U.K.

TO: Operations Committee

FROM: E. Jaferian
(G. A. Thayer)

In order to establish competitive practices in the U.K. in relation to working hours and vacations, the following changes are requested:

A. Work Hours:

MALES
- Present - 40 hours; 8:45 to 5:30; 3/4 hour for lunch M-F
- Proposed - (Same)

FEMALES
- Present - 38¼ hours; 8:30 to 5:15; 1 hour for lunch Mon to Thurs., with 1½ hours for lunch on Fri.
- Proposed - 37½ hours; 9:00 to 5:30; 1 hour for lunch, M-F.

B. Vacation:

Present: 13½ work days per year (accrual at the rate of 1.125 days per month)

Proposed: 15 work days per year (accrual at the rate of 1.25 days per month)

Attached are matrices showing work hours and vacation practices at all our overseas locations. Specific practices at each location are based on competitive norms in industry.

GAT/lw

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WORK HOURS
DIGITAL OVERSEAS LOCATIONS

COUNTRY	PRESENT	PROPOSED	SCHEDULE
U.S.	40 hrs.		7:45 to 11:30 am 11:30 to 12:15 pm lunch 12:15 pm to 4:30 pm - Manufacturing Group. 8:15 am to 12:00 pm 12:00 pm to 12:45 lunch 12:45 to 5:00 pm - Administrative Group.
U.K.	40 hrs. Males	40 hrs. Males	8:45 to 5:30 3/4 hours for lunch.
	38¼ hrs. Females	37½ hrs. Females	9:00 to 5:30 1 hour for lunch.
France	40 hrs.		9:00 to 6:00 1 hour for lunch.
Germany	40 hrs.		8:30 to 5:00 1/2 hour for lunch.
Sweden	40 hrs.		8:30 to 5:00 1/2 hour for lunch.
Benelux	40 hrs.		8:30 to 5:00 1/2 hour for lunch.
Switz.	40 hrs.		8:30 to 5:30 1 hour for lunch.
Italy	40 hrs.		9:00 to 6:00 1 hour for lunch.
Canada	40 hrs.		8:00 to 12:00 1/2 hour lunch 12:30 to 4:30 - Manufacturing Group. 8:15 to 12:00 3/4 hour lunch 12:45 to 5:00 - Administrative Group.
Austra.	35 hrs.		9:00 to 5:00 1 hour for lunch.
Japan	37½/45 hrs.		9:00 to 5:30 1 hour for lunch. Normal working hours are Mon. through Sat. excluding Sats. in every second week.

COUNTRY	PRESENT	PROPOSED	SCHEDULE
Puerto Rico	40 hrs.		7:00 am to 4:00 pm - 1 hour for lunch.

INTEROFFICE MEMORANDUM

DATE 19th March 1969

SUBJECT Working Hours in the U.K.

TO E. Jaferian ✓
c.c. B. Lassen

FROM Geoff Shingles.

Geoff

THE PROBLEM

We are having acute problems in hiring secretaries. The high useage of temporary staff is expensive and extremely inefficient and causes unreasonable frustration.

The cause is two-fold:-

1. We are out of town - this we cannot change easily.

2. Our hours of work are longer than average and we start very early.

Our present hours are:-

Male Staff. 8.30 - 5.15 with 45 minutes for lunch, Monday to Friday
40 hours per week.

Female Staff. 8.30 - 5.15 with 1 hour for lunch, Monday to Thursday
8.30 - 5.15 with 1½ hours for lunch on Friday 38¼ hours per week

The early start precludes many people who use public transport from considering us as it means an unreasonably early start.

Set out below are the hours worked by large Reading firms located in Reading.

Company	Hours	Lunch Break	Total.
Courages	9.0 until 5.15	1½ hours	36½
Huntley & Palmers	8.30 until 5.15	1½ hours	36⅔
I.C.L.	9.0 until 5.30 Monday to Thurs. 9.0 until 5.00 Friday	1 hour	37

/cont.

Firms working near to Digital.

Monogram	9.0 until 5.30	1 hour	37½
Hallmark Cards	8.30 until 4.30	½ for lunch with canteen facilities	37½
Ampex	9.0 until 5.30	1 hour	37½
Gilletts	8.30 - 4.45 Monday to Thurs. 8.30 - 4.15 Friday	¾ hour with canteen facilities	37
Reids Typewrites	Hours to suit staff who are paid accordingly. Some 8.30 to 5.0 Some 9.0 to 5.30 All finish at 5.0 on Fridays		

THE SOLUTION

As you will see from the above figures which cover the largest employers in Reading our working hours are longer than the average.

My proposal is as follows:-

Our working week for female staff should be reduced from 38¼ hours to 37½ hours split as follows:-

9.0 a.m. to 5.30 Monday to Friday with 1 hour for lunch. - 37½

Male staff 8.45 to 5.30 Monday to Friday with ¾ hour for lunch. - 40

In conjunction with this the lunch area is being equipped for use in the No. 2 building, and we are encouraging a local personage to take up again The Lunch Wagon.

SUMMARY I believe that the above amendment which has been based on a limited survey of our own female personnel will prove acceptable to existing personnel, and will considerably enhance our position when trying to hire. However, we will never overcome our out of town problem.

I would like to recommend this proposal for very urgent action.

[illegible]

VACATIONS
DIGITAL OVERSEAS LOCATIONS
(work days)

COUNTRY	PRESENT	PROPOSED	REMARKS
U.S.	10 days		2 weeks per year; after 6 years, one day per year to a maximum of 3 weeks after 10 years.
U.K.	13½ days	15 days	Vacation period is not regulated by law.
France	20 days		Vacation period is regulated by law, companies must give a minimum of 4 weeks, 20 or 24 days depending upon whether or not Saturday is a work day.
Germany	15 days		Vacation period is regulated by law, companies must give 3 full weeks
Sweden	20 days		Vacation period prescribed by the Metal Trades Employers Agreement is normally followed by most companies. Company practice generally is to give 4 weeks as a minimum. This becomes 20 or 24 days depending on whether or not Saturday is a work day. Vacations are increased to a maximum of 30 days, including Saturdays, as salaries increase.
Benelux	15 days		Vacation period is regulated by law, companies must give a minimum of 3 full weeks.
Switzer-land	15 days		Vacation period is regulated by law, companies must give a minimum of 3 full weeks.
Italy	13 days		Vacation period is regulated by law, the 15 days include Saturdays. The law stipulates that the manager receive 30 calendar days, including Saturdays.
Canada	10 days		2 weeks per year, after 6 years, one day per year to a maximum of 3 weeks after 10 years.

COUNTRY	PRESENT	PROPOSED	REMARKS
Austra-lia	15 days		3 weeks per year.
Japan	10 days		2 weeks per year; after 6 years, one day per year to a maximum of 3 weeks after 10 years.
Puerto Rico	5 days		5 days after 1 year, 10 days after 3 years.

DIGITAL

INTEROFFICE MEMORANDUM

ROBERT LASSEN
MAY 06 1969
PERSONNEL DEPT.

DATE 26 April 1969

SUBJECT Vacation

TO J.C. Peterschmitt
Ted Johnson
Bob Lassen

FROM [illegible]

In the past two years it has become common practice in the U.K. to grant a minimum of 3 weeks vacation per year to all level employees. Management personnel generally receive additional days depending on age and length of service with the company. The Electrical Trade Union and Amalgamated Engineering Union have minimum 3 weeks vacation, and all the Transport and General Workers Union members will be up to 3 weeks vacation by 1971, while the clerical grades receive 3 weeks a year now.

Our two main competitors for Sales and Field Service Engineers, I.B.M. and Honeywell, both give 3 weeks per year and build up to 4 weeks after 5 years of service, plus additional days for age.

digital INTEROFFICE MEMORANDUM

DATE: June 5, 1969

SUBJECT: ANNUAL REPORT/PRODUCTS AND SERVICES BROCHURE

TO: OPERATIONS COMMITTEE FROM: Gabe d'Annunzio

We recommend that this year's Annual Report be published in two sections under separate covers. One section would contain the financial report and letter from the President, as well as a list of officers and sales offices. The second section would contain a concise presentation on all DEC products and services.

Economy is a major benefit of such a dual presentation. The financial section, which will probably run about 8 pages, could be printed in a relatively small quantity. The product and services section would not have to wait on the financial section if there were a delay in obtaining figures. Thus possible overtime expenditures on the major part of the Annual Report could be avoided.

The product and services section, which would be printed in a large quantity, could be used for general inquiries, in response to advertising, trade shows, etc.

The attached is a preliminary draft which has the basic format and content we recommend. It is a relatively non-technical presentation, appropriate to a broad audience.

In addition, I have a mock-up design for both sections.

We would appreciate it if you would return your copy of the products and services section, with any suggestions you may wish to make, by Thursday, June 12.

blw

DEC PRODUCTS AND SERVICES

PDP-8/I and PDP-8/L

PDP-8/I and PDP-8/L are built around the same 4,096-word, 12-bit core memory and fully parallel central processor. Both have TTL integrated circuits throughout. Both come with a big software package that is compatible throughout the PDP-8 family.

PDP-8/L is the lowest cost full scale digital computer available. It comes in a very neat, small package, just right for plugging into anybody's integrated system. PDP-8/I has the same basic capability plus an internal peripheral control and data break panel for plug-in expansion. The PDP-8/I is faster, slightly more expensive, and more flexible than the PDP-8/L. The 8/I is designed for those who need plug-in expansion, and the 8/L is designed for those who do not.

The PDP-8 family computer not only handles general purpose tasks, but by means of computerpacks does special purpose jobs as well.

Computerpacks are integrated hardware and software systems that provide a total response to the requirements of a particular computer application. Each computerpack includes a PDP-8 family general-purpose computer, an interface with the instruments or equipment used in that particular application, and a specialized software package. The user, whether he's a research scientist, newspaper publisher, or machine tool manufacturer, need only push a button to get fast, accurate, and reliable results. Through its experience with computerpacks, DEC has developed an overall understanding of problems in many computer applications. The following are only some of the computerpacks currently available.

LAB-8 Signal Averaging

LAB-8 signals, calculates, and displays the trend and variance of data, displays blow-ups of areas of interest, and controls the experiment. It is the first averaging system to incorporate a full-scale, general-purpose, programmable digital computer to provide the researcher with flexibility and versatility all for about the same price as traditional wired-program averages. Its condensed conversational mode programming is both efficient and simple to use. LAB-8 allows the researcher to monitor his experiment as it progresses, detect new trends as they emerge, and change the direction of the experiment as the need arises. It provides instantaneous data reduction and analysis.

GLC-8 Gas Chromatography

GLC-8 is a computer-based system that will service 20 or more gas chromatographs simultaneously. It is the least expensive, most sophisticated system of its type available. It automatically reduces and analyzes data accurately, repetitively, and economically. The system detects and identifies peaks and shoulders, calculates peak areas and peak retention times, allocates peak overlap areas, corrects for baseline shift, calculates component concentrations, and applies response factors. Finally, GLC-8 types a complete analysis report. It can also control the gas chromatographs. The system is designed for maximum flexibility, with a conversational mode to enable the operator to write analysis methods in English statements. Scanning rate is variable, and five sampling rates are available. The system can automatically calibrate an analysis method and update it on-line.

Typeset-8 Typesetting

Typeset-8, the PDP-8 computerized typesetting system, is being used by newspapers and commercial typesetters all over the world. The system takes unjustified and unhyphenated paper tape and converts it, almost instantly, to justified, hyphenated tape for use with hot metal and photocomposition machines. The keyboard operator no longer needs to make end-of-line hyphenation decisions. He simply types continuous copy indicating format, type styles, and paragraphs with simple key-stroke codes. The computer does all the hyphenating, word spacing, and letter spacing to give cleanly justified lines. The computer saves many keyboard operator hours and sets more type in less space.

PDP-8 typesetting systems can set news or classified copy at the rate of 12,000 lines per hour, and display ads at 10,000 lines per hour. Typeset-8 also sets tabular matter, automatically allots its output among as many as 16 paper-tape punches, and stores wire service stories, classified ads, and up to 500 display-ad formats.

PHA-8 Pulse Height Analysis

PHA-8 is a complete computer system for nuclear pulse height analysis. It can gather, store, display, and analyze energy or time-of-flight spectra and record the results on a variety of output devices. Spectra are accumulated using the computer memory increments. Alternatively, energy channel information may be transferred in the accumulator mode, or, using data break transfer, into memory lists. Operating with a single nuclear A/D converter, PHA-8 can store one spectrum of 1024 channels. With dual coincident A/D converters, two-dimensional matrices of up to 4096 points may be stored and displayed. The channel capacity can be increased with the addition of extra memory modules.

Quickpoint-8 Numerical Control Tapes

Quickpoint-8 is a computer-based system for the preparation of tapes for numerically controlled, point-to-point machine tools. Simple codes which describe machine operations and locations can be input to the computer either directly through a Teletype keyboard or from punched tapes through the Teletype tape reader. The computer performs all the calculations and produces a paper tape in proper format and codes to run almost any point-to-point numerically controlled machine tool.

Indac-8 Industrial Data Acquisition

Indac-8 is a computerized, real-time data acquisition and control system. It meets general industrial requirements, and can easily be adapted for a large number of specific tasks. The SNAP feature allows the user to get a "snapshot" of his entire system or any part of it at any specific point in time. SNAPS can be repeated at a set interval, or at a variable frequency determined by the computer or the operator. A wide range of Indac-8 support routines are available to such functions as linearizing thermocouples, resolving strain gauges, and solving equations.

Time-Shared-8

Time-Shared-8 is a new concept in small computers. Basically, it is a multi-language, local time-sharing system with from 8 to 32 terminals. Most of DEC's memory expansion or input/output options (except A/D equipment) can be connected to the central computer. Along with the equipment comes a software package that includes FORTRAN, BASIC, and FOCAL (a simple new conversational language developed by DEC). Machine languages can also be used. All users can be on-line at once, and each user has unlimited choice of languages.

Performance characteristics of the PDP-12 have been optimized around a complete 12-bit hardware/software system, rather than around an expandable minimum processor and memory. The PDP-12 system concept simplifies program tasks, thus freeing users from the mechanics of program preparation to concentrate on more creative aspects of their work. The unified, display-based programming system allows a great deal of hands-on interaction between operator and computer.

The PDP-12 can be extremely useful for a wide variety of research and real-time data-handling applications.

In analytical instrumentation, it can be used to acquire and analyze data from one or more instruments typically used in chemical or physical analysis, such as mass spectrometers, gas chromatographs, chemical analyzers, NMR spectrometers, and various particle-size counters. With its digital and analog input capabilities for handling the instrumentation signals and its relay outputs for instrument control or range switching, the PDP-12 helps eliminate the need for complex special interfaces to several classes of instruments.

In signal processing, the PDP-12 is well suited for manipulation of data through averaging, time interval measurements, frequency analysis, and correlation. It has a buffered analog-to-digital converter which allows analog-to-digital conversion to be initiated by an external source, such as a clock, and does not require any intervention on the part of the processor during the actual conversion of the analog signal. The results are then immediately available to the processor within one machine cycle (1½ microseconds).

The hands-on interactive concept of the PDP-12 makes it particularly well suited for computer extended instruction in universities, junior colleges, and high schools. In technical curricula, computer usage is being taught as part of process control courses for chemical engineers, computer science cources for electrical engineers, instrumentation courses for medical students, and laboratory courses for speech students, just to name a few.

In psychological research, operant behavior, and related fields, the PDP-12 can control experiments, record events, and analyze results. In physiological studies, the PDP-12 has the capability of handling both analog-and digital signals, providing real-time analysis of the information and control of the experiment from which the data is being derived.

In the clinical chemistry laboratory, the PDP-12's turn-key system provides efficient patient monitoring and patient interviewing, better patient care, reduces costs, helps relieve the load on the limited number of technicians, handles more tests, and provides better and faster information to the medical staff. This system interprets and processes data simultaneously from up to 15 analytical instruments. It gives automatic readouts, allows continuous monitoring of the process, files and stores results, and does all of the result calculations. A patient filing system allows an accumulative patient summary to be maintained.

PDP-15

Since certain types of data-handling tasks require specific hardware and software configurations, Digital has developed four standard 18-bit PDP-15 systems, ranging in power from the modestly priced basic PDP-15/10 to the real-time disk monitor environment of the PDP-15/40. At every level, the capabilities of the hardware growth there is a straightforward step of software control to match.

The PDP-15/10 is the first-level PDP-15 system. It is a basic system designed to let beginning users with limited budgets gain access to the power, speed, and 18-bit word length of PDP-15 hardware, in the expectation that the system will later be expanded to take full advantage of the advanced software capabilities inherent in the system's design.

PDP-15/20 is designed for research and engineering environments where real-time data acquisition and control tasks are combined with program development and testing. Monitor controlling virtually ends intermediate operations. Unique real-time input/output routines can also be integrated into the system monitor to accelerate setup and recovery.

PDP-15/30 is designed for research, engineering, and industrial environments where one or more real-time tasks typically require continuous responsiveness from the computer but do not use 100% of its capacity.

PDP-15/40 is designed for industrial and engineering environments where the need for a background/foreground mode of operation is compounded by the necessity of large random-access files.

PDP-10

The PDP-10 is a versatile 36-bit computer system designed to perform conversational time-sharing, batch processing, and real-time operations equally well and simultaneously. A PDP-10 system can perform any or all of these tasks, responding to individual user requirements.

In conversational time-sharing, up to 63 users at local or remote locations can simultaneously share a broad range of system capabilities. Using a choice of several languages, a user can develop a program on his remote console and receive answers to mathematical or engineering problems in seconds.

For programs that do not require immediate processing, a user may initiate batch processing, and let the system software control a queue of card or tape jobs. With the PDP-10, batch processing proceeds concurrently with time-sharing and real-time tasks.

Real-time operations such as data acquisition and control may be the primary purpose of a PDP-10. Real-time system software and hardware assure the real-time user of attention when he needs it, and allow conversational time-sharing as well.

PDP-10's are serving business, industry, and science in a multitude of installations throughout the world. University computer centers use the PDP-10 to solve student and faculty computing problems, develop new programs, process administrative data, and to provide computer-aided instruction.

In hybrid systems, the PDP-10 is combined with analog equipment to simulate the operation and/or control of complex systems. The PDP-10 interfaces easily with analog computers of all the major manufacturers.

In chemical laboratories, the PDP-10 collects data from analytical equipment, makes component identifications and analyses, and builds chemical models.

High energy and nuclear physics laboratories use the PDP-10 for both on-line and off-line analysis of real-time applications.

The PDP-10 is also becoming increasingly important in biomedical research for mathematical modeling and pattern recognition. In applied medicine, it has found uses in clinical chemistry, multiphasic screening centers, hospital information systems, and intensive care units.

MODULES

DEC is the world's leading manufacturer of logic modules. Manufacturers of other equipment, from machine tools to scientific instruments, rely heavily upon DEC modules, and DEC computers and associated equipment are largely constructed from them.

DEC makes 324 different types of modules in three basic families:

K-Series--for control applications in industrial environments requiring immunity to noise

M-Series--for high-speed computer interfacing and instrumentation applications

A-Series--analog-to-digital and digital-to-analog converters

The modules are ideal for interfacing other equipment to DEC computing systems, since the modules are electrically and logically compatible, not only with each other, but with the internal circuitry of the computers as well. Beyond that, the modules can be used to construct a wide variety of laboratory equipment that need not be associated with the computing systems. Up counters, down counters, signal multiplexers, Teletype drivers, Gray to binary converters, paper tape punch controls, reader controls, pseudo random sequence generators, high speed parallel adders, jam transfer buffers, analog to digital converters, digital to analog converters, and shift registers are examples of such equipment.

PDP-14

DEC's 12-bit PDP-14 offers the best solution to mass production control problems. The PDP-14 is built from rugged noise-immune solid state logic and provides complete, flexible control capabilities in one small black box. The PDP-14 not only replaces relays, but also eliminates problems associated with relays and static logic.

The PDP-14 will directly control machines such as automotive transfer lines, complex material handling systems, steel rolling mills and elevator systems. All of these machines have one thing in common: their control sequences are expressed in terms of Boolean equations. The PDP-14 solves Boolean equations efficiently, reliably, economically.

The PDP-14 can lead to a machine monitoring system where each 14 controls its own bank of machine tools and keeps a computer informed of its progress. The computer does not control the machine system in any way, but it does continually monitor every machine and can alert an operator in an control center about a problem as soon as it develops.

It can also communicate with a DEC PDP-8/I, PDP-8/L or PDP-12 computer to put an entire plant under computer monitoring.

COMPUTER LAB

Over 50% of today's high school students will eventually be exposed to computers. Most secondary schools have already begun instruction in binary logic theory. To provide educators with a dynamic and powerful teaching aid for demonstrating the "new math", DEC has developed the Computer Lab, a complete classroom laboratory for teaching digital logic and computer fundamentals.

The student can follow each step of the Computer Lab instructions by wiring the unit with easily inserted and removed Patchcords and then test his final design. The course provides a set of ten experiments illustrating the full range of digital logic principles.

The Computer Lab course can be tailored to different educational levels --from high school "new math" courses to university level electrical engineering programs. The format and sequence of the experiments follow those of leading textbooks, so the Computer Lab course can be easily supplemented by a reading program. Since each experiment is as independent as possible of all others, an instructor can modify the course sequence.

As a laboratory instrument for classroom training in digital logic, the unit can provide a course lasting a full semester, comprising 50 hours of laboratory work supplemented by 30 hours of lectures. For training computer technicians, the Computer Lab furnishes logic functions that are identical to those used in DEC's PDP computers and the experiments reproduce the basic internal operations of all computers. The low cost and portability of the unit make it ideally suited for either home or office study programs for individuals in all areas of business, research and industry where non-technical people must become familiar with computer fundamentals.

PERIPHERALS

ARITHMETIC PROCESSORS	Up to 366 Instructions Up to 16 General Purpose Registers Multi-programming Hardware Priority Interrupt System Console Teletype Paper Tape Reader and Punch Operator Console
DISK SYSTEMS	High-Speed Swapping Disks (to 2,000,000 Words) Disk Packs (to 40,000,000 Words) High-Capacity Storage Disk (to 100,000,000 Words) Disk File 13-Bit Words (to 131,072 Words) Rotating File 13-Bit Words (to 1,024,000 Words)
STORAGE DRUMS	18-Bit Words (to 524,288 Words) 36-Bit Words (to 345,600 Words)
MAGNETIC TAPE UNITS	Seven and Nine Channels 45 and 75 Inches per Second 200, 556, and 800 Bits per Inch Industry Compatible Seven and Nine Channels 25 IPS 200, 556, and 800 BPI Industry Compatible Incremental Write, 700 Steps/Sec. 200, 556, and 800 BPI Industry Compatible
DECTAPE SYSTEMS	Compact 4-inch Diameter Reels Fixed Address Recording 73,984 Words per Reel File-Oriented with Directories 5 Track Redundent Recording
LINE PRINTERS	64 Character, 300 and 1000 lines/minute 96 Character, 600 lines/minute 128 Character, 500 lines/minute

CARD READERS/PUNCHES	1000 cpm Reader (833 cpm for 50 Hertz) 200-365 cpm Punch Card Reader (GDI--Model 100) 200 cpm 50/60 hz. 110V. Card Reader (Burroughs--B122) 200 cpm 50/60 hz. 110V.
PAPER TAPE EQUIPMENT	Readers, optical, 300 cps (characters per second) Punches, 50 cps Typesetting readers, 6 or 8 level, 110 cps Typesetting punches, 6 or 8 level, 110 cps
COMMUNICATIONS EQUIPMENT	Data Line Scanner Computer-Based Communication System Local Terminals (Teletypes and Display) Data Phones Telegraph Lines Automatic Data Set Control Automatic Dialing Capability
TELETYPE EQUIPMENT	ASR-33, 35, 37 KSR-33, 35, 37 100 or 150 wpm
CRT DISPLAY SYSTEMS	Alphanumeric Keyboard Terminals Point Plotting Display Vector Display Fully Buffered Graphic Display Satellite Computer Display Systems Storage Tube Graphic System 20 usec. Character Generator (Hardware) Software Character Generator
PLOTTERS	Width--12 or 18 Inch Step Size--.01 or .005 Inches .1 or .05 Millimeters
REAL-TIME INTERFACE EQUIPMENT	A/D and D/A Converters Digital Input and Output Subsystems Special Systems Gas Chromatography Systems Signal Averaging Systems

DEC SUPPLIES

DEC has a complete line of operating supplies designed to obtain maximum performance from each PDP System. All items are guaranteed to be of the highest quality in accordance to rigid DEC standards of quality control.

Supplies include DECtape, LINCtape, and standard magnetic tape; paper tape; tape storage racks and accessories; printer paper and ribbons; and miscellaneous items. All orders for supplies are normally filled within 48 hours from receipt of order.

COMPUTER SPECIAL SYSTEMS

The Computer Special Systems group is concerned with the application, design and manufacture of special-purpose hardware. The group, comprised of a number of specialists in drums, displays, A/D techniques, etc., interfaces DEC equipment to that of other manufacturers, designing new logic to apply the computer to a particular problem or process, and making required modifications to any of DEC's existing products.

DEC never bids systems that it does not know how to build. These systems fall in two categories: those inadequately or improperly specified, and beyond-the-state-of-the-DEC-art developmental systems. DEC is willing and able to work with the customer to define system responsibility and performance specification. However, the company maintains an admittedly conservative attitude when available hardware is suspected to be only marginally able to meet a prospective system requirement. Analog systems in particular are scrutinized to insure that the required performance does not press the maximum capability of existing devices.

CUSTOM SOFTWARE

For many special applications, DEC has an experienced staff of systems programmers who can develop custom software at competitive prices. In some cases, DEC programmers may be able to adapt parts of its standard system software into custom designs.

Custom software falls into three general classifications:

Large standard applications involve significant hardware and more than one programming man-year. Jobs involving PDP-10 Monitor modifications and extensions, multi-processor software, and dedicated systems are in this category.

Small standard applications primarily involve standard product line hardware or hardware from Module Applications Engineering. Included in this class are minor modifications to standard DEC software.

Special systems applications originate in the Computer Special Systems group. The aim is to provide a total solution, with the software service working in conjunction with Special Systems hardware.

FIELD SERVICE

A world-wide field service staff insures the proper maintenance of DEC machines. One of the company's over 500 field service engineers can be on the spot in a few hours if a problem develops. If a few hours is not fast enough, a resident engineer can be located at a site full time.

For small computer users, DEC also offers unique depot repair stations. Located at strategic Digital service centers, each station is a complete service lab manned with full time engineers and equipped with sophisticated test equipment.

DEC's senior Field Service engineers (about half the total force) average more than six years of computer experience and nine years in the electronics field. A new man never gets near your computer without rigid training. Before receiving a field assignment, he spends the first four months of his career attending classes. He spends about 75% of his first year in formal training.

In addition to this initial training, every Field Service man working on the company's products spends part of each year in a course at the main plant. Also, more than a dozen full-time instructors travel the world teaching Field Service personnel.

DECUS

Digital Equipment Computer Users Society (DECUS) was established in March of 1961 to advance the effective use of computers and peripheral equipment. It is a voluntary, non-profit users group supported by DEC, and whose objectives are to:

advance the art of computation through mutual education and interchange of ideas and information,

establish standards and provide channels to facilitate the free exchange of computer programs among members, and

provide feedback to the manufacturer on equipment and programming needs.

The Society publishes a newsletter, DECUSOPE, every two months, sponsors technical symposia twice a year (Spring and Fall), maintains a program library, and publishes proceedings of its symposia.

DECUS encourages subgrouping of users with common interests. Special interest groups include European users; module users; the education sub-group; users in the biomedical field; and PDP-6/10 users.

The DECUS Program Library is one of the major functions of the users group. It is maintained and operated separately from the DEC library and contains programs contributed by the users. All DECUS programs are available to members without charge.

THE DEC TRAINING PROGRAM

The success of the electronic digital computer has created a problem. The institute or corporation which can now afford a computer, and has a use for one, quite often has no one who is knowledgeable in computer systems.

To prepare future users to program and maintain their DEC equipment, a trained full-time staff periodically conducts courses at DEC's main plant in Maynard, Massachusetts. Since students operate the computers as an integral part of their training, class size is limited. For this reason, early application for enrollment is suggested. DEC provides training materials, such as reference manuals, timing diagrams, and flow diagrams.

COURSE OBJECTIVES

Each programming course will give participants a working knowledge of the appropriate

Assembler
Symbolic Tape Editor
On-Line Debugging Program
Programming Techniques
Input/Output Programming
Program Library

Each introductory maintenance course will give participants a working knowledge of:

DEC Logic and Symbols
Flow Diagrams
Block Schematic Logic
Operation of Basic Input/Output
Operation of Central Processor
Maintenance Programs

With the exception of the Basic Programming course, all courses are designed to teach experienced computer personnel how to program or maintain their computer. The courses assume prior knowledge of basic programming or basic electronics, and computer technology.

digital INTEROFFICE MEMORANDUM

DATE: June 5, 1969

SUBJECT: BIOMEDICAL BROCHURE

TO: OPERATIONS COMMITTEE FROM: Jerry Hill

Attached is the latest copy of the biomedical brochure. There are no references to specific installations in the copy. As the brochure is now planned, these references would be in extensive photo captions.

NOTE: In subdivision II (CURRENT SYSTEMS) the BIOMEDICAL GROUP wishes to include the LAB-K (LOGIC CONTROLLER KIT) and the software package that Digital will eventually offer to control RADIATION TREATMENT PLANNING.

NOTE: In subdivision IV (DIGITAL COMPUTERS) the BIOMEDICAL GROUP wishes to eliminate Timeshared-8 on the grounds that it is not a "biomedical computer system". I have included the Timeshared-8 in this section because the computer could adequately serve a small hospital.

The attached is the outline of the Biomedical Copy.

blw

I. INTRODUCTION (pages 1-4)

A. The Problem
B. Digital's Solution
C. Digital Equipment Corporation
   1. History
   2. Field Service
   3. DECUS
   4. Biomedical History
D. Where we are now

II. CURRENT SYSTEMS (pages 5-7)

A. CLINILAB-12 (CLINICAL LABORATORY SYSTEM)
B. LAB-8

*Suggested additions by biomedical group

*C. LAB-K (LOGIC CONTROLLER KIT)
*D. RADIATION TREATMENT PLANNING SOFTWARE PACKAGE

III. THE FUTURE FOR COMPUTERS IN BIOMEDICINE (pages 8-11)
(In this section the computers are arranged and described by function rather than specific application.)

A. Patient Interviewing Systems
B. Computerized Scanning Devices
C. Patient Monitoring Systems
D. Computerized Patient Records

IV. DIGITAL COMPUTERS (pages 12-16)

A. PDP-8/I and PDP-8/L
B. Timeshared-8
C. PDP-12
D. PDP-15
E. PDP-10

BIOMEDICAL BROCHURE JUNE 3 COPY

INTRODUCTION

The problem: the modern hospital, overcrowded and understaffed, faces an increasingly difficult task in attempting to keep pace with the rapidly-expanding aggregate of services it must offer its patients.

Digital Equipment Corporation is prepared to solve that problem. The solution: place small computers in hospital laboratories wherever they can make work simpler and easier for technicians. Various small computers, performing individual tasks, can automate the laboratory, thereby freeing personnel from routine, time-consuming work. The volumes of paper work generated by the modern hospital can be reduced. Entire laboratory functions can be mechanized, virtually eliminating the possibility of error in data calculation and transcription. Monitoring equipment can be computerized to a point where patient care will be enhanced through round-the-clock observation by computer. Eventually, individual computerized systems within a hospital could be interfaced with a large-scale system to collect and store results of all hospital tests.

In a totally computerized system, in-patients would be given several routine tests, the results of which, collected by computer, could be stored in the computer's memory. Other computerized functions could include patient interviewing and monitoring of intensive care units. Results of these operations would also be stored in memory. Large amounts of data would be collected pertaining to each patient, and this information, available from the computer on command, could be printed out in an easily read report for the physician. Such a system would provide the medical doctor with a bank of clinical information including everything pertinent to the health and care of his patient.

DIGITAL EQUIPMENT CORPORATION

Digital Equipment Corporation is the fourth largest computer manufacturer in terms of number of installations. Beginning with the PDP-1 in 1959, Digital's computer systems have been characterized by the best price/performance ratio in the computer industry. Digital led the industry with a computer for less than $1,000,000. Subsequently, Digital has produced the first computer for less than $500,000, first under $100,000, and first under $20,000. Most recently Digital brought the price of its PDP-8/L computer to less than $10,000, another industry first. Digital also offers a large timesharing system for about $400,000, and small computer timesharing at a price of about $.50 per terminal hour.

Digital Equipment Corporation has an extensive field service organization. Experienced and well-trained engineers from field service check each computer before it leaves the factory. They install the system for you to make sure it works properly. They are ready to serve you whenever your computer goes down. Through a world-wide network of field service offices, service can be provided within a few hours, or you can arrange for a resident engineer to provide full time service. After the warranty expires, you can insure the continuing presence of Digital engineers through a field service contract guaranteeing protection.

DECUS

Digital Equipment Corporation supports DECUS (Digital Equipment Computer Users Society), a voluntary, non-profit users' group whose chief value is the exchange of user information and techniques. The society publishes a newsletter, DECUSCOPE, every two months, maintains a program library, and publishes the proceedings of its technical symposia. In the United States, symposia are held twice a year (spring and fall). At each symposium, one full day is devoted to the uses of Digital computers in the biomedical field. The Spring 1969 Symposium emphasized biomedical computers with two full days of presentations. In Europe, where presentations are similar to those in the United States, DECUS members meet yearly. In addition to regular symposia, DECUS sponsors occasional special symposia in the United States and Europe.

Digital Equipment Corporation is not new to biomedical research. Several years ago laboratory work was begun with the LINC, a computer developed by the Lincoln Laboratory of MIT, and manufactured by Digital. Although the design for the computer was public domain, only one other computer manufacturer produced the LINC. Because of its early involvement with small laboratory computers, Digital has gained experience--unavailable to most computer makers--from which new biomedical solutions can be drawn. Digital has the experience of working with laboratory personnel. Digital understands the problems of the laboratory.

First steps toward the goal of a totally computerized hospital system have already been taken. Digital has manufactured laboratory computer systems, as well as general-purpose computers adaptable to the needs of laboratories and hospitals. Already more than six hundred Digital computers are engaged in both off line (equipment not under the control of a central processor) and on line (equipment directly controlled by a central processor) hospital research projects.

Computers which now fulfill primarily research functions can gradually take on a larger share of the clinical work. Computers are now effective as laboratory assistants. They will soon become coordinators of patient-monitoring devices. Ultimately those same computers can manage radiation treatment planning and pulmonary research. A general-purpose computer can accomplish whatever it is programmed to do. Change the function, revise the program, and the computer becomes a whole new machine.

I. CURRENTLY AVAILABLE SYSTEMS

A. CLINILAB-12 (THE COMPUTER AS BIOMEDICAL DATA PROCESSOR)

Clinilab-12 is Digital's clinical laboratory system. It is built around the PDP-12 computer--standard equipment for which includes a 7" x 9" display scope, 16 channel A/D converter, two tape units, and a 1.6 usec. computer with forty-three basic instructions. The PDP-12, direct descendant of the highly successful LINC and LINC-8 by Digital, is designed for laboratory use. Its clinical laboratory functions are programmed by LABCOM (Laboratory Aided By COMputer), written by the staff of the University of Wisconsin for the purpose of automating the clinical laboratory. In addition to the LABCOM program, the Clinilab-12 system includes a Monitor Control Subsystem and a Patient File Subsystem. This segment of the system program enables a summary printout to be generated automatically on any patient, when the tests requested for that day have been completed, verified by the laboratory personnel, and entered into the patient file on the disk. The summary report contains up to seven days' results on one sheet of paper and includes English comments, where necessary, to describe the results. The patient's entire record remains on disk, available at any time.

The entire Clinilab package can be interfaced with up to twenty-four autoanalyzing laboratory instruments to produce an almost totally automated laboratory. When laboratory work is complete, Clinilab-12 is also a general-purpose computer, easily programmed to solve other problems.

Designed to automate the clinical laboratory, Clinilab-12 aids personnel by providing faster test results and eliminating human errors in the calculation of test data. Mechanical errors are minimized through the computer's capacity to generate checks of analytical instruments during the testing process. Laboratory services are further improved by computer-generated reports providing the physician with a single page typed report rather than a handful of requisition slips containing individual test results. The ultimate beneficiary of the Clinilab-12 system is the patient. More tests than were previously possible can now be accomplished within a short time period. In addition, costs are reduced through effective initial test processing which makes retesting unnecessary.

B. LAB-8 SIGNAL AVERAGING SYSTEM

LAB-8 is a complete, computerized system for a number of laboratory functions, chiefly signal averaging. The LAB-8 package includes a PDP-8/L general-purpose computer, oscilloscope, AX08 Laboratory Peripheral System, and I/O conversion panel. The hardware of the system has been arranged to facilitate signal averaging. The system is programmed to average signals, but that program can easily be altered. The basic LAB-8 digitizes, displays and averages analog signals at rates of from 30 microseconds to 500 microseconds per point. The user can change the program, adjusting the sampling rate on-line and changing the number of sweeps and delay.

The LAB-8 system collects data, plots and prints results, and returns to averaging within the capacity of the averaging program originally stored in the computer. LAB-8 can also do what no other computerized signal averager can. It averages at a special high rate to provide blow-ups of areas of interest, starts averaging before the sync pulse, computes confidence limits for the average, and indicates whether the signal is steady, oscillating, or steadily changing.

LAB-8 can be used by the EEG clinician who needs eight or more inputs; by the audiometry specialists in ear clinics who need to know the trend of the data in objective audiometry; by opthalmologists interested in magnifying a selected portion of the ERG; and by obstetricians and gynecologists who want a single, self-contained unit for taking fetal ECG's. LAB-8 is used by neurophysiologists, psychologists, pharmacologists and cardiologists.

II. THE FUTURE FOR COMPUTERS IN BIOMEDICINE

In addition to the LAB-8 and Clinilab-12 computer systems, Digital Equipment Corporation is involved with computerized research installations. Digital's small general-purpose computers are easily adaptable to hospital laboratories where their price/performance ratio makes them ideal. Although Digital computers are now often used only for research, they will soon be employed to aid the clinical technician and the practicing physician.

A. THE COMPUTERIZED PATIENT-INTERVIEWING SYSTEM

The medical history is one of the most important diagnostic tools. Unfortunately, it is time-consuming for the physician, whose notes are often legible only to himself. Computers are ideally suited to patient interviewing. They can work long hours without tiring, and they can efficiently examine all aspects of the patient's medical history.

One computer system for patient interviews utilizes a branching technique of questioning in order to insure that the patient's medical history is thoroughly examined. Although the computer is an impersonal machine, it has certain advantages over a human interviewer: patients are more willing to discuss potentially embarrassing matters with a computer; the machine never forgets to follow a line of questioning to its conclusion; and the results of a computerized interview are typed, neatly and legibly, on the computer output sheet. The advantages of the computerized interviewing system are conveyed to the sick; for the doctor, freed from long questioning sessions, can devote his time to treating his patients, thus providing them with better care.

B. COMPUTERIZED SCANNING DEVICES

In nuclear medicine and cytology Digital Equipment Corporation computers are interfaced with devices for cell scanning and whole-body scanning. In some systems the computer is connected directly to a microscope for examination of diseased areas. The computer analyzes the size and shape of cells within the area being examined and prints out a proportional pattern of the total area or of individual cells. Further examination provides a picture of changes which are taking place. Doctors can know from the printouts whether or not the treatments are successful.

Other experimental computerized scanning devices are on-line. In these cases the computer is connected directly to the scanning system which is examining the patient while the treatment is being carried out. Changes in cell structure and size can be immediately recognized by the computer, and the treatment can be altered to take advantage of these changes. Computerized scanning has an advantage over conventional systems in that the computer's powers of discrimination are superior to the eyes of experienced cytopathologists. The system can recognize minute chemical deviations early enough to make possible effective treatment.

A computerized scanning system is also used in planning external beam radiotherapy, an effective weapon against cancer. Computers have been used for some time in determining the level of radiation necessary to destroy malignant cells without also injuring healthy ones. These systems, however, have been off-line (the computer was not physically connected to devices attached to the patient). The radiation treatment planning system being developed by Digital in cooperation with a London hospital will eventually be an on-line computer, measuring radiation level and its results while the treatment is taking place.

C. COMPUTERIZED PATIENT MONITORING SYSTEMS

A computer can continuously monitor patient-monitoring equipment. Using a PDP-15, such a system is capable of checking for physiological signals in an intensive care unit. One complex, now in operation, monitors cardiac output, systemic resistance, systolic pressure, diastolic pressure, mean aortic pressure, heart rate, venous pressure and maximum systolic upslope. The instant that any irregularity appears, the computer notices it, compares the information to all the data it has compiled concerning this patient and his particular problem, evaluates the situation, displays the information, and produces a printed copy. Technicians can then call on specialists to determine any action to be taken.

Another experimental monitoring complex utilizes a PDP-12 computer in a four-bed coronary unit for myocardial infarction patients. This computer can regulate conventional patient monitoring units at each bed. It also provides additional cardiovascular variables not available from the usual monitoring equipment. Previously determined constant factors for each patient are displayed on oscilloscopes at the nurses' station, where the computer prints out a summary report every three minutes. The patient monitoring system is flexible enough for nurses to select which beds will be monitored. In an emergency the computer's attentions can be turned to the patient who develops sudden cardial stress.

D. COMPUTERIZED PATIENT RECORDS

A neurosurgeon in Baton Rouge has developed a computerized system to write patient records. He found that during the normal operation of his practice, certain paragraphs describing particular conditions, symptoms, causes, diagnoses and prognoses are used repeatedly in case write-ups, referral and consultive letters. The doctor's solution is a method of writing reports using a PDP-8 computer programmed with several hundred commonly used paragraphs stored on magnetic tape. When the system is complete, stenographers will punch a series of precoded paragraphs, which will automatically be typed into final letter or report form.

PDP-8/I and PDP-8/L

PDP-8/I and PDP-8/L are the latest members of the PDP-8 Family of general-purpose computers. They are small, fast, economical companions to over 4,000 PDP-8 Family computers installed all over the world.

Both PDP-8/I and PDP-8/L are built around the same 4,096-word, 12-bit core memory and fully-parallel central processor. Both have TTL integrated circuits throughout. Both come with a big software package that is compatible throughout the PDP-8 Family.

The PDP-8/L is the lowest cost, full-scale digital computer available. It is compact and easy to interface. Memory is expandable at 8,192 words. Most expansion features are implemented external to the basic machine in order to keep size and price down.

The PDP-8/I is prewired for the addition of the most complete line of options and peripherals in the small computer industry. Core memory can be expanded to 32,768 words and mass storage includes DECdisk, DECtape, and industry-compatible magnetic tape. The PDP-8/I also features a fast multiply/divide option.

TIMESHARED-8

Timeshared-8 is a new concept in small computers. Basically, it is a multi-language, local time-sharing system built around a PDP-8 Family computer.

Timeshared-8 systems can start at four users and grow to 32, by adding up to 32,000 words of core memory, four 250,000-word disks, and eight DECtape units.

Users have an unlimited choice of languages and can run editors, assemblers, compilers, and interpreters simultaneously. Each user has an assigned area in core memory and disk storage and can call on his own private files stored on magnetic tape, disk, or any other storage device. He also has access to all input/output equipment.

Timeshared-8 users have flexible options for program protection. After they develop a program, they can determine whether to let other system terminals use it (read only) or modify it (read and write). And they can be selective, giving some terminals access and prohibiting access to others.

Timeshared-8 can be connected to a large time-sharing computer such as the PDP-10 for added flexibility at low cost. In fact, a typical 16-user Timeshared-8, used 40 hours per week, serves each terminal for less than one dollar per hour.

Timeshared-8 is an extremely economical and efficient means of providing computer services to a number of users in a large engineering, research, or industrial operation, or in a school system or university.

PDP-12

The recently-announced PDP-12 combines the best features of two popular Digital computer systems to produce a completely functional laboratory and research tool. Replacing the LINC-8 laboratory system, the new computer lets the user control his experiments, acquire and analyze data, and store the data in any format.

The new design highlights an integrated display system, a 16-channel analog/digital converter, a completely buffered input/output system, and a prewired real-time clock.

The PDP-12 also provides greatly expanded software. Since it can execute the order codes of either the PDP-8 or LINC systems, the PDP-12 can use the entire library of PDP-8 system and applications programs as well as the LINC applications programs.

Programs can be developed, edited, and debugged from the console while the operator views his progress on the display. Editing is performed on a line-by-line or character basis, using a controllable cursor.

PDP-12 core memory can be expanded from 4,096 to 32,768 12-bit words. On-line low cost storage includes LINCtape, DECdisks, and industry-compatible magnetic tape.

PDP-15

The new PDP-15 was designed to meet the widely varied and constantly changing computing tasks in the sciences and engineering.

Because different users have different requirements, the PDP-15 is available in four standard systems--each hardware and software expandable. All share the same central processor and the common purpose of simplifying the user's tasks in a demanding real-time environment.

PDP-15 systems also share many engineering features: Complete autonomy of central processor, input/output processor, and memory, so that processing and I/O operations can occur concurrently in overlapping cycles.

Fast internal speeds, including an 800-nanosecond memory cycle time to meet the demands of real-time processing.

Expansion to 131,072 words of core memory to allow for future growth.

A sophisticated memory protect system for multi-user integrity.

TTL integrated-circuit construction for high reliability.

PDP-10

PDP-10's are as flexible, and perform as many varied tasks, as a particular customer requires. The variety of PDP-10's currently serving business, industry, and science are testimonials to this fact.

The PDP-10 can perform time-sharing, batch processing, and real-time operations concurrently. Some applications emphasize conversational time-sharing, where up to 63 users can develop, edit, and debug programs on-line. Some are strictly science-oriented, digesting and analyzing data from on-line apparatus, but using time-sharing equipment for some program development. Batch processing can be included in any PDP-10 system.

The PDP-10 is available in a wide variety of system configurations--single-user systems which run one program at a time, small time-sharing systems for universities, industrials users, and commercial time-sharing utilities. Multiprocessor PDP-10 systems have even broader capabilities.

Much of the PDP-10's extensive software is re-entrant, so that one copy of the re-entrant program in core is shared by all users. Re-entrant programming saves much valuable core space.

digital INTEROFFICE MEMORANDUM

DATE: May 28, 1969

SUBJECT: PROPERTY REMOVAL AUTHORIZATION AND PROCEDURE

TO: Operations Committee

FROM: John Kulik, Security Officer

Attached please find my recommendations regarding property removal authorization and procedures as well as a copy of the Property Removal Authorization Pass.

Whereas presently there is no procedure or system to maintain an accountability and authorization of Company property or material being removed on loan or as scrap, this procedure is submitted for your approval.

JK/clw

Attachments

Operations Committee:

Ken Olsen ✓
Stan Olsen
Win Hindle
Nick Mazzarese
Ted Johnson
Pete Kaufmann

PROPERTY REMOVAL AUTHORIZATION AND PROCEDURE

A. To establish an accountability of Company property and material to be removed from Company premises on loan or as scrap material, the following procedure will be in effect:

1. No Company property or material shall be removed, or authorized to be removed from the premises without a Property Removal Authorization Pass issued by the Department Cost Center Manager.

2. The Property Removal Authorization Pass will be made up in two (2) parts, each part bearing a corresponding number. The first, or top part, shall consist of an original and a hard carbon copy. The hard carbon copy will be known as the file copy. The second, or bottom part, will be known as the receipt.

3. The Property Removal Authorization Pass will contain the following:

   a. Date

   b. Badge number, Name, and Cost Center of employee to whom Pass is issued

   c. Description of property or material to be removed on loan including serial number, if any. If the property is scrap material, the issuing authority will note same along with the description.

   d. Signature of employee to whom Pass is issued

   e. Signature of issuing authority (Cost Center Manager)

B. Processing

1. Employee to whom Pass has been issued shall, prior to leaving the Company premises, submit the property or material along with the Pass in its entirety to a security guard.

2. The security guard will check the Pass to ascertain if it contains the requiredinformation and signatures, that the description noted thereon conforms to the property or material being removed, and will verify or confirm the issuing authorization signature if in doubt.

digital

B. Processing (Cont'd.)

3. Upon clearance by security guard for property or material to be removed on loan, the employee will be given the original copy of the first, or top part, of the Pass and permitted to leave with the material or property. The remaining hard carbon copy with attached receipt will be dated and signed by the guard on the reverse side and placed in an "Out-Property" file.

4. Upon clearance by security guard for property or material authorized to be removed as scrap material, the employee will submit the Pass in its entirety to the security guard. The Pass must note, along with description, that the material or property is scrap. The security guard will date and sign the file copy of the Pass and forward to Security Office.

C. Property Return

1. Property or material which has been out on loan when returned must be presented to the security guard for clearance with the original Authorization Pass. The security guard will check the property and Pass with the copy on file. If no discrepancies are discovered, the security guard will fill out and date the receipt (bottom portion of file copy), detach and give to employee as his record of receipt. Date returned and signature will be noted by security guard on back of file copy. File copy and employee original copy will then be forwarded to Security Office.

2. Should property or material out on loan be returned by mail, it must be sent to the Cost Center Manager with the original Authorization Pass. The Cost Center Manager will submit the Pass to the security guard for clearance. If no discrepancies are found, the security guard will fill out and date the receipt and return to Cost Center Manager. Signature will be noted by the security guard on back of file copy and Pass will be forwarded to Security Office.

D. Cost Center Managers should keep for their own information a record or log of property or material issued to employees. At termination of employment of an employee, the issuing authority shall ascertain and check with Security Office that the terminating employee has no Company property or material out on authorized Pass.

Property Removal Authorization Pass forms will be audited by the Security Office and issued to Cost Centers upon request.

John Kulik/clw
5/28/69

digital

MINUTES OF THE OPERATIONS COMMITTEE

JUNE 6, 1969

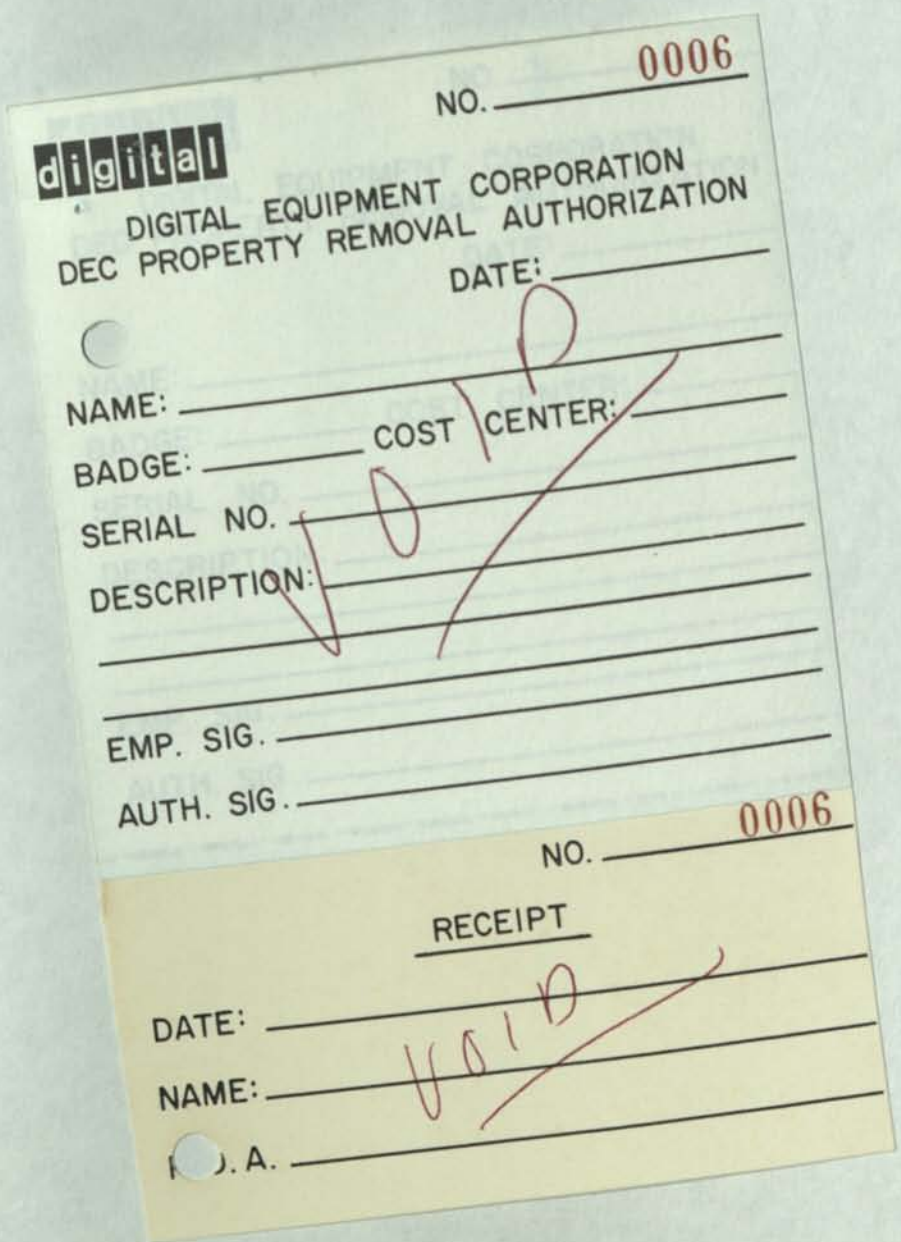
1. Burroughs Disk

See memo June 6, 1969, Fred Wilhelm to Bob Savell.

Eight problems were identified, solutions indicated and responsible person named.

2. UK Production - see Proposal for Increasing UK Production, June 5, 1969, Geoff Shingles and Al Gordon to the Operations Committee.

The proposal was tentatively approved pending commitments from Jean Claude Peterschmitt and Ted Johnson.



jb

digital INTEROFFICE MEMORANDUM

DATE: June 5, 1969

SUBJECT: Proposal for Increasing U.K. Production

TO: Operations Committee FROM: Geoff Shingles
Al Gordon

1. PROPOSAL

To increase the level of production of the present Reading facility to full utilization and to maximize its efficiency. We propose to achieve this by:

A. Exporting to EFTA and EEC all machines built in excess of U.K. requirements.

B. Install a wire wrapping capability in the Reading plant. Basic system to handle 10 stations (amount required at full plant utilization) with initial installation of 4 stations. Initial net investment would be $58K, and potential total net investment for 10 stations would be $113K.

2. COST SAVINGS

Sheets 1 and 1A detail a delivered cost comparison of 8I and 8L costs for Maynard and U.K. produced machines.

Sheets 2 and 2A show a delivered cost analysis for machines shipped to EFTA and EEC from U.K., as against shipped from Maynard.

Sheets 3A, 3B and 3C show a landed value comparison with the net savings for varying production rates.
Note that machines shipped from U.K. production to U.K. customers show a cost savings against U.S. produced machines, while machines shipped from U.K. production to EFTA and EEC show varying cost increases.

As U.K. sales increase, cost savings will be enhanced as illustrated in Graph I. Actual increasing cost savings are shown on Graph II, excluding wire-wrap benefits. By adding the wire-wrap capability, savings are further increased to $20K per month at a monthly production level of 20-8I and 25-8L.

3. RISKS AND SENSITIVITY TO CHANGE

A. Factors which would improve the situation:

(1) Lower module costs at Maynard.
(2) England in the Common Market.
(3) Maynard price increases on 8I/8L.
(4) Any rise in overall volume in U.K.
(5) Building other products in U.K.

B. Factors which would worsen the situation:

(1) Domestic price reductions on 8I/8L.
(2) Significant mix change - greater proportion of Europe to non-England.
(3) Reduction in planned volume (number of processors).
(4) Significant reduction in Maynard FA&T costs.
(5) Rapid death of 8I/8L in Europe before PDP11 or something else is produced in U.K. to utilize people.
(6) A worsening of the parts situation - Maynard to U.K.
(7) All wire-wrap done in Canada - minor effect.

C. Effect on other European production:

Implementation of this program will take some effort away from studies of German production which may slow our entry into manufacturing there.

With expanded production in U.K., German production may be more difficult to justify.

4. SCHEDULE & CONTROLS

By July 15 a schedule is to be submitted showing:

A. Detailed plan for implementation (month by month).

B. Details for wire-wrap installation.

C. Control system consisting of the following charts, updated monthly:

Maynard Costs

(1) 8I cost in Maynard (less modules).
(2) 8L cost in Maynard (less modules).
(3) Invoice value of 8I Logic Assembly and ASR-33.
(4) Invoice value of 8L Logic Assembly and ASR-33.

U.K. Costs

(5) Total production expenses.
(6) U.K. materials - 8I.
(7) U.K. materials - 8L.
(8) Direct labor hours per machine - 8I.
(9) Direct labor hours per machine - 8L.
(10) Personnel changes.

Volume

(11) Number of 8I produced per month.
(12) Number of 8L produced per month.
(13) Number of 8I shipped to U.K., EFTA, EEC (by country) per month.
(14) Number of 8L shipped to U.K., EFTA, EEC (by country) per month.

5. TAXES

The overall effect on the tax situation is under review by Ed Savage. Questions to be answered from a tax point of view relate to:

A. Sub-part F - where more that 30% of U.K. income is generated outside U.K.

B. Section 482 - allocation of costs.

C. Can the transfer price of cost +40% still be maintained.

6. U.K. CONTENT

In addition to cost savings, wire wrapping increases U.K. content to at least 50% for both 8I and 8L, as shown in attached sheets 4A, B, C, D.

SUMMARY

Basically, it is proposed to save money by increasing U.K. production to fully utilize existing facilities. Your approval of this plan is requested.

jkl

Att.

AL

COST ANALYSIS - PDP-8/I

SHEET I.

U.S. DELIVERED COST vs U.K. PRODUCTION

DELIVERED COST OF 8I FROM MAYNARD

Plant Cost at Maynard	5500	5000
Freight and Insurance	~~257~~	233
Duty	1361	1406
DELIVERED COST	7065	6639

BUILT IN U.K. Back-up Details pages 1 - 4
Maynard support $3900 per month - even distribution per 8I and 8L

MONTHLY PRODUCTION QUANTITIES

	U.K. only	U.K. + EFTA		U.K. + EFTA + EEC		
	6	9	12	15	20	25
Maynard Parts 8I	~~3491~~ 2397	~~3391~~ 3491	~~3391~~ 3491	~~3391~~ 3491	~~3391~~ 3491	~~3391~~ 3491
U.K. Parts	1161	1150	1130	1118	1101	1088
Labour & Var. O'Head	301	247	236	217	199	169
Fixed O'Head alloc.	267	201	161	154	116	102
PLANT COST	~~5221~~ ~~5184~~	~~5014~~ ~~4939~~	~~5011~~ ~~4918~~	~~4990~~ ~~4890~~	~~4907~~ ~~4807~~	~~4750~~
Duty on U.S. Parts	~~644~~ 661	~~644~~ 661	~~644~~ 661	~~644~~ 661	~~644~~ 661	~~644~~ 661
Frt. & Ins. on U.S. Parts	~~109~~ 113	~~109~~ 113	~~109~~ 113	~~109~~ 113	~~109~~ 113	~~109~~ 113
PRODUCTION COST	~~5974~~ ~~5945~~	~~5759~~ ~~5742~~	5671	~~5760~~ ~~5633~~	~~5677~~ ~~5560~~	~~5620~~ ~~5503~~
Maynard Fixed cost	260	195	156	130	98	78
DELIVERED COST	6255 ~~6134~~	6054 ~~5937~~	5944 ~~5827~~	5890 ~~5763~~	5775 ~~5658~~	5698 ~~5581~~

COST ANALYSIS - FET-8/L

SHEET IA

U.S. DELIVERED COST vs U.K. PRODUCTION

DELIVERED COST OF 8L FROM MAYNARD

Plant Cost at Maynard	3700	~~3528~~ 3546
Freight and Insurance	152	
Duty	859	
DELIVERED COST	4711	~~4529~~ 4557

BUILT IN U.K. Back-up details pages 5-8
Maynard support $3900 per month - even distribution per 8I and 8L.

MONTHLY PRODUCTION QUANTITIES

		U.K. Only	U.K. + EFTA		U.K. + EFTA + EEC		
		9	11	13	15	20	25
Maynard Parts	~~2365~~ 2528	~~2365~~ 2528	~~2365~~ 2528	~~2365~~ 2528	~~2365~~ 2528	~~2365~~ 2528	~~2365~~ 2528
U.K. Parts		779	772	766	758	750	744
Labour & Var. O'Head		301	247	236	217	199	169
Fixed O'Head alloc.		267	201	161	154	116	102
PLANT COST	~~3927~~ ~~3712~~	~~3585~~ 3748	3528	3691	~~3494~~ 3657	3440	3693 ~~3280~~ 3543
Duty on U.S. Parts	466 ~~438~~	~~438~~ 466	~~438~~	466	~~438~~ 466	~~438~~ 466	438
Frt. & Ins.		75	75	75	75	75	75
Production Cost	4463 ~~4225~~	~~4098~~ 4289	4041	~~4232~~ 4198	4007	3953	~~3893~~ 4134
Maynard Fixed cost		260	195	156	130	98	78
DELIVERED COST	4723	4485	~~4295~~ 4484	~~4197~~ 4388	~~4137~~ 4328	~~4051~~ 4132	~~3971~~ 4134

- ASL 33 Cost Diff 25 — 4698

25 — 4459

25 — 4363

25 — 4303

25 — 4207

25 — 4109

LIT-9/1 HACK MOUNTED WITH ASR-33

SHEET 2

DELIVERED COST ANALYSIS

FROM BOSTON

FROM U.K.

	TO	HAYWARD COST	FREIGHT & INS.	RATE OF DUTY	ACTUAL DUTY	DELIVERED COST	U.K. COST	FREIGHT & INS.	RATE OF DUTY	ACTUAL DUTY	DUTY DRAWBACK	DELIVERED COST	DIFFERENCE
											Logic + TTY only		
U.K. + EFTA ONLY	SWEDEN	5000	229	8%	385	5667	6054	130	6%	385	587	5972	(505)
	DENMARK	5000	224	8	385	5667	6054	130	6%	385	(568)	5972	(505)
	NORWAY	5000	224	8	385	5667	6054	173	FREE	0	0	6427	(350)
	SWITZERLAND	5000	229	S.F.272/ 100 KG.	162	5391	6054	67	S.F.272/ 100 KG.	163	(568)	5686	(204)
U.K. + EFTA + EEC	DENMARK	5000	229	8%	385	5667	5990	130	6%	385	587	5805	(137)
	NORWAY	5000	224	8	385	5667	5990	173	FREE	0	0	6063	(509)
	SWITZERLAND	5000	229	S.F.272/ 100 KG.	162	5391	5990	67	S.F.272/ 100 KG.	162	(568)	5522	(468)
	GERMANY	5000	224	14%	1329	6563	5990	64	14%	1329	587	6496	(433)
	FRANCE	5000	224	14%	1326	6563	5990	42	14%	1329	(568)	6674	(511)
	HOLLAND	5000	224	14%	1329	6563	5990	42	14%	1329	587	6674	(511)
	BELGIUM	5000	224	14%	1329	6563	5990	42	14%	1329	587	6674	(511)

NOTES

Section 1 shows costs if built in U.K. for U.K. + EFTA only
Section 2 shows costs if built in U.K. for U.K. + EFTA + E.E.C.
ÐI DOES QUALIFY FOR EFTA TARIFF TREATMENT
EFTA Tariff would be used in Sweden only
More economical to pay duty on import to Denmark & Switz. & reclaim U.K. duty on re-export.

SHEET 2

SHEET 24

HOP-B/L TO CABINET WITH ASR-33

DELIVERED COST ANALYSIS

FROM BOSTON

FROM U.K.

TO	HAYWARD COST	FREIGHT & INS.	RATE OF DUTY	ACTUAL DUTY	DELIVERED COST	U.K. COST	FREIGHT & INS.	RATE OF DUTY	ACTUAL DUTY	DUTY DRAWBACK	DELIVERED COST	DIFFERENCE
										Logic TTY Only		
U.K. + EFTA ONLY — DENMARK	3700	183	4%	235	4183 964	4237 4458	61	4%	235	(405)	4184 4360	+ 56 (232)
U.K. + EFTA ONLY — SWEDEN	3700	196	8%	471	4367 4213	4199 4459	88	8%	471	(405)	4442 4625	+ 89 (246)
U.K. + EFTA ONLY — SWITZERLAND	3700	152	S.F 272/ 100 KG.	80	3932 3771	4199 4459	39	F.S 272/ 100 KG.	80	(405)	4097 4173	- 25 (241)
U.K. + EFTA + EEC — DENMARK	3700	183	4%	235	4183 964	4237 4303	61	4%	235	(405)	4088 4104	(297) (76)
U.K. + EFTA + EEC — SWEDEN	3700	196	8%	471	4367 4213	4257 4303	88	8%	471	(405)	4291 4257	(76) (42)
U.K. + EFTA + EEC — SWITZERLAND	3700	152	S.F 272/ 100 KG.	80	3932 3771	4237 4303	39	F.S 272/ 100 KG.	80	(405)	3891 4017	(141) (15)
U.K. + EFTA + EEC — GERMANY	3700	152	14%	819	4671 4517	4237 4303	40	14%	803	(405)	4575 4741	(96) (70)
U.K. + EFTA + EEC — FRANCE	3700	152	14%	819	4671 4517	4237 4303	31	14%	802	(405)	4563 4731	(108) (60)
U.K. + EFTA + EEC — HOLLAND	3700	152	14%	819	4671 4517	4237 4303	31	14%	802	(405)	4565 4731	(106) (60)
U.K. + EFTA + EEC — BELGIUM	3700	152	14%	819	4671 4517	4237 4303	31	14%	802	(405)	4565 4731	(106) (60)

NOTES: Section 1 shows costs if built in U.K. for U.K. + EFTA only
" 2 " " " " " " U.K. " U.K. EFTA + EEC

81. DOES NOT QUALIFY FOR EFTA TARIFF TREATMENT
Sweden is only country affected as it is more economical to pay duty
In Denmark and Switzerland and claim drawback of U.K. duty on re-export.
$66.00 could be saved if imports could be made in Sweden under EFTA in the future.

SHEET 24

LANDED VALUE COMPARISON

DESTINATION

8I

SHEET 3A

SHEET 3A

												+ W.W SAVINGS	TOTAL
	6	37506											
		39834									2328	2118	4446
		2328											
	9	(6) 36324	(1) 5992	(1) 6227	(1) 5686								
		39834	5667	5988	5391						2671	3339	6010
		3510	(305)	(239)	(295)								
	12	(6) 35664	(2) 11944	(2) 12454	2 11372								
		39834	11334	11976	10782						2492	4512	7004
		4170	(610)	(478)	(590)								
	15	(6) 35340	(1) 5808	(1) 6063	(1) 5522	(3) 20088	(1) 6674	(1) 6674	(1) 6674				
		39834	5667	5988	5391	19689	6563	6563	6563				
		4494	(141)	(75)	(41)	(399)	(111)	(111)	(111)		3505	5700	9205
	20	(6) 34650	(2) 11386	(2) 11996	(2) 10814	(5) 32905	(1) 6559	(1) 6559	(1) 6559				
		39834	11334	11976	10782	32815	6563	6563	6563				
		5184	(52)	(20)	(32)	(90)	4	4	4		5002	7740	12742
	25	(6) 33155	(2) 11232	(2) 11742	(2) 10660	(7) 45528	(2) 12964	(2) 12964	(2) 12964				
		39834	11334	11976	10782	45941	13126	13126	13126				
		5646	102	234	212	413	162	162	162		7093	9800	16893

LANDED VALUE COMPARISON
DESTINATION

SHEET 3B.

SHEET 3B 8L

	U.K.	CANADA	AUSTRALIA	SWITZ.	GERMANY	FRANCE	HOLLAND	BELGIUM	TOTAL ( ) = COST	W.W. Savings	TOTAL
9	(9) 42282 41013 (1269)								(1269)	1368	99
11	(A) 40131 41013 882	(1) 4350 3964 (386)	(1) 4613 4213 (400)						96	1771	1867
13	(9) 39247 41013 1746	(1) 4254 3964 (290)	(2) 9034 8426 (608)	(1) 4677 3778 (299)					549	2120	2669
15	(9) 38727 41013 2286	(1) 4194 3964 (230)	(1) 4457 4213 (244)	(1) 4017 3778 (239)	(1) 4741 4517 (224)	(1) 4731 4517 (214)	(1) 4731 4517 (214)		921	2475	3396
20	(9) 37863 41013 3150	(1) 4098 3964 (134)	(2) 8722 8426 (296)	(1) 3921 3778 (143)	(4) 18580 18068 (512)	(1) 4635 4517 (118)	(1) 4635 4517 (118)	(1) 4635 4517 (118)	1711	3360	5071
26	(9) 36981 41013 4032	(1) 4000 3964 (36)	(1) 3526 8426 (100)	(2) 7646 7556 (90)	(6) 27282 27102 (180)	(2) 9074 9034 (40)	(2) 9074 9034 (40)	(1) 4535 4517 (18)	3528	4280	7808

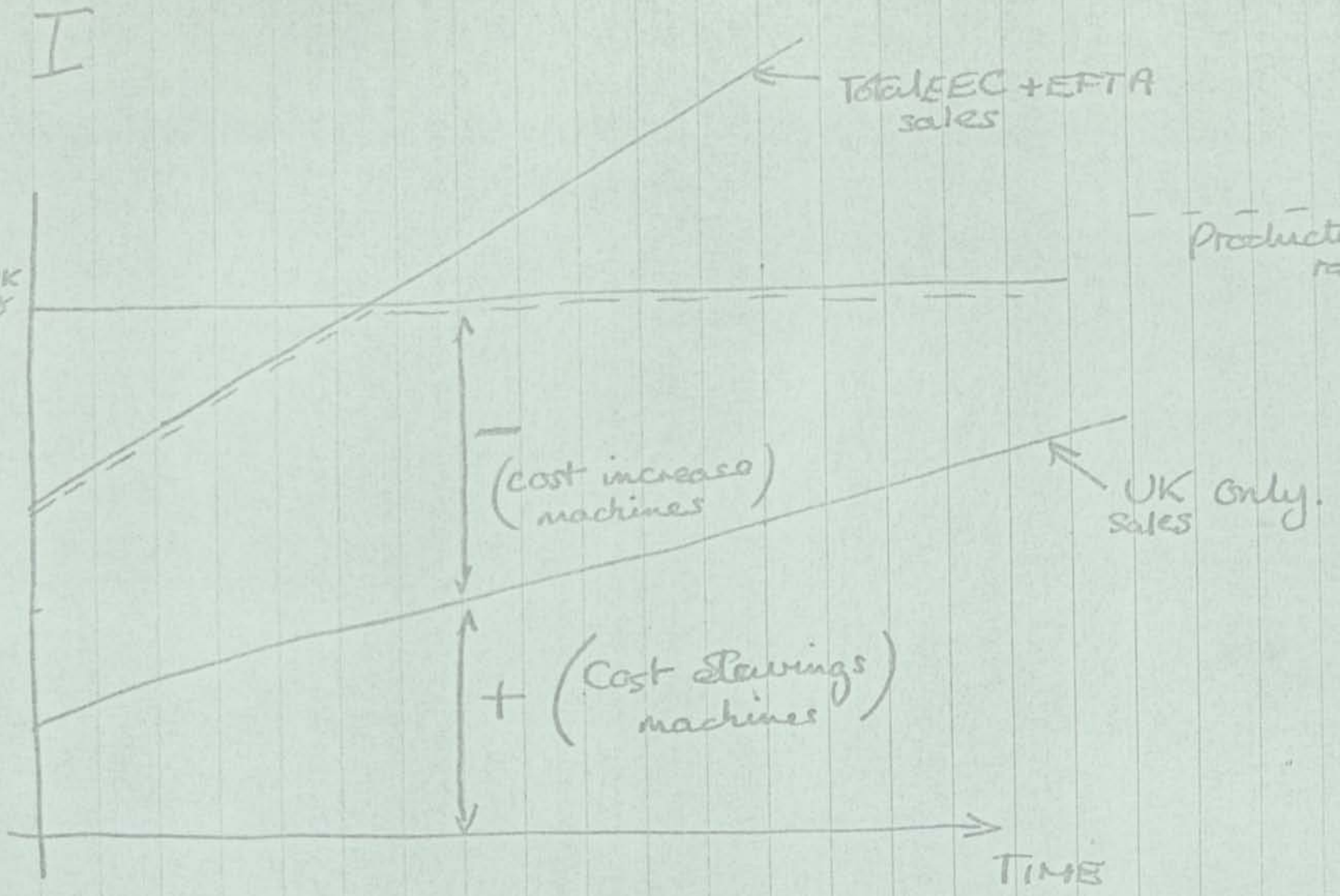
SHEET 3C

DESTINATION

SHEET 3C

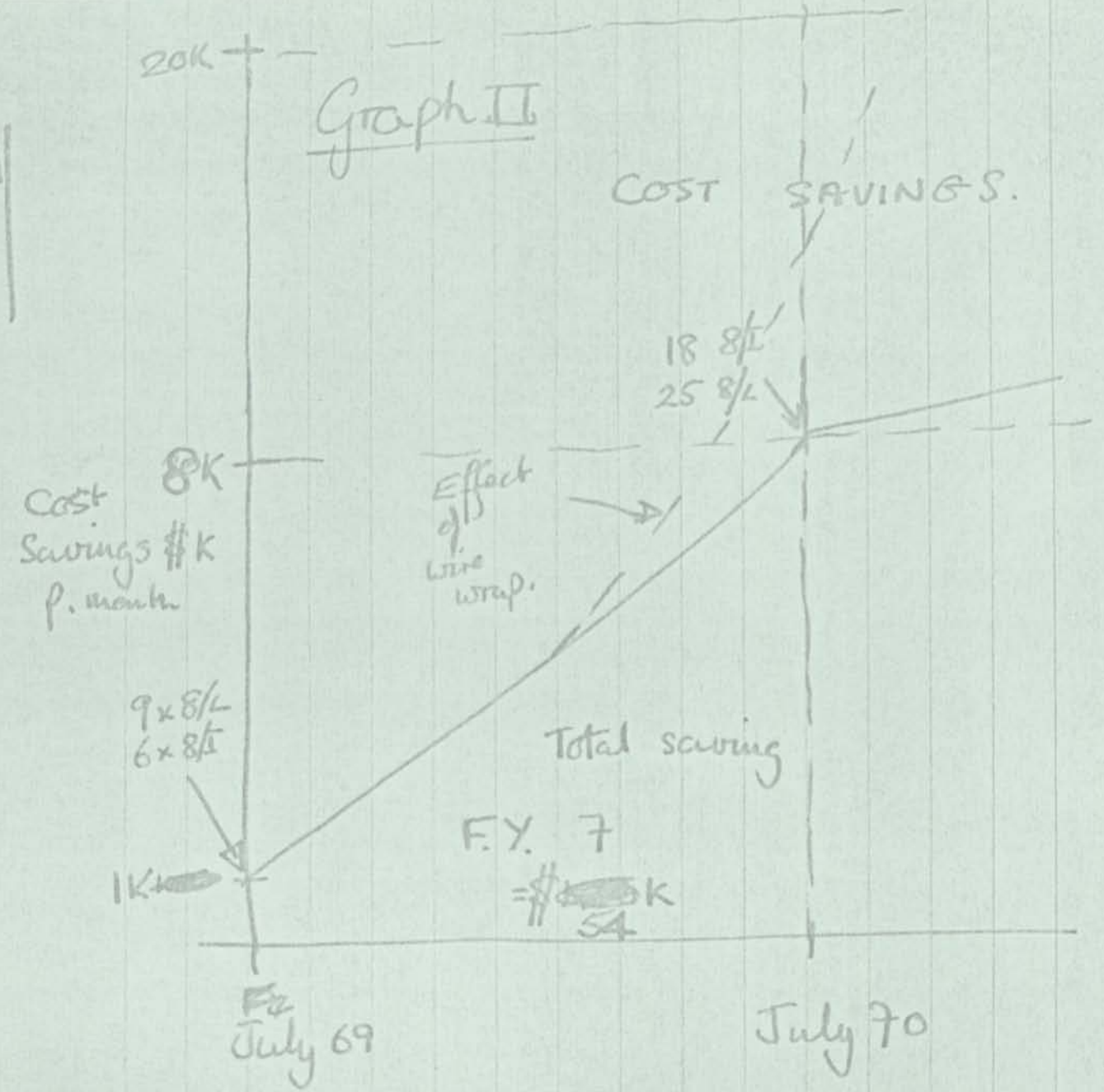
		U.K.	CANADA	AUSTRALIA	S.AFRICA	GERMANY	FRANCE	HOLLAND	BELGIUM	TOTAL	+ W.O Savings	total Savings
BI	69	2328										
BL	9	(1269)										
		1059								1059	3486	4545
BI	9	(1) 3510	(1) (305)			(1) (239)	(1) 295					
BL	11	882	(386)			(400)	—					
S/C		4392	(691)			(639)	(295)			2767	5110	7877
BI	12	(1) 4170	(2) (610)			(2) (478)	(2) (590)					
BL	13	(9) 1746	(1) (290)			(2) (608)	(1) (291)					
S/C		5916	(900)			(1086)	(881)			3049.	6632	9681
BI	15	(6) 4494	(1) (141)	(1) 75		(1) (41)	(3) (399)	(1) (111)	(1) (111)	(1) (111)		
BL	15	(9) 2286	(1) (230)	(1) 244		(1) (239)	(1) (244)	(1) (214)	(1) (214)	0		
S/C		6780	(371)	(319)		(280)	(155)	(325)	(325)	(111)	4894	8175	13069
BI	20	(6) 5184	(2) (52)	(2) (20)		(2) (32)	(3) (90)	(1) 4	(1) 4	(1) 4		
BL	20	(9) 3150	(1) (134)	(2) (296)		(1) (143)	(4) (512)	(1) (118)	(1) (118)	(1) (118)		
S/C		8334	(186)	(316)		(175)	(602)	(114)	(114)	(114)	6713	11,100	17,813
BI	25	(6) 5646	(2) 102	(2) 234		(2) 212	(7) 413	(2) 162	(2) 162	(2) 162		
BL	25	(4) 4032	(1) (36)	(2) (100)		(2) (90)	(6) (180)	(2) (40)	(2) (40)	(1) (18)		
S/C		9678	66	134		122	233	122	122	144	10,621	14,080	24,701.

GRAPH I



COST SAVINGS / SALES RATE PROFILE

GRAPH II


20K
Graph II
COST SAVINGS.
18 8/L
25 8/L
8K
Cost Savings #K p. month
Effect of wire wrap.
9 x 8/L
6 x 8/L
Total saving
F.Y. 7
=#54K
1K
Fr July 69
July 70

BEST CASE SHEET 4A

8L U.K. CONTENT - PRESENT d/s

LESS TELETYPE

U.S. PARTS (COST)	1724	
U.K. "		779
FRT. + INS		60
DUTY		362
	1724	1201

TOTAL MATERIALS 2925

U.K. CONTENT MATERIALS 41%.

U.K. LABOR + O'HEAD 568

TOTAL U.K COSTS. (2925+568) = 3493

U.K. CONTENT (1201+568) = 1769

= 50%

WITH - WIRE WRAP FUTURE

U.S. PARTS	1490	
U.K. PARTS.		779
FRT. + INS		52
DUTY		313
	1490	1144

TOTAL MATERIALS = 2634

U.K. CONTENT = 43%.

U.K. LABOR + O'HEAD = 568

" L. + O.H WIRE WRAP = 131

699

TOTAL U.K. COSTS = 3333

U.K. CONTENT (1843) = 55%.

WORST CASE.

8L. U.K. CONTENT – LESS WIRE WRAP

U.S. PARTS (COST)	1724	
U.K. "		744
FRT + INS		60
DUTY		362
	1724	1166

TOTAL MAIL 2890

U.K. CONTENT - MAIL 40%

U.K. LABOR + O'HEAD 271

TOTAL U.K. COSTS 3161

U.K. CONTENT (1166+271) 1437 = 45%

WITH WIRE WRAP

U.S. PARTS	1490	
U.K. "		744
FRT + INS		52
DUTY		313
	1490	1109

TOTAL MATERIALS 2599

U.K. CONTENT : 43%.

U.K. LABOR + O'HEAD	271
" " " WIRE WRAP	131
	402

TOTAL U.K. COST 3001

UK CONTENT (1109+402) 1511 = 50%.

BEST CASE — SHEET 4C

II. U.K. CONTENT - PRESENT — 4/5

LESS TELETYPE

U.S. PARTS. (COST.)	2687	
U.K. "		1162
FRT. & INS		93
DUTY		557
	2687.	1812

TOTAL MATERIALS COST. 4499

U.K CONTENT - MATERIALS 40%

U.K LABOR & OVERHEAD MFG. 568

TOTAL U.K. COSTS (4499 + 568) 5067

U.K. CONTENT (1812 + 568) 2380

= 47%

WITH WIRE-WRAP — FUTURE

U.S. PARTS	2227.	
U.K. "		1162
FRT. & INS		77
DUTY		459
TOTAL	2227	1698

TOTAL MATERIALS COST = 3925

= 43%

LABOR & O'HEAD MFG = 568.

" " WIRE WRAP = 255

TOTAL 823

TOTAL U.K. COSTS = 4748

U.K. CONTENT (2521) = 53%

WORST CASE — SHEET 4D

8I — U.K. CONTENT - LESS WIRE WRAP

U.S. PARTS	2687	
U.K. "		1088
FRT + INS		93
DUTY		557
	2687	1738

TOTAL MATERIALS COST. 4425

U.K. CONTENT-MATL 40%.

U.K. LABOR TO HEAD 271

TOTAL UK COST 4696

U.K. CONTENT (1738 + 271) = 2009 = 43%

WITH WIRE-WRAP.

U.S. PARTS	2227	
U.K. "		1162
FRT + INS		77
DUTY		459
	2227	1698

TOTAL MATERIALS COST 3925

= 43%

L + O.H MFG 271

" " WIRE WRAP 193

464

TOTAL U.K. COSTS 4389

U.K. CONTENT (2162) = 50%

COMPANY CONFIDENTIAL

OPERATIONS COMMITTEE MEETING

June 2, 1969

AGENDA

1. Additions and Corrections to Minutes of the May 27th Meeting
2. Discussion of Burroughs Disk Problems - (Bob Savell/Fred Wilhelm/Joe St. Amour/ Dick Best/Jerry Butler)
3. Biomedical Trade Shows - (Mort Ruderman)
   (See attached report)
4. Electrical Module Handle Design - (Phil Markell)
   (See attached report)
5. Proposed Departmental Listing Directory - (Nick LoRusso)
   (See attached report)
6. Special Salary Review for Lee Carroll - (Ted Johnson)

Executive Secretaries

COMPANY CONFIDENTIAL

MINUTES OF THE OPERATIONS COMMITTEE

JUNE 2, 1969

Present: K. Olsen, S. Olsen, N. Mazzarese, T. Johnson, P. Kaufmann, (Secretary)

Absent: W. Hindle

1. The minutes of May 27, 1969 meeting were approved as written.

2. Module Handle Design (Phil Markell)

Stan claimed that DEC has made an attempt to educate the public on the handle design. Stan will follow through to insure we push the application for a trademark of our handle.

3. Departmental Listing Directory (Nick LoRusso)

The list was approved (with corrections) for publication with our Telephone Directory.

4. Biomedical Trade Shows (Mort Ruderman)

Mort Ruderman requested four additional biomedical shows: American Heart Association, American Association of Clinical Pathologists, Seventh International Congress of Electroencephalography and Clinical Neurophysiology, Third International Biophysics Congress of the International Union for Pure and Applied Biophysics. Nick claimed these were not the total Biomedical Shows required for the year. Mort will submit the total list of shows required. The two shows requiring immediate decision were approved. Within the next month, all additional shows desired will be submitted to the Operations Committee.

5. Burroughs Disk (Jerry Butler, Bob Savell, Fred Wilhelm, Dick Best, Joe St. Amour, Alan Kent).

The PDP-10 is using the disk at 18M bits, Burroughs at 16M bits. Friday, June 6, a plan for Burroughs Disk problem solution will be presented. All possible solutions will be tried on the units even if considered a Burroughs problem in order that we might ship June units.

6. PDP-10 Backlog, Bookings, Shipments - May 28, 1969

Backlog	Total	Q4	Q1	Q2	Other
PO's	16888	4000	5936	2951	4643
LIO's	-	572	2582	4995	-
Quotes	-	444	647	-	-
Total		5016	8365	7946	4643

	Q4 Actual	Q4 To Go	Q1	Q2
Budgeted Billings	2,575	5,125	6,000	8,050
Required Shipments			6,730	8,920
Budget Building Systems			7,240	11,010
Peripherals			Unknown	Unknown

Bob will investigate the shipping versus production commitments.

7. Education (Dick May)

Dick May discussed his view of the education market and discussed the follow market segments.

1. Independent Schools
2. Small (Mini) Colleges
3. Public High Schools

Our experience shows we can sell below 15K without federal funding. Over 25K federal funding appears to be necessary. Cost/student and obsolescence appear to be important points in making a sale as well as the ability to start small and add additional capability.

Dick mentioned one possible problem was lack of good BASIC for 4K machine. It doesn't fit without a disk. Focal versus Basic argument is simple when we have Basic.

Ken suggested we have Dick May push this portion of market.

8. Special Review (Lee Carroll)

The special review for Lee Carroll was approved.

digital INTEROFFICE MEMORANDUM

DATE: May 20, 1969

SUBJECT: Electrical Module Handle Design

TO: Operation Committee

FROM: Philip Markell

In October of 1967, DEC filed an application for trademark registration of the Electrical Module Handle Design with the patent office. The patent examiner has twice rejected the application on the basis that the mark is not capable of indicating origin and is functional.

We have asked our patent and trademark counsel to render an opinion on the advisability of pursuing the application. In his opinion the application should be dropped. We are in agreement with him. His opinion is based on the following considerations:

First, the designer of our handle apparently chose that particular configruation for purely functional reasons, this must, therefore, suggest that others desiring to make a handle for a module would come up with the same or substantially similar configuration. This in turn, must lead to the conclusion that the handle design is not capable of indicating origin. Trademarks, in order to be valid must indicate origin.

Secondly, at the present time, there is no real evidence that we as a company could show that we consider the handle design a trademark. No attempt has apparently been made to educate the public, through advertising and the like, that when they see the handle they should think of Digital Equipment Corporation. If we started now to establish that the handle design was that of Digital Equipment Corporation's, we still could not stop others making similar handles to discontinue to do so.

On the basis of his analysis, he also has concluded that it would be very difficult, if not impossible to successfully prevent the use by others of a similar handle design.

digital INTEROFFICE MEMORANDUM

DATE: May 28, 1969

SUBJECT: Departmental Listing Directory

TO: Operations Committee

FROM: Nick LoRusso

As directed during your meeting of May 19, 1969, I am submitting a listing of Cost Centers as I propose to be added to our Telephone Directory. I f you approve this addition to the directory, I will submit it to the Cost Center Managers to check for accuracy before going to press.

Nick

CLASSIFICATION OF COST CENTERS

The telephone extensions shown may not necessarily be those of the cost center head - but may be the number of a supervisor, secretary, or other person in that cost center.

2252	Accounts Payable	Alma Pontz	5-2,5B
2410	Accounting, Foreign	Ed Savage	5-2,10B
2589	Accounts Receivable	Don Summers	5-2,7A
2226	Advertising	Gabe d'Annunzio /Mary Boeske	5-2,22B
2595	Analog Dev./Systems	Clark Crocker	5-2,19B
2229	Art	Elliot Hendrickson	3-5
2582	Board Fabrication	George Wood	7-1
2688	Capital Equipment	Werner Fritz	5-2,6A
2395	Carpenter Shop	Stan Baker	7-1
2273	Chief Engineer	Dick Best / Carol Mauro	5-3,6A
2552	Communications Center	Nick LoRusso / Nancy Pearson	4-3
2218	Computer Administration	Tim Chamberlain	5-3,12A
2231	Computer Production	Jack Smith / Shelly Moore	1-4
2297	Cost Accounting	Dick Bergeron	5-2,3A
2589	Credit	Don Summers	5-2,7A
2414	DECUS	Angela Cossette / Jeanne Gabrish	12-2,3A
2225	Direct Mail	Al Gleeson	6B-3
2374	Dispensary	Dot Hudson	5-4,25A
2275	Drafting	Roger Melanson / Toni Lawn	4-4,9C
2350	Educational Marketing	Norm Doelling / Becky Nunnelly	5-2,14A
2700	Electrician	Jack Pinder	4-3
2244	Engineering, MEchanical	Loren Prentice	4-5
2341	Engineering, PDP-8	Bill Long / Pat Colby	5-2,15A
2352	Engineering PDP-9	John Jones / Norma Barnes	5-34A
2239	Engineering PDP-10	Bob Savell / Barbara Fiske	5-5,42A
2249	Engineering, Pr ocess	Tom Stockebrand / Barbara Nelson	4-5
2500	Export	Brad Towle	5-3,14A
2723	Fabrication Shops	Dan Sullivan / Carol Stacy	5-1
2548	Field Service	Jack Shields / Norma Darling	5-3,36A
2221	General Accounting	Bob Dill / Eva Savickas	5-2,4A
2500	Import	Brad Towle	5-3,14A
2429	Insurance (Company)	Reeves Akin	5-2,5A
2606	Insurance (Group)	Lee Callahan	5-4,36B
2410	Ledgers & Taxes	Ed Savage / Barbara Avey	5-2,10B
2686	Legal Department	Ed Schwartz / Pat O'Dea	5-2,9A
2339	Library		5-3
2360	Mail Room	Dick Maloney	4-3
2308	Maintenance	John Culkins	4-3
2433	Marketing, Biomedical	Mort Ruderman / Doris Covey	5-5,43D
2792	Marketing, Clinical	Ray Lindsay	5-5
2793	Marketing, LINC	Ed Kramer / Ruth Baldwin	5-5
2646	Marketing, PDP-10	Dave Cotton / Lori LaBossiere	5-5,43A
2675	Marketing, Module	Bill McNamara / Carol Mauro	5-3,6A
2343	Marketing Services, Module	Frank Kalwell / Jean Haynes	5-3,16A
2369	Millwright	Nase Wilkins	4-3
2309	Model Shop	George Gerelds	5-3,30D
2393	Module Test	Jim Cudmore / Terry Buckley	5-4,31A
2783	Office Services	Nick LoRusso / Nancy Pearson	4-3
2720	Order Desk , Central	Kathy Halley	5-3
2691	Payroll	Ted Tibbetts	5-2,7C
2538	Peripheral Equipment, PDP-10	Jonal Sutton / Mary Lou Clark	5-5
2636	Personnel	Bob Lassen / Jo Reilly	5-4,36A
2367	Photography	Bill Edmonds	3-5
2766	Physics Applications	Ken Larsen	5-5
2379	Plant Engineering	Al Hanson	4-3
2300	President's Office	Ken Olsen / Elsa Carlson	12-1
2582	Printed Circuits	George Wood	7-1
2371	Print Shop	Ray Lapan	3-5
2425	Product Line Mgr. LINC	Dick Clayton	5-5
2341	Product Line Mgr. PDP-8	Nick Mazzarese / Betsy Browne	5-2,14B
2352	Product Line Mgr. PDP-9	John Jones / Norma Barnes	5-3,4A
2239	Product Line Mgr. PDP-10	Bob Savell / Barbara Fiske	5-5,45A

2787	Product Line Mgr., Trad.	Bob Lane / Ethel Lanes	5-3,5C
2671	Product Line Support PDP-8	Ron Wilson / Diann Curtayn	5-3
2245	Program Library	Bonnie Korsman	3-5
2471	Programming	Larry Portner / Gloria MacDonald	12-2
2610	Purchasing	Henry Crouse / Ann Simoes	5-4,44A
2860	Receiving	Phil Feehan	5-3
2501	Sales	Bill Farnham	5-3,5D
2226	Sales Promotion	Gabe d'Annunzio / Mary Boeske	5-2,22B
2695	Sales Support, PDP-10	Steve Mikulski / Joann Masula	5-5
2439	Shipping	Wally Mason	1
2325	Special Systems	Brad Vachon / Elaine Ebert	5-2,16D
2960	[redacted]	[redacted]	4-3
2305	Systems & Prodedures	Dave PAcker / Terry Wilkins	5-2,6D
2222	Technical Documentation	John Bellantoni / Wendy O'Brien	5-2,10C
2393	Test Equipment Services	Jim Cudmore / Terry Buckley	5-4,31A
2302	Trade Shows	Roy Gould	5-3
2232	Traffic	Ray Michel	5-3,10A
2341	Vice President PDP-8	Nick Mazzarese / Betsy Browne	5-2,15B
2340	Vice President PDP-9	Stan Olsen / Carole Gallant	5-3,3A
2338	Vice President PDP-10	Win Hindle / Barbara Fiske	5-5,44A
2556	Vice President Mfg.	Pete Kaufmann / Janet Buscemi	1-4
2342	Vice President Sales	Ted Johnson / Margaret Rand	5-3,3D

digital INTEROFFICE MEMORANDUM

DATE: May 29, 1969

SUBJECT: BIOMEDICAL TRADE SHOWS

TO: Operations Committee FROM: Mort Ruderman

Attached is information on four Biomedical Trade Shows which I feel DEC should attend. Although three of these four shows take place in September, they represent various applications, and are located in different geographic regions.

Trade shows are an important part of our Biomedical Marketing effort, and I feel that the ones mentioned on the following pages merit careful consideration.

cc: Gabe D'Annunzio
Roy Gould

sb

Third International Biophysics Congress of the International Union for Pure and Applied Biophysics

Dates: August 29-September 3, 1969

Place: M.I.T., Cambridge, Massachusetts

Equipment: PDP-12

Cost of Space: No exact figures are available at this time, but the exhibit manager estimates around $400 for one booth (10').

Number of Attendees: approximately 2,500

Reasons for attending:

This conference was held in 1961 and 1965, and DEC has not attended previously. As it is an international meeting, attendees will be from several countries, and will be representative of the biomedical research markets, such as Physiology, where DEC has already been quite successful.

In addition to this exposure, there is also a political consideration. Some months ago, DEC was approached by Professor W. A. Rosenblith of M.I.T., and requested to give a $5,000 donation for this meeting. It was decided that we would not do this, but would instead support it by exhibiting.

Seventh International Congress of Electroencephalography and Clinical Neurophysiology

Dates: September 14-20, 1969

Place: San Diego, California

Equipment: LAB-8 and PDP-12

Cost of Space: $750 for one booth (10')

Number of Attendees: approximately 2,000-2,500

Reasons for Attending:

This congress will include the EEG, Neurophysiology markets where the LAB-8 and PDP-12 are applicable. The LAB-8 would be located in the 10' booth space, and the PDP-12 would be at a nearby location, used in live demonstrations.

Dr. Reginald Bickford, University of California and a LINC user, has agreed to conduct these demonstrations, with animals as subjects. They will be broadcasted over closed circuit television to the other conference rooms.

DEC has not exhibited here before. There is a total of 65 exhibit spaces available for this show, in addition to a limited area for these live demonstrations.

American Association of Clinical Pathologists

Dates: September 15-18, 1969

Place: Chicago, Illinois

Equipment: PDP-12 LABCOM System

Cost of Space: 20' for $800

Number of Attendees: 5-10,000

Reasons for Attending:

DEC attended this show last year with the LINC-8 LABCOM System, and there is no doubt that it is an important one for exposure in this market. Of the 7,000 hospitals in the U.S., DEC expects to sell to 20% or 1400, over the next two years. The Pathologists who will attend this show are those who will have a decision-making role in the purchase of these systems. This show is a

necessity, if we are to reach our goals in the Clinical Chemistry Market.

American Heart Association

Dates: November 13-16, 1969

Place: Dallas, Texas

Equipment: PDP-15

Cost of Space: $625-675 (8' x 8')

Number of Attendees: 4-5,000

Reasons for Attending:

There are now several installations using PDP-9's in this area. As they develop and go from experimental stages into actual clinical use, the PDP-15 is expected to move into this market area. The American Heart Association Show will be an effective step in identifying DEC and the PDP-15 with this market area.

The attendance of 5,000 people will consist of physicians, scientists and nurses, all interested in heart and circulatory applications.

EDUCATION MARKET AREAS

INDEPENDENT SECONDARY SCHOOL

1. Interest is usually in math. or science department. Interest in machine as problem solving device. Occasionally, headmaster is interested in "computer awareness" course. Knowledge level in this environment is high. Most schools have people already trained or are in process of training people.

2. Interest in this area is intense. Over 40% of schools in Massachusetts, Maine, New Hampshire, Vermont and Rhode Island which graduate over 30 students per year are presently either on TS terminal or own DEC equipment.

3. Present Equipment Requirements

   a. PDP-8/I, HS Reader (Punch), (DF32)
   b. Two FOCAL Terminals (BASIC would be nice but not required).
   c. One FORTRAN or PAL III Terminal.

4. Future Equipment Requirements

   a. Four or more FOCAL terminals
   b. H.S. Reader
   c. RF/RS08 (Multi-user FOCAL system, storage of user programs, possible expansion to TSS-8)
   d. CRT Display

5. Decisions made by Headmaster or board of trustees. Money is available in most cases either for time-sharing or DEC equipment. As of today, schools without computer facility are second rate. Computers are definitely established in this environment.

6. Our approach to influence decision makers in this environment should be personal letters to Headmasters stressing our reputation in this area and the economics of multi-terminal FOCAL systems. Section of a brochure stressing economics should be directed to Headmaster and board members.

SMALL (MINI) COLLEGES (500-1,000 enrollment)

1. Interest for most part is in math. and science departments. Most people in this environment are acutely aware of need of and responsibility to teach course in computer technique and computer technology. Knowledge level in this area is surprisingly low. Most people with knowledge are knowledgeable of IBM only. Some are vaguely familiar with 1620 or 1130.

Many of small colleges have formal consortiums and are considering joint purchase of IBM 1130, Hewlett-Packard TS system or TSS-8.

PDP-8/I or PDP-12 with multi-user FOCAL and 8K FORTRAN is adequate to fill their requirements. PDP-12 is ideal machine for this group. Multi-user FOCAL for general use; 8K FORTRAN for advanced math courses; CRT, A/D and ect. for computer science courses.

2. Interest in this area is high. These people are actively investigating types of equipment which will best fill their requirements.

3. Present Equipment Requirement

   a. PDP-12, PDP-8/I, 8/L, H.S. Reader (Punch).
   b. Two or more FOCAL terminals (BASIC not necessary).

4. Future Equipment Requirements

   a. Four or more FOCAL terminals.
   b. H.S. Reader
   c. CRT Display
   d. A/D

5. Decisions made by department heads and presidents of college sometimes with advice of a consultant. Most people in decision making capacity are not aware of what equipment is available to adequately fill their requirements. Those who do not rely on consultants are prone to go to 1620 or 1130 because "other people are using them."

6. Our approach to influence decision makers should be to saturate all departments with literature describing cost and performance; technical specs (cycle time, bits, etc.) should not be stressed in this literature. We should cite specific examples of"Family of Eights" being used at Western Connecticut State College, McNeese State College, Louisiana Polytech and other small colleges as well as in departments of major universities. We should stress the number of machines currently installed in the college environment, and their enthuriastic acceptance in colleges, universities, and small colleges. A complete list of machines in universities and colleges is impressive.

PUBLIC SECONDARY SCHOOLS

1. Interest is usually high in math. department. Interested in machine or problem solving tool.

2. Interest in public school area is intense. However, much of this interest is from people wanting to learn the very basics of computers. Very few people are familiar with any language but are very acutely aware that other people have TS terminals or are "borrowing" time on machines in the area. They are also very much aware of their obligation to teach a computer awareness course. The school administrations are very interested in EDP possibilities of computers, but are not aware of expenses involved. Most administrators are unreceptive to computers except for data processing applications. The teachers are slowly getting the point across that they want an 8/L or 8/I for student instruction only. Most administrators are unreceptive to this fact.

3. Present Equipment Requirements

   a. PDP-8/L or 8/I

4. Future Equipment Requirements

   a. 8K and Multi FOCAL terminals
   b. (DF32 Multi FOCAL terminals).

5. Decisions made by superintendents. After superintendent has made decision he must sell program to group of school committemen. If this group approves, the item must be voted into the town budget.

6. Our approach to this market should be a comprehensive brochure with sections directed to the following:

   a. Teachers - show comparative problem solving examples; traditional vs. computerized.

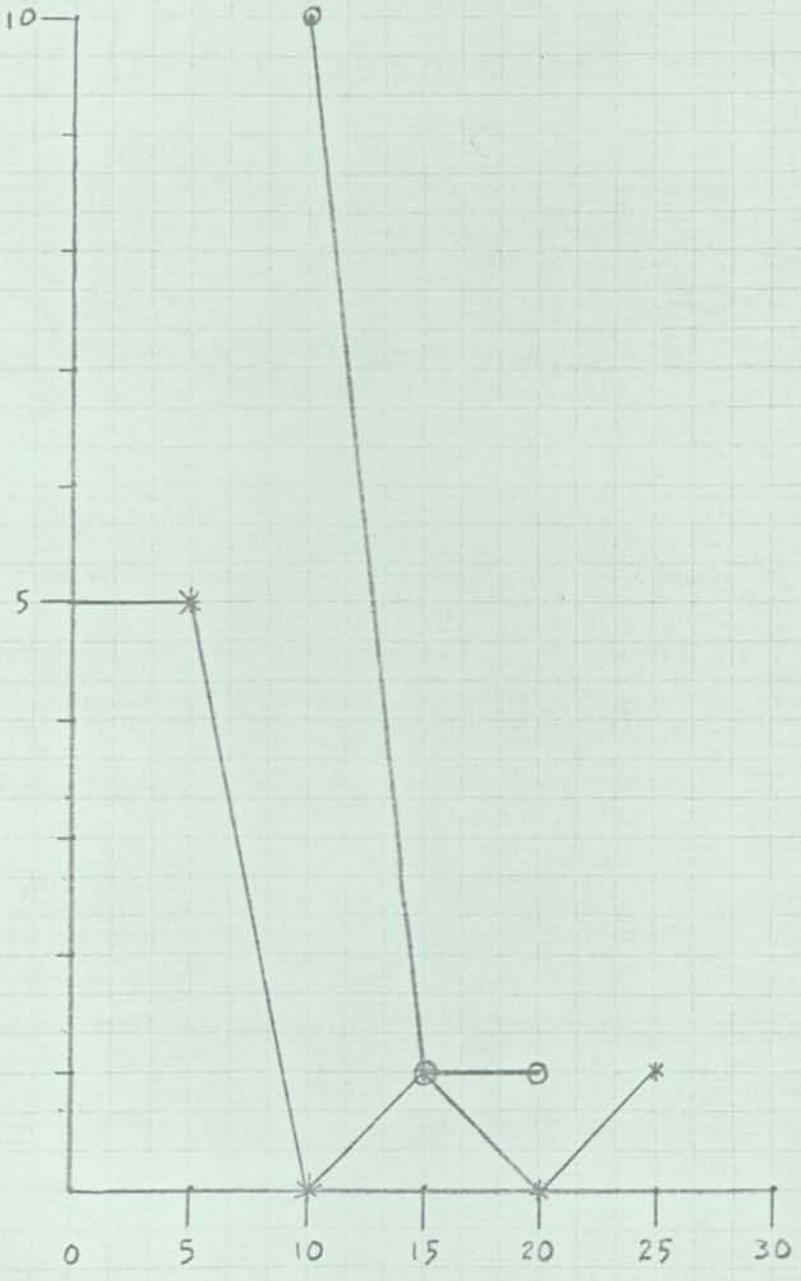
   b. Principals and Superintendents - discuss why people teaching computers and computer techniques feel they are important in the learning process. Colleges are requiring knowledge of computer programming. Growing use of computers in every occupational area. Critical need for people knowledgeable in computer technique (witness flourishing growth of commercial programming schools). Good discussion of obsolescence and why DEC machines do not become obsolete.

   c. School Committee and general public - Same as "b". Strongly stress vocational training for terminal students and the motivation aspects of using a machine in the classroom.

Forget about space ads! Represent ourselves at meetings through our users, making talks and displaying equipment Help our users get articles published in education journals. Write articles ourselves if necessary or have them written by users. Get feature story on number of DEC machines in independent schools and in Federal projects. Ask users to allow us to use quotations by them in articles which we write.

Loan machines to colleges teaching summer courses in programming. Most of these courses are sponsored by NSF.

Work closely with people at the Federal and State supervisory level. Hold seminars for people at this level. Encourage them to visit places like Project LOCAL (Mass.), The Huntington Project (N.Y.) and computer instruction network (Oregon). Make concentrated effort to place machines in State Teacher Training Colleges.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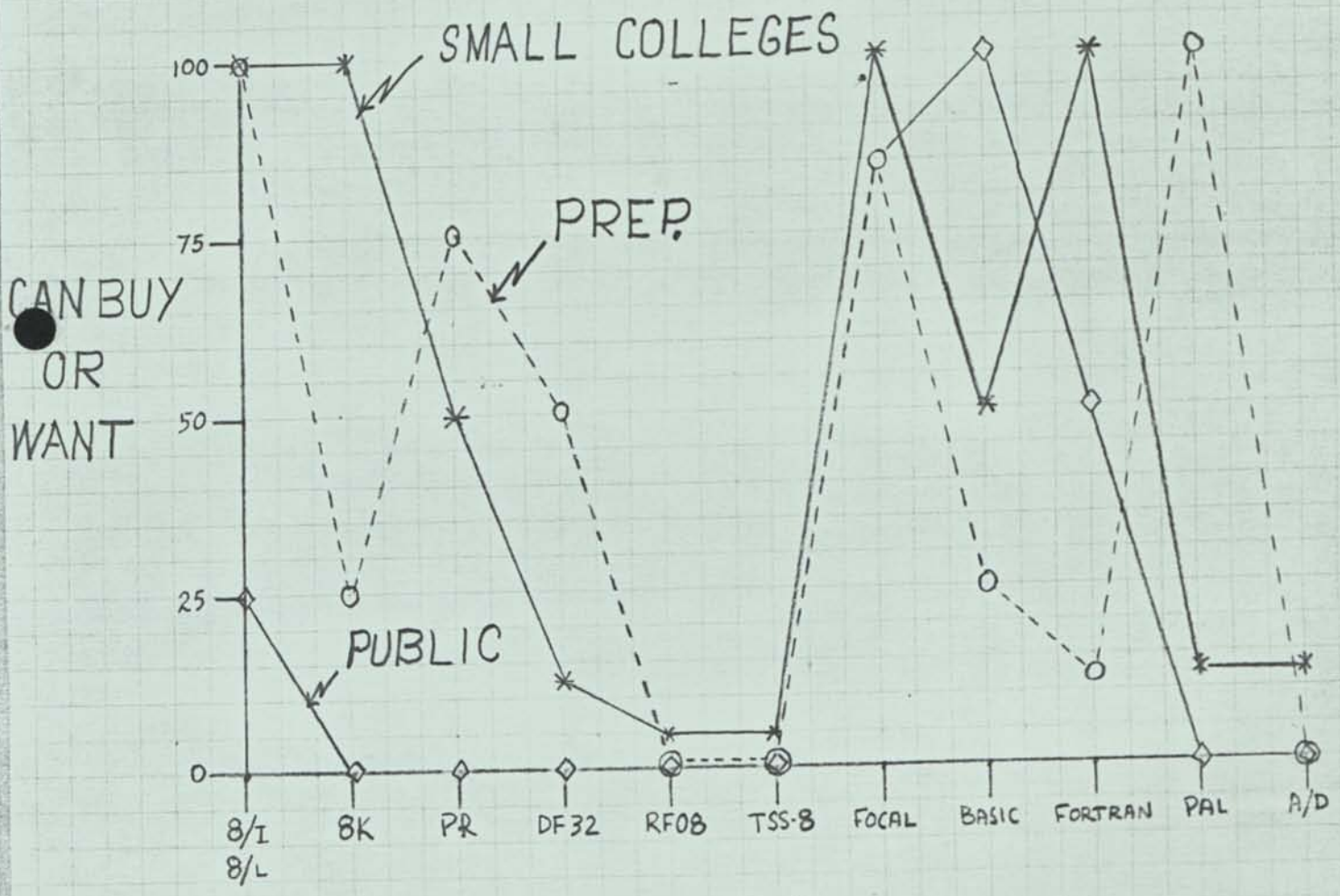
SMALL COLLEGES
PREP.
PUBLIC
CAN BUY OR WANT
100
75
50
25
0
8/I
8/L
8K
PR
DF32
RF08
TSS-8
FOCAL
BASIC
FORTRAN
PAL
A/D
CONFIGURATION

MAINE

School	Enrollment	Graduate	Remarks	St. Mark's Index Enroll.	St. Mark's Index Graduate
Berwick Academy	200	58		.83	1.35
Gould Academy	350	99		1.45	2.3
Bridgten Academy	150	115		.63	2.7
Higgins Classical Inst.	260	73		1.1	1.7
Fryeburg Academy	526	140		2.2	3.3
Hebron Academy	215	74		.9	1.7
Kent's Hill	280	90	Dart.T.S.	1.15	2.1
Maine Central Academy	520	218		2.2	5.1
N. Yarmouth Academy	155	50		.65	1.15

NEW HAMPSHIRE

Procter Academy	180	43		.75	1.0
Cardigan Mt. School	170	51		.71	1.2
St. Paul's	450	96	Dart.T.S.	1.9	2.2
Phillips Exeter	821	245	Dart.T.S.	3.4	5.7
Kimball Union Academy	215	69		.9	1.6
New Hampton School	275	86		1.15	2.0
Holderness School	185	40		.77	.93
Tilton School	300	87		1.25	2.0

VERMONT

Lynden Institute	500	113		2.1	2.6
Putney School	190	53		.8	1.2
St. Johnsbury Academy	715	162	Dart.T.S.	3.0	3.76
Vermont Academy	219	67		.9	1.5

CONNECTICUT

Pomfret	215	50		.9	1.15
Taft	383	96		1.6	2.2

MASSACHUETTS

School	Enrollment	Graduate	Remarks	St. Mark's Index Enroll.	Graduate
Abbot Academy	262	78		1.1	1.8
Brooks School	230	47	CAC	.96	1.1
Phillips Academy	850	251	Dart CAC	3.5	5.0
Cushing Academy	235	93		.98	2.16
Belmont Hill	330	58	T.S.	1.38	1.38
Thayer Academy	561	100		2.3	2.3
Chauncey Hall	125	120		.52	2.8
Browne & Nichols School	360	37		1.5	.86
New Prep School	250	100		1.05	2.32
Concord Academy	230	65	T.S.	.96	1.5
Middlesex	205	41	T.S.	.85	.95
St. Joh's Prep	603	120		2.5	2.8
Noble & Greenough	230	46	DEC	.96	.98
Deerfield Academy	518	161	T.S.	2.16	3.7
Williston Academy	460	103		1.9	2.4
Cornwall Academy	155	71		.65	1.65
Groton School	200	36	CAC	.83	.83
Lawrence Academy	240	49		1.0	1.15
Cranwell School	240	53		1.0	1.25
Lenox School	230	70		.96	1.65
Windsor Mt. School	235	70		.98	1.63
Tabor Academy	415	113	BBN	1.7	2.62
Milton Academy	290	59	CAC	1.2	1.35
Milton Acad. Girls Sch.	190	37	CAC	.79	.86
Mansen Academy	175	55		.73	1.25
Walnut Hill	190	62		.79	1.45
St. Sebastian Country Day School	230	50		.96	1.15
Mary A. Burnham Sch.	225	70		.94	1.6
Mt. Hermon School	618	180	T.S.	2.6	4.2
Northfield School	585	162	T.S.	2.4	3.75
Berkshire School	315	66		1.3	1.55
St. Marks	240	43	DEC	1.0	1.0
Governor Dummer	285	76	DEC	1.2	1.75
MacDuffie School for Girls	340	74		1.43	1.72
Chapel Hill School	170	46		.7	1.1
Dana Hall School	420	116	Local	1.75	2.7
The Cambridge School	320	70	Local	1.35	1.62
Revere Country Day Sch.	230	33	Local	.96	.77
Wilbraham Academy	300	77		1.25	1.8
Assumption Prep	395	91		1.65	2.1
Worcester Academy	430	142		1.8	3.3

RHODE ISLAND

School	Enrollment	Graduate	Remarks	St. Mark's Index Enroll.	St. Mark's Index Graduate
Portsmouth Priory	220	45		.915	1.05
St. George	215	57	DEC	.9	1.3
Lincoln School	408	52		1.7	1.2
Moses Brown School	570	64		2.4	1.5

CONSULTANTS ON EDUCATIONAL DATA SYSTEMS
15 High Street
Plymouth, New Hampshire 03264

WILLIAM S. CLARK, JR.
BRUCE RYAN

May 3, 1969

Digital Equipment Corporation
Maynard, Massachusetts

Dear Sir:

Is there a credibility gap in the field of computer usage?

We feel there is, particularly between school administrations and the computer industry. Certainly a few schools have experimental systems in the instructional area, and a few others are using computer services in their administration; but for the vast majority of schools, the computer impact is non-existant.

Why?

Probably because school administrations are unaware and afraid of what the computer really is and can do.

What can be done?

We feel that an unbiased educational program administered by people who understand both the computer field and the problems of school administrations is the starting point in the elimination of this credibility gap. To maintain continuity in this program, it is also necessary to make available to the administrations unbiased answers and suggestions to their questions.

We are currently organizing just such a program and need a broad data base to make suggestions as to exactly what is available in the areas of hardware, software, and services. In order that your firm may be considered in our recommendations, we would appreciate your sending us all materials which you would deem important in this endeavor.

Yours truly,

William S. Clark, Jr.

William S. Clark, Jr.

WSC/kjc

digital INTEROFFICE MEMORANDUM

DATE: May 21, 1969

SUBJECT: Appointments to Executive Secretarial Classification

TO: Operations Committee

FROM: Personnel (John Murphy)

The supervisors of the following senior secretaries have proposed that they be reclassified to executive secretaries (see attached job description):

Elsa Carlson
Margaret Rand
Barbara Fiske
Janet Buscemi

/gl

Executive Secretary (IBM Code ESC) (Wage Class 2)

Must be capable of performing the most complex secretarial assignments with a minimum of supervision. Responsibilities include dictation, typing, preparing correspondence, arranging schedules and alleviating, wherever possible, in behalf of supervisor, administrative details. Interfaces regularly with department managers and individuals outside of the Corporation. Generally reports to an officer of the Corporation. This position represents the highest level within the secretarial family of jobs. Appointment to this level must be approved by the Operations Committee.