CONFIDENTIAL

SPECIAL OPERATIONS COMMITTEE MEETING

(Including Bill Long, Larry Portner, Joe St. Amour, Bob Savell)

August 25, 1969

AGENDA

1. Analysis of Sales Expense - (Ted Johnson)
   (See attached report)

2. New Forecasting Procedure - (Pete Kaufmann)
   (See attached report from Dick Moeller and Bill Hanson)

3. Justification of 4th Quarter 1969 Budget Variances - (Gabe d'Annunzio, Bob Lassen, Nick LoRusso, Dave Packer)
   (See attached reports)

4. Comparison of 4th Quarter Budget With 4th Quarter Actual and Review of 1st Quarter 1970 Budget - (Dick Clayton, Al Devault, John Jones, Bob Lane)
   (See attached reports from Clayton, Devault, and Jones)

5. Review of Monthly Financial Report
   (See attached report)

CONFIDENTIAL

OPERATIONS COMMITTEE MINUTES

August 25, 1969

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

Also Present: W. Long, L. Portner, and R. Savell

Due to the presence of other managers, the minutes from the previous meeting were not presented. They will be included at the next meeting.

1. Analysis of Sales Expense

   The Committee unanimously agreed that they want Ted to gain Positive Control over the Sales Force in meeting their Product Line Budgets. Brewster will work on other methods of charting.

2. New Forecasting Procedure - Pete Kaufmann

   General reaction is that the system looks good, and that we should give it a try. They (Dick Moeller and Bill Hanson) will guarantee that it will be obvious who makes mistakes.

3. Justification of 4th Quarter 69 Budget Variances

   Brewster's people will now report on their reactions to reports which were given.

4. Literature Standardization

   Product Lines must print handbook first, then the brochures will be accepted. All exceptions to this are subject to approval by the Operations Committee.

5. Review of Monthly Financial Report

   Win would like us to review reports on the 4th Monday to give the Product Line Managers time to write their summaries. Brewster would still like to keep it on the 3rd Monday.

   Frank Kalwell will write a report covering the areas where he went over in July, and those areas where he will go over in the coming year.

The Operations Committee will meet next Tuesday, September 2, 1969

cag

digital INTEROFFICE MEMORANDUM

DATE: August 20, 1969

SUBJECT: ANALYSIS OF SALES EXPENSE

TO: Operations Committee

FROM: Ted Johnson

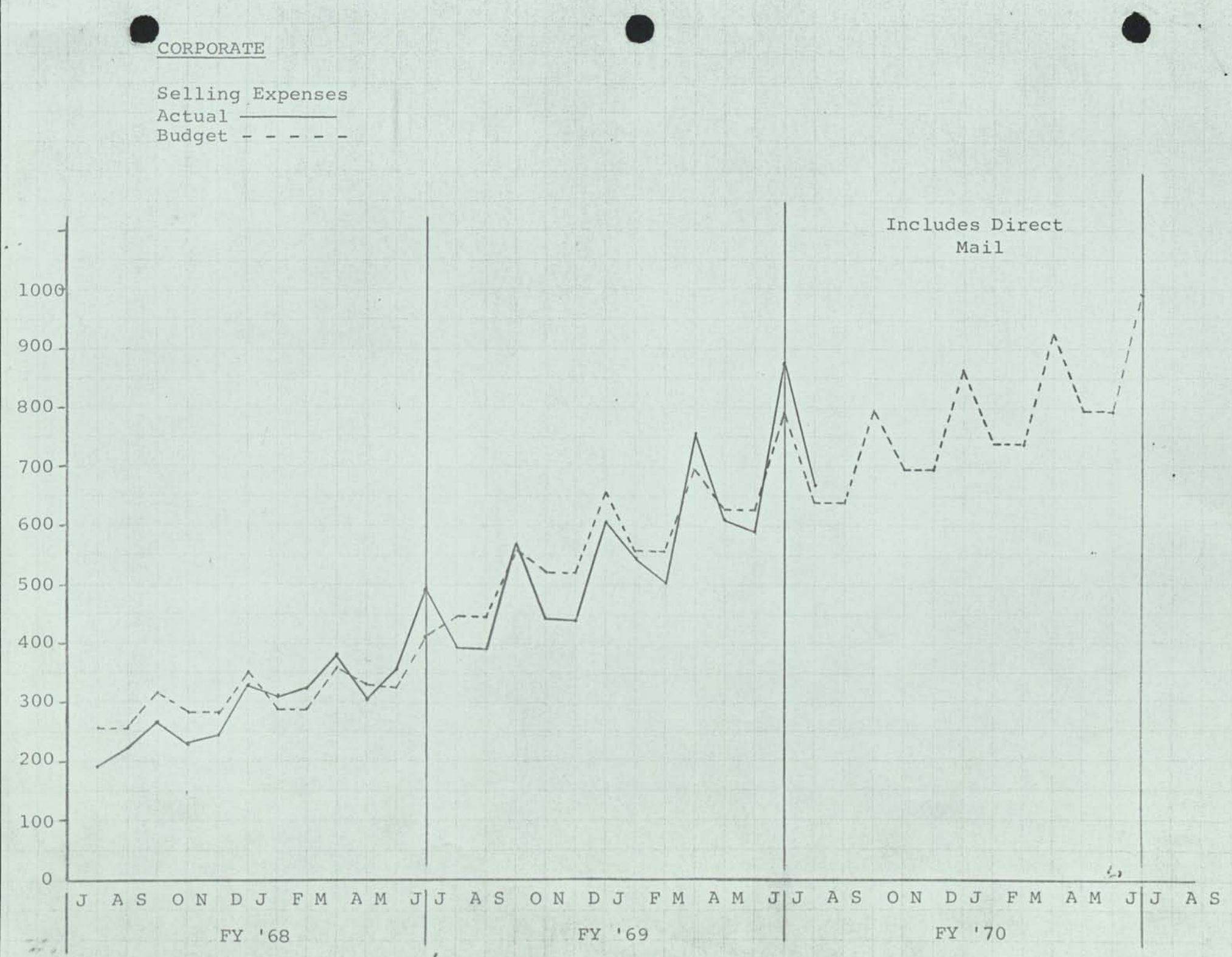
I haven't had an opportunity to present an analysis of sales expenses and how we are going to get in line. I have, instead, charted out sales expenses against budget, two-year actual and Fiscal Year '70 budget. I believe this puts the actual to budget control plan in clearer perspective.

Ted

mr

Enclosure

CORPORATE

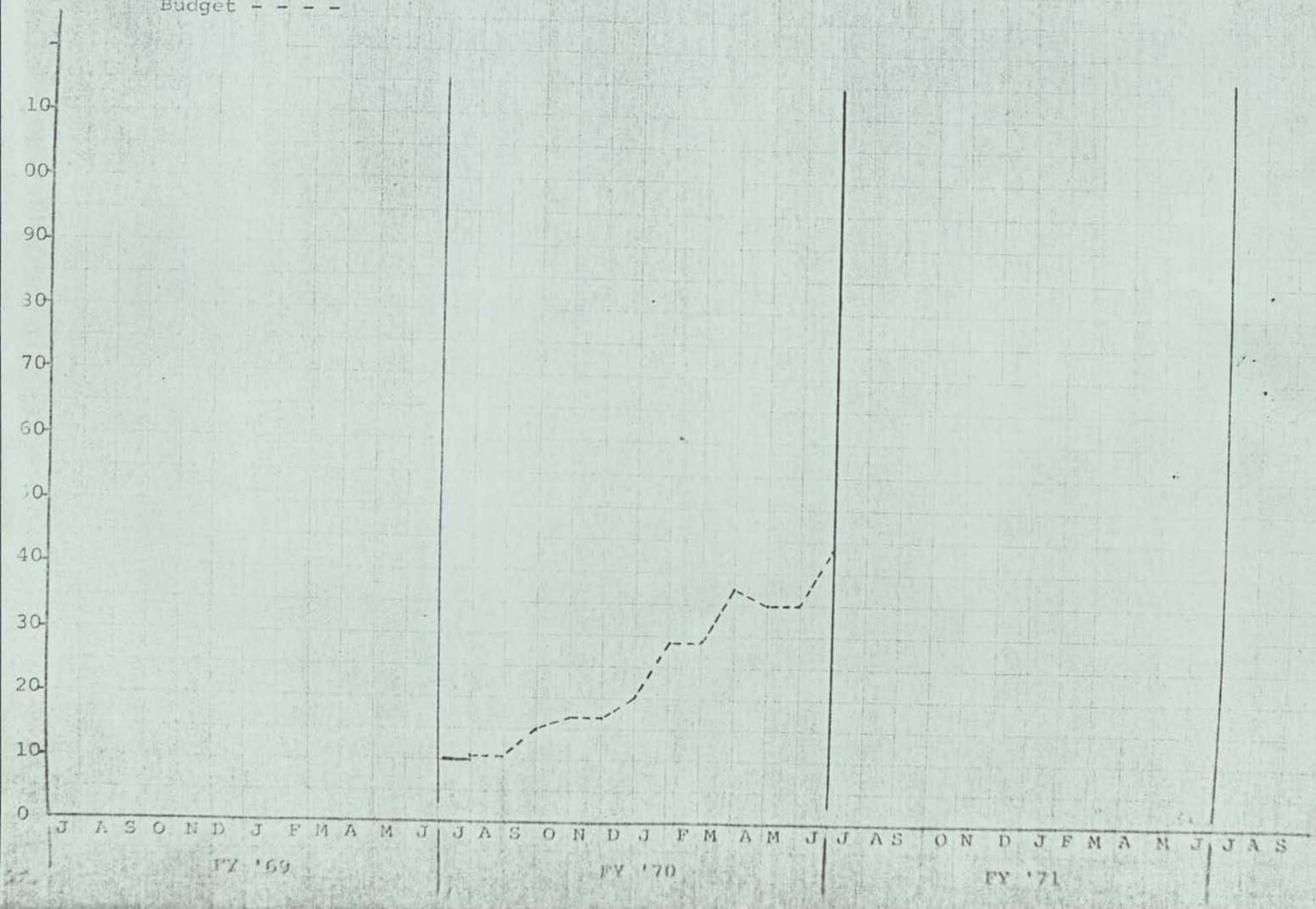

Selling Expenses
Actual
Budget
Includes Direct Mail
1000
900
800
700
600
500
400
300
200
100
0
J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S
FY '68
FY '69
FY '70

MODULES

Selling Expenses
Actual _____
Budget - - - - -

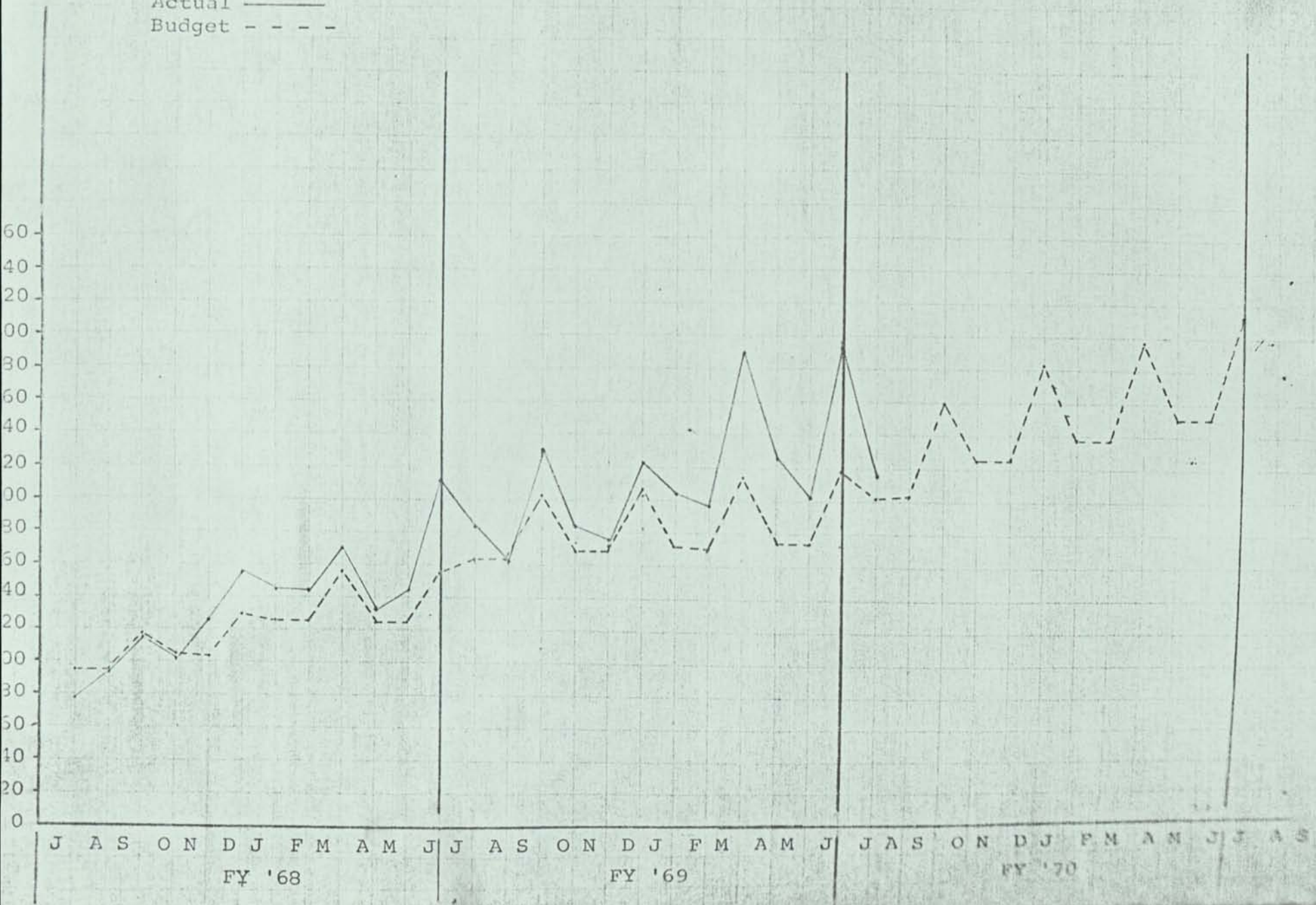
PDP 14

Selling Expenses
Actual ————
Budget - - - -

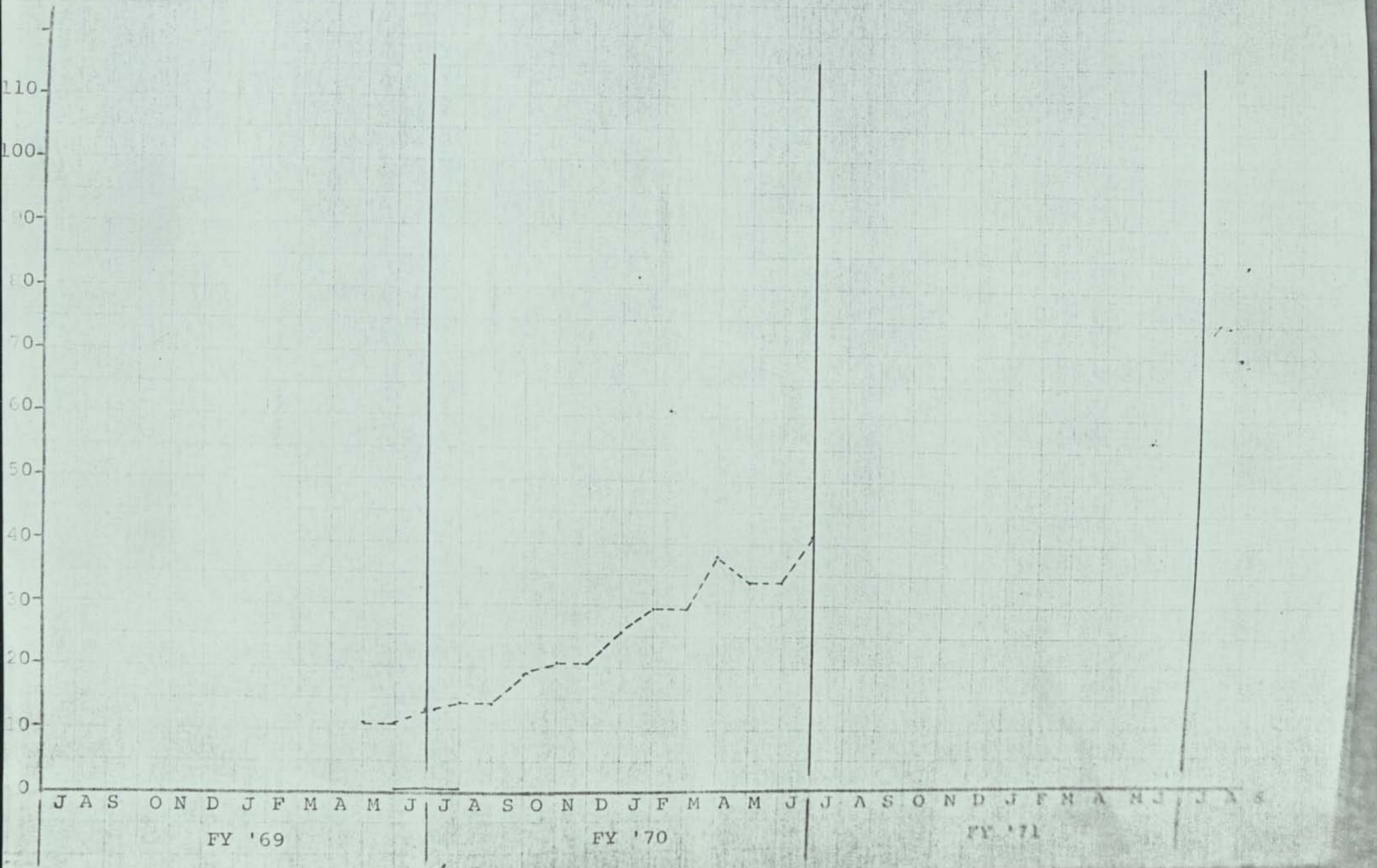


8 Fam - FY 68, FY 69
PDP 8/I & 8/L - FY 70

Selling Expenses
Actual ———
Budget - - - -



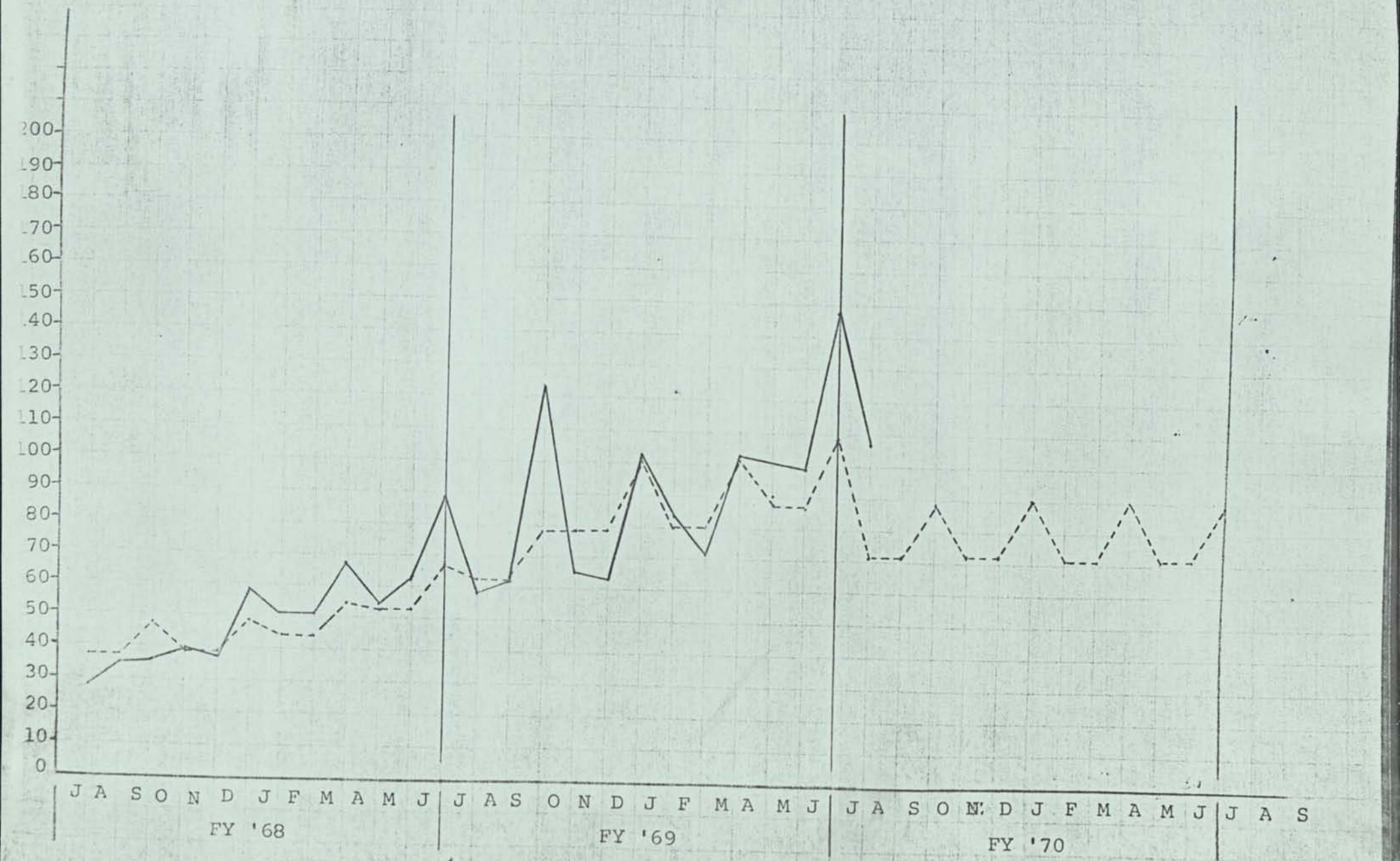
Selling Expenses
Actual _____
Budget - - - - -



L-8, PDP 12


Selling Expenses
Actual
Budget
110
100
90
80
70
60
50
40
30
20
10
0
J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S
FY '68
FY '69
FY '70

Selling Expenses
Actual ——————
Budget - - - - -

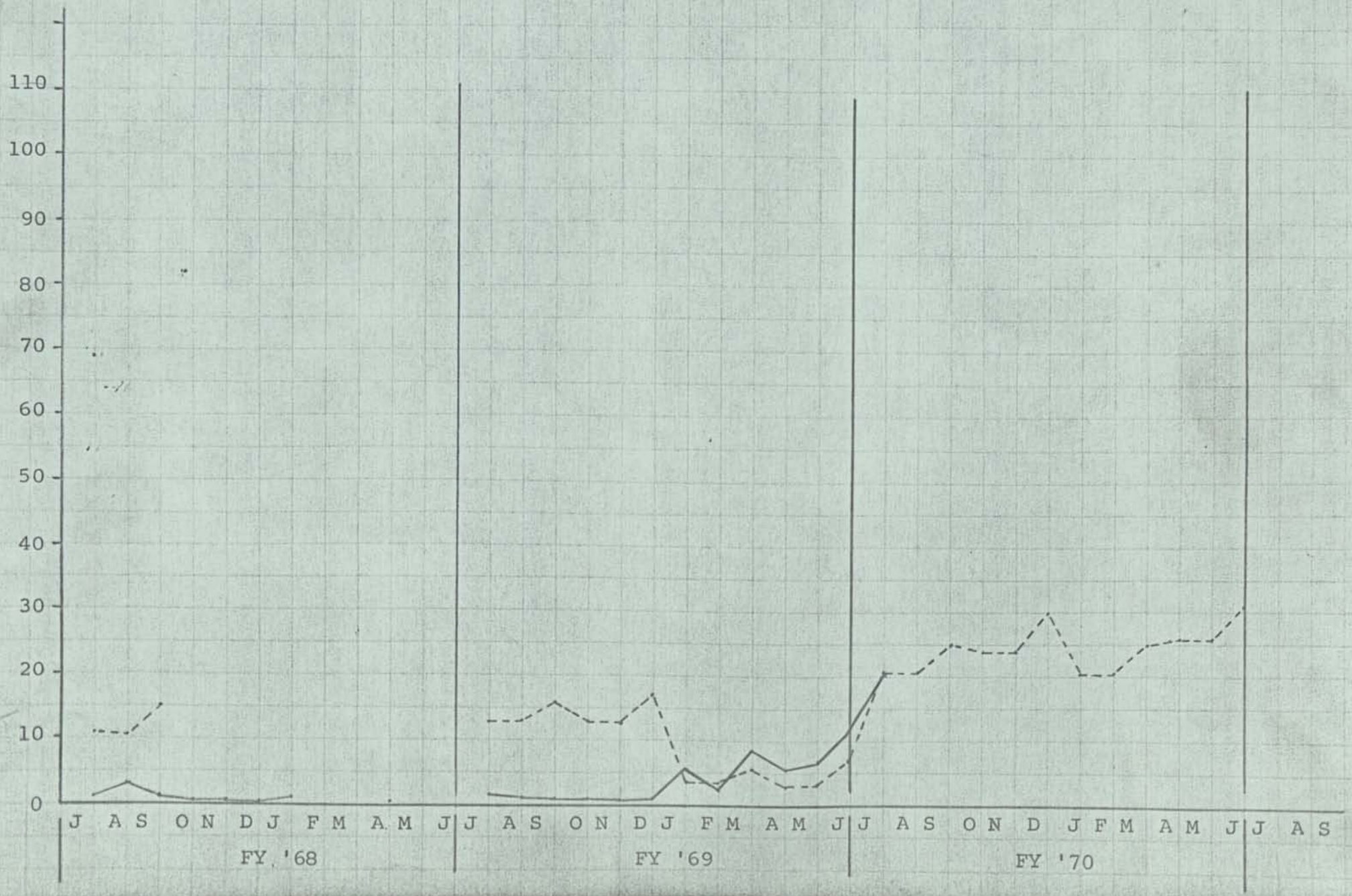


FOP 10


Selling Expenses
Actual
Budget
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S
FY '68
FY '69
FY '70

TPL

Selling Expenses
Actual ———
Budget - - - - -



digital INTEROFFICE MEMORANDUM

DATE: August 13, 1969

SUBJECT: PROMOTIONAL LITERATURE BUDGET DISCREPANCIES

TO: Operations Committee FROM: Gabe d'Annunzio

cc: C. Rix

It is apparent that some of the basic budgeting ground rules that I have been following are not in keeping with the Company's budgeting goals. In particular, I have placed major emphasis on meeting my budget goal on an annual basis rather than quarter by quarter. I was led to believe that quarterly fluctuation over or under budget was tolerable as long as the year end figures came within the original budget plan. I also operated under the premise that advertising and promotional literature should be treated as a lump sum, allowing me to shift funds from one area to another as a means of maximizing our promotion cost effectiveness. This shifting was helpful but did not completely compensate for the fact that during FY-69 we developed our entire PR operation from ground zero using funds assigned to the promotional literature line on the budget. Furthermore, we did this without asking for a budget adjustment at mid-year.

Here are some particular points which relate to the fourth quarter budget:

- Advertising for Q4 was $13K under budget. Trade Shows were $3K under budget. Promotional Literature was $128K over.

- Four major projects (the 1969 Logic Handbook and three product summary brochures) were originally budgeted for Q3. Late billing on the handbook and a shift in schedule for the brochures (all were moved up to be available at SJCC) accounted for $108,000 being shifted into Q4. Note that in Q3 we were $103,000 under budget.

- Several product lines anticipated a tight first quarter for FY-70 and applied considerable pressure to complete and pay for certain promotional literature projects in Q4. Some projects were, in fact, completed, although most will wind up being paid for in FY-70, Q1.

/meb

INTEROFFICE MEMORANDUM

DATE: August 8, 1969

SUBJECT: PERSONNEL DEPARTMENT BUDGET PERFORMANCE

TO: Operations Committee

FROM: Bob Lassen
Mike Dowling

For the 4th quarter the Personnel Department spent $427 K which was $96 K over the December revised budget. However, in comparison with the budget approved by the Operations Committee on February 15, 1969, of $438 K, actual expenditures were $11 K under budget. The February budget was submitted to and approved by the Committee as a result of increases in the hiring projection of 90 professional, 30 field service engineers, and 100 hourly employees over and above the forecasts available at the December rebudgeting.

We should be able to meet our projected hiring requirements in the hourly personnel and field service areas (Chambers) with the funds allocated, barring any increases over the present forecasts in these areas.

However, in the professional area (Thayer) the manpower forecasts for Q1 have increased 40% over the estimates agreed upon by the Operations Committee in May (see attached). Our first quarter budget, in addition to being based on lower estimates, was further cut by $60 K in late May at the suggestion of the Operations Committee that employment advertising be curtailed. We are now faced with the situation of being unable to meet the Company's professional hiring needs with the funds available, and we expect to come to the Operations Committee shortly with a proposed budget increase.

If the request for additional funds is approved, we would expect to spend $30 K over our Q1 budget in order to begin building up our recruiting efforts. We do not expect to increase the rate of hiring until Q2 due to the normal time lag involved in applicants responding to ads and working through personnel agencies. We would not be able to wisely spend more than $30 K additional in Q1, but we will also need to spend additional funds over our budget in Q2 and Q3 in order to meet the requirements for the remainder of FY 70.

MJD/jfr
Enc.

PROFESSIONAL MANPOWER FORECAST

FY 1970 -

(Based on Approved Manpower Forecasts)

July 15, 1969

GROUP	Q1	Q2	Q3	Q4	Totals
Johnson	10 (6)	9	18	13	50
Hindle	34(15)	30	8	4	76
Mazzarese	21(15)	15	7	5	48
Olsen	8 (3)	12	3	1	24
Kaufmann	22(14)	19	7	3	51
Kopp	4(11)	2	2	0	8
Total Additions	99(64)	87(43)	45(31)	26(20)	257(158)
FY 70 Replacements	40	40	40	40	160
Total Adds & Repl.	139	127	85	66	417

The numbers in parentheses represent the forecasts developed in May by the Operations Committee with Graydon Thayer and Bob Lassen.

In addition, we have strong indication that the forecast of 417 Professional Hires will increase.

Ken

digital INTEROFFICE MEMORANDUM

DATE: August 13, 1969

SUBJECT: 4TH QUARTER BUDGET VARIANCE EXPLANATION FOR C.C. 641 - OFFICE SERVICES

TO: Operations Committee FROM: Nick LoRusso

In December of Fiscal 1969, the Office Services budget was in order. At that time the Legal, Insurance and Office Services staff were given an opportunity to revise their budget, but did not elect to do so. The factors which led to an unfavorable variance in the last quarter are poor planning and unexpected expenditures. The following is an explanation of those variances.

	Unfavorable $ Variance
INSURANCE PREMIUM	
Increased property value was not anticipated.	19,000
LABOR - ED SCHWARTZ - PERSONAL	
Payment to Ed Schwartz charged to Office Services	25,000
LABOR - LEGAL PERSONNEL (NOT BUDGETED)	
(1) Secretaries 3.0/ Qtr. (2) Lawyer 3.0/ Qtr.	6,000
LABOR - OFFICE SERVICES	
(1) Communications Engineer was hired per the request of the Operations Committee	11,000
(2) Receptionists were needed to replace two Pinkerton Guards. This decision was made after the December 31st budget revision.	
(3) Warehouse attendant for scrap and obsolete equipment.	
In general, the need for Office Services Personnel was underestimated.	
TRAVEL - LEGAL	
Probably the result of additional legal personnel.	1,000
LEGAL FEES	
Fees paid to various states for issuance of new stock issue was not anticipated.	12,000

	Unfavorable $ Variance
STATIONERY	
A decision was made in February to change from Xerox machines to Bruning machines. Bruning machines require more stationery expense but less rental costs. This reduced our rental account but savings are not shown because of invoices submitted by Xerox that were six months to a year old.	16,000
FAVORABLE VARIANCES	(11,000)
TOTAL INFAVORABLE VARIANCE 4TH QUARTER	$79,000

I fully expect to operate within the budget for the first quarter. This may not be evident from first month results due to:

1. Quarter billings
2. Rental of St. Bridget's charged to Office Services
3. Ed Schwartz' salary charged to Office Services
4. Patent Attorney fees charged to Office Services

Nick LoRusso

digital INTEROFFICE MEMORANDUM

DATE: August 13, 1969

SUBJECT: Fourth Quarter 1969 Budget Variance, CC649, Systems and EDP

TO: Operations Committee FROM: David W. Packer

Total variance was 68.7K. It was caused by 3 major items.

1. Keypunch subcontracting. 30K over original budget.
Unanticipated load in keypunch area plus a shortage of operators required use of outside vendors for a significant volume of work.

2. Consulting Fees (Lybrand's). 19K over original budget.
This item not included in original budget, but approved in October 1968.

3. Labor, Overtime, and Fringe Benefits. 12K over original budget.
Reflects extensive use of overtime and hiring more people in the operations area to meet the workloads well above original plan.

DWP:tw

digital INTEROFFICE MEMORANDUM

DATE: August 20, 1969

SUBJECT: PDP-12, LINC-8 Detailed Analysis of Q4 FY 1969

TO: Operations Committee FROM: Richard Clayton

Attached is a detailed analysis of the budgetary variances in the combined budgets of PDP-12 and LINC-8 for Q4 FY 1969. The Actual, Budget, and Variance figures are shown for various budget lines and in each case an explanation of the reasons for the variance are included. The lines covered are:

1) Net Operating Revenue

2) Engineering Expenses

3) Warranty and Installation Expenses

4) Selling Expenses

1) NET OPERATING REVENUE

The three components to NOR for the PDP-12/LINC-8 operation for Q4 FY 1969 are:

	Jan. Budget	Actual	Variance
LINC-8 Sales	200	160	(40)
LINC-8 Maint. Income	60	67	7
PDP-12 Sales	1,660	300	(1,360)

The unfavorable profit variance created by the lack of shipments (660K profit) is far and away the most significant aspect of the PDP-12 Budget for Q4 FY 1969.

There are three significant failures in the PDP-12 project that contributed to the substantial shipment delay. These are:

a) Incorrect estimation of the amount of engineering remaining and understaffing in the engineering area.

b) Planning on Production Engineering doing substantially more than they were capable of accomplishing.

c) Complete miscalculation of the Production Parts Control and Ordering System by the Product Line.

During Q2 and Q3 a great deal of responsibility was turned over to our production parts control operation in various forms. Because this was the first major project in many months and because of other production pressures, the parts situation got completely out of control. The recovery of this item decreased the effectiveness of already inadequate Engineering and Production Engineering groups. The engineering delays thus created served to further complicate the project.

The lack of resources under the direct control of the PDP-12 Production Group and the inexperience of that group in the early stages made the already difficult parts flow and start-up problems even worse.

The addition of six totally untrained technicians decreased the output of those who were productive, although the lack of parts flow prevented this from being a gating factor.

In summary, both the Product Line and Production significantly underestimated the requirements to turn on a $15 million project with a relatively new product.

2) ENGINEERING EXPENSES

The combined shared engineering expenses totaled 40K which provides a favorable variance of 10K. Because of the lack of billings this figure represents approximately 8% of NOR.

The remaining engineering expenses come in Product Line Engineering which are shown below.

PRODUCT LINE ENGINEERING

	April	May	June	Q4
Budget	26.2	26.2	32.6	85.0
Actual	38.1	52.3	45.1	135.5
Variance	(11.9)	(26.1)	(12.5)	(50.5)

Production Engineering expenses were 23.4K of which a total of 4 man months of direct labor were actually accrued. This accounts for half the expenses at best. The remaining 12K is limited release modules which go into machines for shipments but appear as an engineering expense. We did not budget substantial quantities of production parts under engineering expenses. We are now working with Mike Dowling to get an automatic way of getting these costs into a Cost of Goods Sold.

Another 10K of extra expense was accrued in the Model Shop. Again the limited release module problem as well as module rework for production systems was not budgeted for in the way it happens.

Another 10K of extra expense exists in Drafting; this is due to incorrect estimation of the PDP-12 completion date. As the project goes on there are continuing expenses.

The remaining 10K is scattered in many engineering places and is due to budget errors and an all-out effort to speed up the shipment process wherever things could be done.

3) WARRANTY AND INSTALLATION

	April	May	June	Q4
Budget	40.6	40.6	50.8	132.
Actual	39.0	19.3	54.8	113.1
Variance	1.6	21.3	(4)	18.9

Because of the lack of shipments one would expect this expense to be lower. In Q4 there is approximately 30K in training of field people, and 50K in the Field Service Acceptance and Support Groups which represents a fixed expense. The remaining 30K is actual service charges for a few PDP-12's, the PDP-12 demo machines, and LINC-8 warranty expenses which were over budget.

4) SELLING EXPENSES

A. Field Sales:

All the variance occurred in June, and there is no chance of controlling the third month of Q4 after the fact.

Combined Field Sales PDP-12, LINC-8

	April	May	June	Q4
Jan. Budget	50.5	50.5	63.0	164.
Actual	50.8	47.9	78.6	177.3
Variance	(.3)	2.6	(15.6)	(13.3)

B. Product Line Marketing

This expense was exactly as estimated; note that the accounting division of a Quarter is absolutely flat over 13 weeks while our planned expenses were on a growth curve.

	April	May	June	Q4
Jan. Budget	23.4	23.4	29.2	76.
Actual	17	23.2	32.5	72.7
Variance	6.4	.2	(3.3)	3.3

C. Advertising, Promotional Literature, and Trade Shows

	Q3	April	May	June	Q3 & Q4
Jan. Budget	58	17.9	17.9	22.2	116
Actual	49	23.5	16.3	47.8	136.6
Variance	9	(5.6)	1.6	(25.6)	(20.6)

This segment of the PDP-12 Budget should be viewed over two Quarters. The variance to deal with is the 20K for combined Q3 and Q4.

4K of this variance is error charges to be returned in Q1 1970. 10K of the variance comes from the PDP-12 Brochure which was planned at 8K, the final estimate before printing was 10K and the actual cost 20K. 3K was overcommitted projects and a lack of clear understanding of what expenses were to be assigned from corporate projects. As of this date, the remaining 3K has not been found.

Due to better product control at this time, we are in a much better position to monitor these activities.

A. Devault 8-11-69

- CONTROL PRODUCTS -

FY69, Q4 to FY70 Q1, Comparison

	Variance	Dec 31 revised Budget Q4	Actual Q4	Budget Fy 70 Q1
Bookings	(0.40)	3.60	3.20	3.20
NOR	(0.10)	3.00	2.90	2.70
ENGRING	(0.14)	0.30	0.45	0.35
SALES	.07	0.48	0.41	0.41
MKTING	(0.10)	0.20	0.30	0.25
G + A	(0.01)	0.16	0.17	0.16
PBT	(0.24)	0.74	0.50	0.60

COMMENTS:

1. Unfavorable profit variance

   A. Logic Handbooks budgeted for 3rd quarter $60 K

   B. PDP-14 Marketing anticipated for 3rd quarter $20 K

   C. Engineering - preproduction material costs for the PDP-14 not considered engineering expense $120 K

   Total $200 K

2. First quarter probability is excellent

digital INTEROFFICE MEMORANDUM

DATE: August 12, 1969

SUBJECT: PDP-15: COMPARISON OF Q4 BUDGET TO Q4
ACTUAL AND COMMENTS ON Q1 BUDGET

TO: Operations Committee FROM: John A. Jones

line 1. Shipments (911)
Production loading problem?
an enormous March $ 1,700 K Followed by
a disasterous April 488
and a poor May 774
made even Junes' 2,398 inadequate for our quarters needs

PDP-9 and 9/L backlog at end of Q4 was up to $4,779K

Continued inability to get disks hurt.

Q1 budget too conservative, has been raised to 2,700 and may get higher.

line 15. Warranty expense (28)
This was a 14% over run for Q4 but the budget looks very bad for Q1. Jack Shields is working the problem. We should have a seperate memo from him by 8/18.

line 21. Margin on Equipment (238)
Margin as a % of shipments actually exceeded budget.

line 22. Margin on Rentals (21)
Margin as a % of rentals was on budget

line 23. Margin on Service (18)
This margin has fallen and also represents a clear budget problem for Q1; to be solved with Field Service.

line 40. P.L. Engineering (58)
$ 30K of this overrun is for modules going into systems to be shipped.
$ 10K bad charges to be corrected (to another product line)
$ 18K Q3 events moving into Q4
Q1 budget increased 4% to 537K. Seen as reasonable

line 41. Shared Engineering (38)
Over run due to write off of TU79

line 42. Mfg. Projects (11)
No information

line 50. P.L. Mktg. (6)
The Q1 budget is tight and has already been raised from $97K to $111K.

line 51. Selling (63)
Expenses over budget in Q4 and continue over budget in Q1. Expect a seperate memo from Ted who is working on this problem.

line 52. Adv. and Promotion (48)
$15K Q3 events moving into Q4
10K Q1 events that were pre-charged in Q4
23K bad P.L. Management
Q1 budget appears reasonable

line 61 Administration Expense (87)
No information

line 70 P.B.T. (582)
Q1 Budget has been changed from (55) to 120

cc: Phil Feeney

ph

	Better (Worse)	4th Qtr. Budget	4th Qtr. Actual	1st Qtr. Budget Original	1st Qtr. Revision #1
Beginning Backlog			3,759	5,309	5,309
	398	4,600	4,998	3,600	3,600
	(911)	4,600	3,689	2,330	2,700
	23	(46)	(23)	(7)	(7)
	(10)		(10)		
	160	(368)	(208)	(123)	(123)
	(738)	4,186	3,448	2,200	2,570
	(28)	60	32	24	24
	1	200	201	258	258
	(765)	4,446	3,681	2,482	2,852
	523	1,980	1,457	1,025	1,187
	(28)	196	224	160	165
	5	31	26	9	9
	500	2,207	1,707	1,199	1,361
	7	12	5	10	10
	(19)	140	159	181	181
	488	2,359	1,871	1,390	1,552
	(238)	1,979	1,741	1,001	1,209
	(21)	48	27	14	14
	(18)	60	42	77	77
	(277)	2,087	1,810	1,092	1,300
	(58)	460	518	518	537
	(38)	138	176	50	50
	(11)	24	35	11	11
	(107)	622	729	579	598
	(6)	124	130	97	111
	(63)	301	364	240	240
	(48)	41	89	46	46
	(117)	466	583	383	397
	(87)	198	285	185	185
	6	65	59		
	(582)	736	154	(55)	120

OPERATIONS COMMITTEE MEETING

August 18, 1969

AGENDA

1. Additions and Corrections to Minutes of the August 11th Meeting, and the "Woods" Meeting on August 12th and 13th
2. Marketing Review Committee Summary - (Ted Johnson)
   (See attached minutes of the August 11th meeting)
3. Justification of Budget Variances - (Nick LoRusso/Dave Packer/Bob Lassen/ Gabe d'Annunzio)
   (See attached reports)
4. Comparison of 4th Quarter Budget With 4th Quarter Actual and Review of 1st Quarter 1970 Budget - (Dick Clayton/Al Devault/John Jones/Bob Lane)
   (See attached reports)
5. Proposed DEC Security Personnel - (John Kulik)
   (See attached report)
6. Proposed Change in Travel Advance Policy - (Brewster Kopp)
   (See attached report from Bob Dill)
7. Overdue Orders - (Stan Olsen/Nick Mazzarese/Win Hindle)
8. Proposed Termination of the GLC-8 - (Brad Dewey)
   (See attached report)

OPERATIONS COMMITTEE MINUTES

August 18, 1969

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

1. MINUTES

Minutes from the meeting of August 11th and the Woods Meeting on August 12th and 13th were approved.

2. Marketing Review Summary

This report was approved.

3. Palisades Office Space

Brewster will be a committee of one to decide on this issue.

4. Proposed DEC Security Personnel

John Kulik will come back with a short summary.

5. Proposed change in travel advance

This was approved. Bob Dill and Nick LoRusso will work together in order to close the loop in controlling travel.

6. Overdue Orders

PDP-12	- 2 million overdue
PDP-10	- 2 million overdue
Modules	- No report, but there was much discussion
Traditional	- No report

We are beginning to become overdue on Memorex Disks. We have lost ground on the PDP-8's as the overdue backlog increased from 2 million to 3.6 million in July. The problem is mainly attributed to RF/RS08 problems.

7. GLC-8

Noonan, McInnis, and Johnson and the two (2) programmers will make a list of pros and cons of PDP-8 and PDP-15 for future GLC. If they decide on the PDP-8, the "8" budget will remain intact and check points will be established.

8. Publicity

All publicity for new plants must go through Pete Kaufmann.

cag

digital INTEROFFICE MEMORANDUM

DATE: August 7, 1969

SUBJECT: Travel Advances

TO: Operations Committee FROM: R. F. Dill

Our existing company policy states that no one may get a travel advance while he has monies advanced to him from a previous travel advance which has not been cleared up by submission of an expense report.

To date adherance to this policy has been extremely hard and has caused many ill feelings due to the fact that many travelers are punctual in filling out their travel advances, but lack the necessary signatures to get it down to Accounting so that it can be received by our cashier,and posted to show that his account had been cleared.

This necessitates on our part a refusal to the individual,or if not a refusal,a subsequent checking which is time consuming and tends to frustrate not only the Accounting Dept. but also the department who is being asked to give us evidence that a travel voucher is in the pipeline. Therefore, I suggest an alternative to the existing procedure be that we allow employees two advances before we refuse additional advances as long as a one week span has taken place between the advances. Any employee who has two advances outstanding over one week old will not receive a travel advance.

egs

R. F. Dill

Ken

digital INTEROFFICE MEMORANDUM

DATE: August 13, 1969

SUBJECT: GLC-8

TO: Operations Committee FROM: Brad Dewey

SUMMARY

Because of reliability, performance, and maintenance problems with the GLC-8 software, we do not have a system which we can deliver to existing customers, nor do we have a system which we can continue to market in its present form. It is recommended that the system be temporarily withdrawn from the market until such time as a complete software rewrite is completed. Termination of the product is not recommended because of the resulting loss of good will, the present customer commitments, the substantial expertise built up in the last year, and the favorable long-term potential for the GLC-8 system.

Present System Status

1. Hardware

   With a few minor exceptions, the AF06 interface developed for the GLC-8 system has had no reliability or performance problems. It presently has a limited release to production, and the first two units manufactured indicate that it can be manufactured without undue difficulty.

2. Software

   The system software was contracted to an outside vendor (Digital Applications, Inc.) who had had considerable experience in the design and implementation of Computer systems similar to the GLC-8. The vendor implementation of the system was less than satisfactory, and he has had to make several extended trips to Maynard to assist us in the debugging of the software.

The present software has three problems which cannot be further improved upon:

a) Reliability

The system, under accelerated loading, can be made to crash in 24-48 hours. Crashes do not result in total system destruction, but rather take the form of loops in the teletype handler and the loss of Analysis Methods.

b) Maintainability

The system software is the best possible system diagnostic. It will pick up virtually all hardware problems. Unfortunately, it gives no indication whatsoever of the source of the error. Thus, a marginal hardware system will crash in a wide variety of ways, giving no indication of the problems which caused the crash. Because of this, we feel that Field Service cannot maintain the present system.

c) Low Level Performance

The performance of the system on low level peaks is not satisfactory. Good repeatability can be obtained, but the performance is very sensitive to the adjustment of the function codes (tuning parameters). Learning to properly adjust these function codes is a long and unduly difficult process.

Of the above problems, the most important are the reliability and maintainability of the system in actual use. The present system performance is acceptable on an interim basis, but is not accepted as a product line which DEC could market and obtain long-term customer satisfaction.

Customer Commitments

Three GLC-8 systems have been delivered to date, one of which does not use the GLC-8 software. The system at Gulf Research has been operating in a satisfactory manner since delivery early in February. They have, however, modified the system to their particular needs, and thus it can no longer be considered a true GLC-8 system.

The system at Enjay had severe reliability problems up until mid July. At that time, we delivered the current version of the software. They have been running without any failures since July 21. With experience, they have learned to get satisfactory results on low level peaks. and they feel that they can use the existing software until we can complete a rewrite.

We have accepted purchase orders from:

DuPont of Canada
Dow Chemical
Bayer Chemical AG
Shimadzu
Houston Chemical
Solvay Chemical

We have received, but have not accepted, purchase orders from:

Union Krastoff AG
Shimadzu
Marathon Oil
Polymer Corp. Ltd.
Imperial Chemicals (ICI)

We are within 4 weeks of closing orders at:

Montecatini Edison
Hoffman La-Roche
Ciba Chemical
Geigy Chemical
Gulf Oil Company

Reasons for Present Status of GLC-8

When we contracted the system development to D.A.I., we had a limited understanding of the total system requirements. Because of this, the contract did not adequately specify standards for system implementation, nor were we able to adequately supervise the system implementation. Having gained this understanding the hard way, we are now in a position to develop a system which can be debugged, maintained, and modified without running into the problems caused by the present system software implementation.

I have supervised both the marketing and the development of the GLC-8 system. Because of this dual responsibility, the project has suffered. From the start, there should have been an Engineer with technical responsibility for the overall GLC-8 system reporting to me. This might have enabled us to adequately test the system performance 6-8 months earlier than we actually did, thus identifying the need for a system redevelopment 6-8 months earlier. Any further development of the GLC-8 system will be directly supervised by an Engineer with overall technical responsibility for the system.

The marketing of the GLC-8 system has been based on the assumption that we had a system which adequately performed the desired job. This assumption was in turn based on the satisfactory operation of four systems designed and implemented by D.A.I. We have now determined that although the system does operate satisfactorily in certain environments, it is not entirely satisfactory for laboratories which do the greater part of their work on low level peaks.

A more appropriate approach to the marketing of the GLC-8 would have been to refrain from all marketing until we had resolved the initial startup problems at Enjay. Had we done this, our potential liability would be substantially less than it is today, and we would be in a much better position to undertake a system rewrite. As it is, customer commitments have forced us to live with the present system software much longer than we otherwise would have done. If a system rewrite is undertaken, all further marketing of the GLC-8 will be terminated until such time as we have a working, deliverable system.

Courses of Action Open

1. Correct the existing software:

   We have reached the point of diminishing returns with the existing software. My conclusion is that the existing software cannot be maintained, nor can its low level performance be improved without the rewriting of over 80% of the program. This course of action thus becomes equivalent to a complete system rewrite.

2. Terminate the product:

   Termination of the product is not recommended because:

   a) A substantial loss of good will throughout the world would result.

b) Our ability to introduce other computerpacs (Indac-8, etc.) to this market will be impaired.

c) DEC's image in this market, and possibly other markets as well, would suffer.

d) We would not be able to realize any return on the investment made to date.

e) I believe in our ability to do the job as it should have been done, and in the potential for DEC in this market.

3. Redevelop System Software:

This would require a temporary hold on the product. It is the most attractive course of action because:

a) We have the capability to successfully develop and market a GLC-8 system.

b) It would keep DEC in an emerging market with very attractive long-term potential.

c) The payback for the system redevelopment will come early in the second half of Fiscal 1971.

d) It would enable us to capitalize upon the training of programmers, field service, and salesmen which has been done to date.

e) It will minimize the loss of good will.

Recommendations

1. We undertake a complete redevelopment of the system software. The timetable for this is as follows:

Functional System Specification - Sept. 30
System ready for product test - March 1
System ready for field testing - April 1
System accepted by program library - June 1

2. We suspend the marketing of the system until the system is through product test.

3. We delay delivery on all existing purchase orders until we can deliver the rewritten system. It is expected that this will result in some cancellations. In certain cases, however, we are dealing with customers who are willing to accept a "hardware only" system (with the software supplied at no charge, but unsupported by DEC) until we can deliver the rewritten version of the software. A few customers, knowing the exact condition of the present system, are insisting on delivery. By delivering the system on the above basis, this severe sales pressure will be alleviated. This has the additional advantage of providing us with a way to field test the new software and a base of existing customers when we go back to the market.

Action Required

The approval of the Operations Committee is needed in order to implement the above recommendations. If approved, the following budget variations will result:

	Actual Fiscal 70 Budget	Proposed Fiscal 70 Budget	Variance
Bookings	$2,925	$350	$-2,575
Shipments	2,080	0	-2,080
Net Profit	527	(130)	-657

APPENDIX A

TERMINATION OF PROJECT

A. Sunk Costs

1.	GLC-8 Program Development	68,000
2.	Interface design, Engineering	48,000
3.	Support Programming, debugging, (1 man/yr.)	20,000
4.	Advertising, Promotion, Manuals, etc.	20,000
5.	Marketing Support (1½ man/yr.)	45,000
6.	Field Service Training	20,000
	Total Sunk Costs	221,000

B. Cost of Termination

1.	Work in Process	120,000	
	Less Recoverable Items	40,000	80,000
2.	Finished Goods		18,000
3.	Marketing Support		8,000
4.	Liquidated Damages (if any)		Not known at this time
5.	Loss of Good will		Not known at this time
	Minimum Total Termination Cost		106,000

APPENDIX B

REDEVELOPMENT OF SYSTEM PROGRAM

1. Programming	50,000	
2. Engineering Support	25,000	
3. Marketing Support	15,000	
4. Inventory Expense (Expense 25% of $100,000)	25,000	
5. Promotion, Manuals, Brochures	15,000	
Total Redevelopment Cost		130,000

APPENDIX C

4 YEAR SALES PROJECTION

($ X 1000)

	Current Fiscal 70 Budget	70	71	72	73
Backlog	$ 260/4	$770/11	$ 770/11	$1,120/16	$420/6
Bookings	2,925/45	350/5	2,100/30	1,050/15	0
Billings	2,080/32	0	1,750/25	1,750/25	420/6
Cancellations	0	350/5	0	0	0
Net Profit	527	(130)	432	432	105

1. Average System Selling Price of $70,000.
2. System margin projected to be 25% net before taxes.
3. Redevelopment break even point in early second half of Fiscal 71.
4. Recovery of Sunk Costs in 4th Quarter Fiscal 71.
5. For purposes of this proposal, no billings have been shown to Fiscal 70, although a modest amount is expected.
6. Incorporated in this budget is the development of a GLC-11 in Fiscal 72.

digital INTEROFFICE MEMORANDUM

DATE: August 14, 1969

SUBJECT: GLC-8 System Redevelopment

TO: Operations Committee FROM: Brad Dewey

1 PAGE SUMMARY

A. Because of reliability, performance, and maintenance problems with the GLC-8 software, we do not have a system which we can deliver to existing customers, nor do we have a system which we can continue to market it its present form.

B. Alternative solutions open at this point are:

1. Correct the existing software
2. Terminate the product
3. Redevelop the system software

C. Recommendations:

1. We undertake a complete redevelopment of the system software
2. We suspend marketing of the system until it has completed product testing.
3. We defer delivery to existing customers when possible. In certain cases, delivery of a "hardware only" system is recommended.

D. Impact on Corporate Profits

1. The current GLC-8 budget is for shipments of $2,080,000 and bookings of $2,925,000, which will not occur in Fiscal 70. However, the PDP-8 product line feels that they can find other customers for this equipment. This will minimize the impact on the PDP-8 budget.

2. The GLC-8 Expense budget will be reduced from $141,000 to $130,000.

digital INTEROFFICE MEMORANDUM

DATE: July 26, 1969

SUBJECT: Engineering and Marketing Projects
FY'70 Budget

TO: Operations Committee FROM: Bill Long

In attempting to gather data on the history of the engineering and marketing projects, one thing is immediately clear: we haven't made much effort to isolate our costs to specific projects. The entire discrete projects listing for Fiscal 1969, boils down to the following data pertinent to the PDP-8 Family:

Project	FY'69	Total
Disk Software	24.6	80.0
LAB-8	60.5	93.3
TSS-8	72.1	87.3
Communications Software	75.5	75.5
INDAC Software	38.9	38.9
A/D Support (363)	43.4	
GLC-8	77.7	77.7
Communications Hardware	49.1	49.1
PDP-8/L Development	145.6	145.6
Small Computer Marketing (8/I)	342.5	
PDP-8 Engineering (8/I)	65.4	
PDP-8 Engineering (8/L)	15.8	

All of the major marketing efforts including those internal to the PDP-8 Marketing organization have now been assigned discrete project numbers, so that next year at this time we should be able to better identify where we have spent our effort and money.

Two large engineering projects account for the bulk of the effort in the PDP-8 Engineering group: the PDP-8/L and the PDP-11.

By most standards, the PDP-8/L project has been a very successful one.

Another large piece of the engineering effort went into the development of the communications hardware for the PDP-8/I. A significant amount of money was spent in software also. In spite of the fact that this project suffered from the lack of really effective cooperation, we are delivering hardware consistent with original specifications. An inordinate amount of difficulty was experienced in getting the new communications hardware in Production. Some of that difficulty can be attributed to the personalities involved, but primarily it stemmed from the

inexperience of the individuals with the system, and the complexity of the product. We have not yet quite caught up with the notoriously late deliveries, but another month should eliminate the rest of the overdue backlog.

Another famous project this year has been the TR02. This project suffered from an unrealistic original schedule. In addition, the engineer was new to project management at Digital and learned the intricacies of the system the hard way and was not fully aware of his responsibility as project leader.

Our major new projects the coming year will be:

- a new 12-bit machine.
- CMD disk.
- positive logic options.
- new typesetting options.
- mark-sense card reader.

In the marketing area there were seven major projects. As best we can tell, the typesetting business has been very successful for us and will continue to be so next year.

Significant money was spent in the development of the INDAC system; of course, this represents a major engineering effort as well as a marketing project. This project has not progressed as rapidly as originally anticipated, but we are now proceeding in a systematic fashion with hardware deliveries beginning in October. Introduction of the product is being approached in a conservative way, in order to avoid the customer disappointment that has plagued some of the other projects.

The GLC-8 continues to be a problem. Certainly measured against the plan of a year ago, the project has been disappointing; both hardware and software problems have been consistently underestimated. From a marketing point of view, the project is an embarrassing success. There has been a broad interest in the product and our failure to deliver according to commitment has caused international badwill. I think the key in our other potential failures is prematurity. We are premature in discussing the system with customer, we are premature in committing to specifications, and we are premature in committing to customer deliveries.

The Timeshared-8 project has been victim of the difficulties experienced with the RS08 disk. Customer response is most encouraging, provided we can overcome the disk problem. I think we will be able to count this particular project among our successes; the key here is timing. We have spent and will spend nearly a quarter of a million dollars to develop the software for TSS-8. We expect that the life of the product will be limited to the next 1½ to 2 years. Thus, to accomplish an effective return we must begin to make consistent deliveries of the system.

Quickpoint-8 by itself has achieved only modest sales; there are less than a dozen installations to date. However, I think our efforts with Quickpoint has led a couple significant OEM's into the business, and through them we have more than 50 machines in numerical control applications.

The LAB-8 has been a consistent income producer. The LAB-8/L will keep us in competition with the hard-wired averagers for sometime to come. As best we can determine, I would count this in the successful.

Considered in total, our marketing effort can only be considered successful. Last year's bookings exceeded budget by better than 30%, and the rate of growth of sales seems to be at least as good as the rate of growth of the market. The continued genesis of new small computer companies is bound to make our task more difficult next year, particularly in the OEM area which we have virtually dominated in the past years.

In spite of what we know to be our advantages, there are some minuses:

- the decrease in the discount levels.
- the further penetration of the end-user market through computer paks eliminates some OEM's.
- the wiser of the new competitors are directing themselves exclusively to one market segment.
- there is a tendency for the really large users to develop a computer in-house for their purposes.

We will make a concerted effort during the coming year to maintain our hold on the OEM's, catering to our existing customers and promoting very hard at potential new ones.

Other major marketing efforts in the coming year will be directed at small computers in education, and certain segments of the business data processing market. Dick May is handling the promotion of the small computer, particularly around multi-user FOCAL, to secondary schools and small colleges. We have yet to define specifically our approach to the business data processing market.

FY'70 Budget

As the dust continues to settle, I still feel good about the FY'70 Budget.

Fiscal '69 finished up pretty much according to our expectation. The rumor of impending price increases and discount level changes caused even greater bookings activity, finally ending with a backlog of 21.3 million for the 8 Family; the PDP-8/I and PDP-8/L account for 19.6 of that total.

The discount level changes and price increases were accomplished somewhat later than planned, and order activity has been very strong during the grace period. The net result is some diminishing of the intended effect of these changes, but I think we will be able to adjust for that impact.

Except on the West Coast, there continues to be high optimism for our product and the ability of the sales force to meet its goals.

Apart from the RS08 and the GLC-8, most of our delivery problems are well on the way to solution. Our continued failure to resolve RS08 deliveries will have a serious impact on our budget; we currently have 165 customers awaiting over 240 disk surfaces. Many of the systems involved are large; for example, the Timeshared-8 systems are worth $100,000 on the average.

The effect on manufacturing is twofold: first, it is getting difficult to locate sufficient nondisk customers to maintain full Production activity; secondly, when the disks do become available there will be a tremendous strain on the Systems Group to accomplish expected machine volume. In summary, without a RS08 or equivalent, it will be difficult to achieve either our bookings or delivery goals.

All things considered, I still feel our budget is a challenging one but realizable.

WHL:pc

Bill

digital INTEROFFICE MEMORANDUM

DATE: August 8, 1969

SUBJECT: PDP-12 Budget Performance

TO: Operations Committee FROM: Richard Clayton

In Q4 FY69 bookings were about 10% over the December revised budget. However, engineering and production delays caused Net Operating Revenue to be about $1.4 million below budget, creating an unfavorable profit variance of $660K.

The remaining $160K of the unfavorable variance can be traced to:

- Warranty expenses 23% of NOR instead of 7%, causing $80K lower profits.

- Total engineering expenses were $41K over budget for the quarter. Product line engineering, Drafting, and Model Shop were the areas where costs were underestimated.

- Selling expenses were $47K over budget, almost entirely in field sales and promotional literature.

In Q1 FY70 we expect to exceed our bookings budget by about $500K, largely due to an influx of orders prior to the price change. However, we will not ship at the rate we had planned, resulting in Net Operating Revenue of $400K lower than budget. We expect field selling expenses to exceed budget by $45K, but all other controllable expenses should be in line with plan. The net result is an unfavorable profit variance for the quarter of about $275.

RJC/reb

CONFIDENTIAL

OPERATIONS COMMITTEE MEETING

August 11, 1969

AGENDA

1. Additions and Corrections to Minutes of the August 4th Meeting
2. Marketing Review Committee Summary - (Ted Johnson)
   (See attached minutes of the July 29th meeting)
3. Production Plans for Fiscal 1970 - (Pete Kaufmann)
   (See attached reports from Bill Hanson and Bob Puffer)
4. PDP-10 Cabinet - (Pete Kaufmann)
   (See attached report from Joe St. Amour)
5. Proposed Shared Product Development of Data Acquisition Products - (Ron Noonan)
   (See attached report)
6. Engineering and Marketing Plans for Traditional Products - (Bob Lane)
   (See attached report)
7. Discussion of Marketing Schedule for PDP-10 - (Dave Cotton)
8. Review of FY 1969 and First Quarter 1970 Budgets - (Nick LoRusso)
   (See attached report)

THE NEXT "WOODS" MEETING IS SCHEDULED FOR AUGUST 12 AND 13
AT KEN'S HOME ON GOVERNOR'S ISLAND, N. H.

CONFIDENTIAL

OPERATIONS COMMITTEE MINUTES

August 11, 1969

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

1. The minutes from the meeting of August 4th were accepted, with the exception of the last sentence in Item #5. This proposal was approved.

2. Marketing Review

   Only the Board of Directors may approve change of logo or possible playdown of PDP.

3. Production plans for Fiscal 1970

   This item was postponed until the upcoming Woods Meeting.

4. PDP-10 Cabinet

   When the PDP-10 group is prepared, they will come to the Operations Committee for approval of not using new cabinets.

5. Disk Problems

   PDP-8/9 will come up with priority lists for disk customers with air conditioned atmosphere. Pete will build at maximum rate. In two (2) weeks, Joe St.Amour will decide if we can ship.

6. Shares Product Development-Data Acquisition - (Ron Noonan)

   This proposal was approved.

7. Engineering and Marketing Plans for TPL - (Bob Lane)

   Bob will come back next week in order to answer the question of whether or not he believes in the budget...Discuss with Ted.

8. FY69 and First Quarter 1970 Budgets - (Nick LoRusso)

   Nick will write a formal report with conclusions.

9. Brewster will get someone to put the information together for all the people who were over budget.

cag

digital INTEROFFICE MEMORANDUM

DATE: 7 August 1969

SUBJECT: New Versus Old Cabinet - PDP-10

TO: Pete Kaufmann

FROM: Joe St. Amour

cc: Win Hindle
Bob Savell
Fred Wilhelm
Loren Prentice

Mechanical Engineering, as directed by PDP-10 Engineering, will proceed to put the new PDP-10 in the old cabinet.

I think this is a mistake and question spending in excess of $150,000 to $200,000 per year for aesthetics, particularly in view of the fact that certain options (RM-10 and MD-10) will go in the new cabinet because they cannot fit in the old cabinet. This the PDP-10 Group has already agreed upon. I'm sure other new options will also fall into this category.

Attached is the report submitted covering savings. Savings are ultraconservative and do not consider such problems as differences that must exist in standard peripherals because of a dual-cabinet system. It also adds to both material control, fabrication and inventory problems.

Happy manufacturing!

/gp

digital INTEROFFICE MEMORANDUM

DATE: August 1, 1969

SUBJECT: Estimated Cost Saving on PDP-10 Systems: The New H950 Cabinet vs. the Old Cabinet

TO: F. Wilhelm
B. Savell
W. Hindle

FROM: Alan Lyons

cc: Joe St. Amour
Loren Prentice
Ira Morris
Jim Jordan

There are two basic reasons a change to the new H950 cabinet is desireable for DEC:

1. The very large cost saving.

2. The establishment of a unified cabinet system.

The objection by the PDP-10 group to the change is the inconsistancy of appearance when selling H950 cabinets to customers wishing to expand their present PDP-10 systems.

The points raised in Alan Kent's memo of April 9, 1969, Subject: New Cabinets; apart from the question of style, are generally problems brought about by the introduction of any new major item. We feel that all of these problems can be rectified to produce a soundly engineered product.

There are at least three solutions to this problem:

1. Stay with the old style cabinet without any changes.

2. Use the new H950 cabinet without any changes.

3. Use the H950 cabinet with a modification to add the existing bezel so that it lines up with existing PDP-10 system.

The cost saving, estimated at $125.00/cabinet based on projected sales of 1400 cabinets per year, is $175,000.00. Engineering and Drafting costs for the change will be approximately $30,000.00, yielding a net saving of $145,000.00. (See Exhibit)

However, this figure is conservative. During discussions with the Tooling and Methods group the following points were made:

a) The H950 cabinet will almost certainly see a reduction in cost as improved tooling and assembly methods evolve. This is not so with the old style cabinet as it is produced by vendors and quantities are not large enough for any significant tooling changes.

b) The greatest single item on the old cabinet is the time necessary to install additional rivnuts. The cost of $123.00 for a frame shown on exhibit is based on the belief that a common cabinet for all 19" options can be designed with all holes drilled before assembly and welding of cabinet. The present cost of this cabinet is approximately $150.00.

c) Utilization of two cabinets will require duplicate engineering and drafting for items used in other product lines. It will also mean non-common shop, component and assembly practices. Finally, it will necessitate minimum inventory levels of four cabinets instead of two (19" and 30").

Proposal:

Utilize the H950 cabinets substantially as is with the exception of a few minor quality improvements. Our experience is that neither the esthetic requirements of DEC's PDP-10 customers, the PDP-10 group nor Industrial Design will be served by a halfway shift to the new cabinet.

Alternatively, as suggested in solution 3, we can utilize the H950 cabinet by modifying the top pan so that the existing PDP-10 bezel lines up with the bezel on the present PDP-10 system. However, this method will cut into the savings (not shown or estimated) from having a single system.

To this I will add an extract from the July work report of Jim Jordan:

"One of the most interesting projects with which I have been associated is an analysis of the PDP-10 old and new cabinets. It appears from the analysis that even with the most conservative figures we will be able to save about $100,000.00 by

going to the new cabinet over the period of a year, or as much as $ 250,000.00. My feeling is that if we are not able to make the translation from the old to new cabinets completely that we should not take half measures. The primary problem here is one of esthetics and compatibility of the old system with the new system. My esthetic judgement is that to try to go half way is to perpetrate a completely unsatisfactory solution on the product line and the public. With this solution we will have neither good appearance nor compatibility of old and new systems. My experience is that small changes look more like mistakes than a bold selection of alternatives. One of the ways in which we may effect the change is that in those cases where we sell new systems in the new cabinet to customers with old cabinets, we offer to provide floor plan site preparation that will minimize the desparity between old and new cabinet systems. In no case should old and new cabinets be used side by side."

19" CABINET MB10

Part	Cost Old Cabinet	Cost New Cabinet	Cost Mod. New Cabinet
Frame	123.00	41.80	48.06
End Panel	40.20	19.00	19.00
Door (Rear)	24.50	8.71	8.71
Door (Front)	13.90	8.34	9.59
Trim Strip	2.61	Not Required	Not Required
Totals	$204.21	$77.85	$85.36

COST DIFFERENCE - $126.36 - New Cabinet
$118.85 - Modified New Cabinet

digital INTEROFFICE MEMORANDUM

DATE: August 5, 1969

SUBJECT: Fiscal 1970 Build Rates

TO: P. Kaufmann FROM: W. Hanson

Please find attached a copy of the Fiscal 1970 Build Rates.

/kb
Attachment

August 5, 1969
W. Hanson

FISCAL 1970 BUILD RATES

Product Line	July	Aug.	Sept	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
PDP-8L	120	120	135	125	130	135	125	125	125	125	125	125
PDP-8I	110	110	115	150	150	175	130	130	140	130	130	140
PDP-12	25	30	30	30	30	30	40	45	45	45	50	50
PDP-15	8	20	30	30	30	30	30	33	35	40	40	40
PDP-10	5	5	6	7	7	8	8	9	9	10	10	10
PDP-14	10	10	10	10	10	10	15	20	30	40	45	50
PDP-11	--	--	--	--	--	--	10	30	60	80	90	100
MC8L	25	25	30	25	25	30	25	25	25	25	25	25
MC8I	83	83	85	110	110	132	110	110	110	110	110	110
MM15	4	4	9	10	7	6	6	6	7	9	10	11
MA10	16	12	16	18	18	17	17	17	17	10	10	5
ME10	--	--	--	--	3	3	5	10	15	20	25	25
TU55	150	170	210	230	230	250	230	250	280	280	290	290
DF32	76	66	66	70	70	75	70	70	70	70	70	70
RS08	35	60	70	60	60	70	100	100	100	100	100	100
RD10	6	6	8	8	8	8	8	9	9	10	10	10
RC10	4	4	6	6	6	7	7	8	8	9	9	9
RP	5	5	8	8	8	8	8	9	9	10	10	10

ESTIMATED BUILD RATE EXPRESSED IN GROSS SALE DOLLARS

Build $/Qtr	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Total
PDP-8	17,300	20,100	17,900	17,900	73,200
PDP-12	4,700	5,100	6,100	7,300	23,200
PDP-15	4,000	6,600	7,000	8,100	25,700
PDP-10	13,000	15,800	16,880	18,800	64,400
PDP-14	500	500	750	2,250	4,000
PDP-11	--	--	1,000	2,500	3,500
Module	3,100	3,100	3,500	3,500	13,200
Other	4,000	3,000	2,000	2,000	11,000
Total	46,600	54,200	55,050	62,350	218,200

digital INTEROFFICE MEMORANDUM

DATE: August 7, 1969

SUBJECT: Product Managers Approval of Share Development of Data Acquisition Hardware

TO: Operations Committee

FROM: Ron Noonan

Attached are copies of comments from the Product Lines on subject project.

Per the Operating Committes instructions, comments from the Product Lines were requested before approval of the previously submitted proposal (also attached) for shared development of needed data acquisition equipment.

I would like to discuss formal approval of this with you.

Regards,

RPN

RPN: cs
Attachments

digital INTEROFFICE MEMORANDUM

DATE: July 23, 1969

SUBJECT: DATA ACQUISITION I/O HARDWARE

TO: Ron Noonan FROM: Bill Long

Your proposal for shared development funding of Data Acquisition I/O looks very good. As you know, the PDP-8 Product Line is providing about 2/3 of the existing funding for the A/D Development Cost Center.

Most of what should come out of your new proposal should be of benefit to all the product lines; consequently, it is appropriate to share these expenses. The really new devices like the FET switch could not be undertaken unilaterally by the 8 group, but should be economically justifiable when spread across all the product lines.

I assume that none of the new projects will affect the schedule of those projects already directly funded by the PDP-8 Product Line.

WHL:pc

Bill

ROUGH DRAFT

digital INTEROFFICE MEMORANDUM

DATE: July 10, 1969

SUBJECT:

JUL 17 REC'D

TO: Ronald P. Noonan

FROM: Bob McInnis

cc: Operations Committee

The PDP-9/15 Product Line approves of the data acquisition hardware you proposed and agrees to share in the support of this project.

This hardware is mandatory for our penetration of the industrial market and is in phase with our development of a basic industrial monitor.

Goals as stated in your memo look reasonable.

Bob

jl

JUL 10 1969

digital INTEROFFICE MEMORANDUM

DATE: July 9, 1969

SUBJECT: Shared Product Development
of Data Acquisition Products

TO: Dick Clayton FROM: Ed Kramer EAK

1. I agree that what is proposed is quite reasonable, and the hardware projects are definitely needed additions to our bag of goodies for the data acquisition field. At least as important is the production of Customer/Sales documentation--that is understandable.

2. I feel the PDP-12 has less to gain from this endeavor than the 8, 9/15, and 11 product lines. This implies something about the use of shared product development funds for proposals that do not include all products although this is probably the best source of funds for something that crosses more than one product line.

3. I would like to see more detail on how these new hardware options are to be supported by software such as INDAC. I would also like to see some evidence that this is the most important set of projects to increase our business in the data acquisition area.

cc Ron Norman for his information

EK:sw

digital INTEROFFICE MEMORANDUM

DATE: July 23, 1969

SUBJECT: Proposal for Shared Development of Data Acquisition Systems

TO: Ron Noonan

FROM: Bob Savell

We looked at your proposal and feel that it is very worthwhile to do. We feel that we will get benefit from it resulting from PDP-8's which can be connected to our PDP-10's. We did not see any software budgeted. What do you propose to do about this and how much will it cost?

bwf

digital INTEROFFICE MEMORANDUM

DATE: July 8, 1969

SUBJECT: Proposal for Shared Development; request for Product Line Approval.

TO: Product Line Managers

FROM: Ronald P. Noonan

Attached is a proposal for shared development funding of Data Acquisition I/O hardware which has been made to the Operations Committee.

As discussed at our peripheral product planning meeting last month, this proposal has been made in lieu of the DSI system. It represents an optimum solution in terms of providing needed products and documentation this fiscal year, reasonably quick payout, development costs, and utilization of our present development capability. This proposal will provide needed improvements primarily for the 8, 9/15, and 11 Product Lines. Some useful modules could fall out of this project for the module group and secondary benefits would accrue to the PDP-12 and TPL. There is no direct benefit here for the 10 family except that this project would strengthen our data acquisition capability in smaller computers for satellite configurations.

It is requested that each of you submit a brief memo to me with a copy to the Operations Committee which states your position on the use of shared development funds for this project. Please indicate your:

1. Approval or disapproval of the project as proposed

2. Brief comments on the reason for your position

3. Suggestions, if any, for modifying the goals presented

I would appreciate receiving your reply by Friday, July 11.

BJC

cc: Operations Committee

Regards,

RPN

digital INTEROFFICE MEMORANDUM

DATE: July 3, 1969

SUBJECT: Shared Development of Data Acquisition Products

TO: Operating Committee FROM: Ron Noonan

The following summarizes the proposal dated June 26, 1969, previously made to the Operating Committee:

I. What is Proposed

The use of $202,000 of shared funds for the following projects:

1. New 12 bit plus sign A/D subsystem with single ended and differential multiplexers.
2. Digital I/O subsystems with several module options.
3. Cabinets with needed termination and grounding facilities.
4. Production of needed customer/sales documentation.

II. What Are Our Current Problems

1. No Digital input/output products currently exist in the computer product lines.
2. Special system approaches to Digital input/output and industrial packaging are generally not competitive.
3. Costs and performance of our basic A/D subsystem (AF01 series) are becoming less competitive.
4. Meaningful technical sales documentation for proposals and evaluation is lacking resulting in loss of sales effectiveness.

III. Why Should We Do It

1. Will enable 8, 9/15, and 11 product lines to increase penetration of markets requiring data acquisition and control functions. These markets were over $160 million in 1969.
2. Projects will be completed in F70 and will payback development costs in the fourth month of F71 yielding less than one year payback.
3. Bookings of $1.6 million in these options per se and $15 million in associated computer systems will occur in F71.
4. Will permit us to maintain and improve our data acquisition hardware development capability. Such a capability is essential in allowing our computer products to be interfaced to real time devices, instruments, and machines.
5. Provides an optimum solution for the problems outlined in paragraph II above.

RN/

digital INTEROFFICE MEMORANDUM

DATE: June 26, 1969

SUBJECT: Proposal for Shared Development of needed Data Acquisition Hardware

TO: Operating Committee

FROM: Ron Noonan

I Summary

This memo proposes the use of corporate shared funds for the development of basic data acquisition hardware for our small and medium computer product lines. The cost of such development is $182,000 occuring within fiscal year 1970. Additionally, funding of $20,000 is requested to provide much needed technical sales literature for both existing and proposed equipment which is offered accross our various computer product lines. The execution of this proposal will allow DEC to:

1. Maintain a competitive position in basic analog to Digital conversion capabilities.
2. Offer, badly needed, Digital input/output capability and user oriented packaging to the data acquisition markets for increasing penetration by the PDP-8 and 15 lines.
3. Book $1.6 million in the purposed options themselves during fiscal 1971 (the systems containing these options will provide total bookings of approximately $15 million that year)
4. Achieve bookings in fiscal 1970 and payback at the start of the second quarter of fiscal 1971 on the basis of the options alone.

II Background

This proposal is being submitted in lieu of the DSI (Data Acquisition Systems Interface) project which was brought to the Operations Committee's attention by Nick Mazzarese in May. The DSI project (Appendix 2) while providing an excellent technical solution to the problem of providing standardized, CPU independent, and highly modular data acquisition hardware, did not look attractive in terms of DEC's customary expectations of one year or less as the period for achieving payback on development investment. On analysis of the pro-forma P+L statements (Appendix 1) for the DSI, it was decided by the Data Acquisition and Control Group that we would not make a formal proposal for its funding even though considerable effort was expended in preparation. The more significant financial problems with the DSI project were:

1. Long development and test cycle--18 months
2. Relatively high development costs--$360 K
3. First shipments in quarter three of second year
4. Break-even on basis of cumulative net before tax at end of quarter two of third year.

Additionally there was little short-term help for the PDP-15 and 8 lines, and perhaps the danger of making too large a step change or "leap frog" for which the company as a whole (sales, field service, software development, etc.) was not yet ready.

The present proposal overcomes most of the financial timing problems above by taking a limited but pragmatic approach to Digital I/O and packaging on PDP-8 systems and adding PDP-15 interface facilities.

III Product Line vs Shared Funding of Project

Table 1 indicates the development costs and funding for F70's Data Acquisition hardware development for cc 363 (Analog Development). For support and discrete projects by various product lines, $102 K have been provided; and $85 K is proposed for shared project funding. The shared development project will require $97 K from other engineering services making a total of $182 K to provide the development requisted herein.

Planning, development, and funding of data acquisition products or options has proven to be somewhat of a problem within the product line structure because of:

1. Marketing and technology for these markets do not usually exist in the individual product lines.

2. Development requests are normally on a random request basis which does not lend itself to the development of an integrated, well-planned product capability.

3. Product lines in budget squeeze situations find it easy to cut off or defer funding for service groups. This impacts the stability and effectiveness of the special technology required to sustain and improve our competitive posture in the many markets requiring data acquisition functions.

Shared funding appears in part to solve some of the more immediate problems and provides the basic equipment to improve our competitive capabilities.

IV Project Justification

Table 2 indicates the development schedule for cc363 including the shared projects. Tables 3 and 4 contain a brief description of the discrete and shared projects respectively. Essentially, the shared projects break into three pieces:

1. New 12 bit plus sign A/D with single ended and differential MUX for PDP-8, 15, and 11.

2. Digital I/O for the 8 and 15.

3. Industrial packaging for data acquisition I/O for the 8 and 15.

New A/D and MUX Control

This project is essentially a competitive replacement for our current AF01 series with optional differential capability. This unit will reduce our current factory costs by about 50%,ie,$1,800 to $900. We are currently shipping 10 units per month this year. Refer to table 7--Data Acquisition Option Shipments. Therefore, 120 units times $900 factory cost savings would yield $108,000 direct-cost savings in one year neglecting the higher margins and increased performance and sales of this unit. Also, this unit provides the foundation for more sophisticated front end configurations.

Digital I/O

Currently, there are no standard Digital I/O options available in the PDP-8 family. The 9/15 family offers a limited one-word contact sense which is generally not useable in data acquisition applications. These options allow our systems to be interfaced with external machines, controls and devices that provide or require Digital signals e.g., limit switches, pushbuttons, solenoids, relays, pulse generators, etc. The lack of such capability results in a lack of sales effectiveness--all requirements require special system quotes--approximately 30/month, low proposal capture rate, and no basis on which to generate sales and application literature. Since the basic design for this equipment is being done on a special systems basis for INDAC-8, we will be able to bring this to a product status quickly for shipments in quarters three and four of F70 with payback by quarter one of F70. See tables 5 and 5A.

Industrial Packaging

This is needed to meet the needs of customers for terminating large numbers of input/output wires in a reasonable fashion-wiring troughs, modules screw terminal facilities, signal conditioner mounting, and controlled grounding. This modest project will take an expedient approach with existing cabinets to solve these problems. See tables 5 and 5A for booking and return data.

Table 5 shows projected bookings for these new options for the various product lines. Table 5A is an abbreviated operating P+L on these options. These indicate payment of the $202 K request from shared funds in the fourth month of F71.

Operating expenses of 22% were assumed for simplicity on the bases of the following expense allocation from gross sales:

Shared Engineering	2%
Field Sales	8%
Marketing	4%
G and A	6%
Reserves	2%
Total	22%

Development cost and specific sales literature costs are shown as actuals.

VI The Market

The current market for computer based data acquisition and control system is shownon table 6--approximately $168 million in 1969. Currently, most of our activity in this area is with OEM's-- Terradyne, Picker, Foxboro, etc. A long-term strategy for profitable penetration and growth in these important markets is to develop a balance between our OEM and end user channels. The current proposal provides some basic front-end capabilities to attack a small portion of the user and system contractor portions of these markets. A cross-product strategy for doing this will be provided in a subsequent Data Acquisition Market Plan.

VII Sales Literature

Included in this proposal is a request for $20 K to produce much needed technical sales literature for our current and proposed data acquisition options. There is presently a serious back of good material for salesmen and customers as well as backups for written proposals. Product lines, in my experience, do not desire to fund cross-product line literature. They would rather use such funds on promotion specific to their products. Since they do not generally possess the technical marketing background to generate meaningful data acquisition literature, the job has not gotten done. The funds would be used as follows in F70:

	Items	Cost	When
1.	Editing, graphics, and printing of Data Acquisition and Control Systems Notebook (currently in draft form)	$3.5 K	QTR 1
2.	Editing and publishing costs for approximately 35 pages in 1970 Controls Handbook	3.0 K	QTR 1
3.	Creation and publication of an organized set of user oriented Spec Sheets for all data acquisition options on cross-product basis	13.5 K	QTR 2,3,4,

VIII Conclusion

Examination of table 7, Data Acquisition Option Shipments, indicates that our shipments of this equipment in F69 will be approximately $1.4 million after adding June shipments and items that did not get posted to the source data for the report. With the impact of INDAC, other programs aimed at this market; and, hopefully, the requested projects, the revenue from these options should increase significantly over the next few years. Current projections look like $2.4 million in F70 and $3.2 million in F71. Assuming that 10% of sales is a reasonable annual expense guideline for continuing development of high technology hardware, this would indicate a development budget of 240 K and 320 K in F70 and F71. The current budget of $280 K (see table 1) plus another $40 K in other development costs for funded discrete projects would indicate a 13% level in F70 and 11% in F71. Therefore, it would seem reasonable in view of the importance of data acquisition capabilities to support our computer product lines that the subject proposal has merit.

1/26/64

This will conserve our current technical resources and provide much needed competitive capability.

As a longer term consideration, I would be willing to consider and propose a profit center means of managing and evaluating our efforts in Data Acquisition related markets if the Operations Committee feels that this would be worthwhile.

BJC

BJC

ATTACHMENTS

Tables

Appendicies

digital INTEROFFICE MEMORANDUM

DATE: August 7, 1969

SUBJECT: TRADITIONAL PRODUCTS - BUDGET REVIEW - ENGINEERING AND MARKETING OBJECTIVES

TO: Operations Committee FROM: R. L. Lane

PRODUCTS - PDP-1, 4, 5, 6, 7, 8, 8/S and Options (LINC-8 being incorporated)

BUDGET - Total Projected Business for F70	-	$7,000,000	100%
Income from Sales of Equipment	-	4,100,000	58%
Income from Field Service	-	2,900,000	42%
BACKLOG - Backlog as of July 25, 1969 (Equipment Sales)	-	1,400,000	100%
Non Shippable Backlog (RS08, RP02)	-	385,000	27%
Shippable Backlog	-	1,015,000	73%

BOOKINGS - Bookings as of July 25, 1969 are negative due to some very large cancellations which happened in early June. These did not get processed until July 3 (F70). Also, the discount adjustments (mentioned later in this report) are negative bookings.

Additional core and I/O device bookings are extremely good.

DF32 continues good but RS08, RP02 mass storage is in a look-see period as salesmen are not really pushing them.

Processor bookings will suffer as deliveries for PDP-8 and 8/L get better.

Bookings during F69 were 33% below budget. Consequently, the backlog at the beginning of the year was disappointing.

The best marketing tool is quick delivery and responsiveness to DEC salesmen and DEC customers.

BOOKINGS (Cont'd.)

We are continually reviewing which options are most popular and attempting to create a shelf of these items.

COMMENTS - Equipment Sales

Equipment Sales fall into four major categories:

(1)	Additional Core Memory	30%
(2)	Mass Storage	33%
(3)	I/O Devices and Other	32%
(4)	Processors	5%

PDP-8 core is becoming price sensitive as customers can purchase an 8/L for less than a 4K add-on memory. We have engineered the interface to 8/I core but are delaying the cut over (except for TSS-8 systems) until the 184 backlog drops and 8/I memory is easily available.

We forecast both bookings and deliveries of RS08 systems during F70 but the current situation appears bad. Deliveries are non-existent and bookings are now for Q4 and slipping. We expect this to put us below budget. To offset this, or as backup, we are applying 90% of our engineering capabilities to the RK08 Mono Disk Drive.

The RP02 disk is also on hold. Deliveries are late. This will not effect our sales until Q2 and 3. Delays in delivery will certainly effect the anticipated bookings. There are no current plans to offset this problem, except the substitution of RP01 on a loan basis. (This will be costly and result in some additional inventory.)

The F69 8/S clearance was very successful and the inventory level is almost zero. We do not anticipate many new orders for central processors. (We plan no new build.)

PDP-8 processors, on the other hand, will most likely carry on into F70 (via ALC and Computer Industries). We promise immediate delivery to customers who cannot wait for an 8I/L. We still have a PDP-8 inventory due to the "rotation" policy of last year. This inventory of PDP-8 computers will either be capitalized or will be sold prior to any more new builds.

The volume of add-on I/O devices is very encouraging and we continue to promote fast deliveries as our biggest marketing tool.

Re-pricing of certain options common to the 8 family has been done and new PDP-8/8S price lists are in printing.

We are introducing a "bargain corner" in the Sales Newsletter which will be for used options, options heavy in Z stock, and certain obsolete products we want to clear from inventory.

FIELD SERVICE - Field service margins have historically been very poor. We have corrected certain accounting and reporting procedures and Company Policies which distorted these margins. Some price increases have been initiated. The results will be closely investigated to see just what effect these changes have made and where other changes are needed to increase the margins.

Certain changes to budgeted income, i.e. training income, will reduce projected margin by $155,000 for F70. This is due to a Field Service budgeting error.

BUSINESS PROBLEM - TPL suffered a severe blow during the F69/F70 transition. This is directly attributed to inefficient processing of paper work by contract and computer administration. Also, it was due to my inability to recognize the problem early enough to initiate an offsetting reserve.

BUSINESS PROBLEM (Cont'd.)

Since there is no way to perform an "adjustment to last year's business", F69 profits were exaggerated and F70 profits will suffer substantially.

Numerous discount and inventory adjustments, credits, and error corrections were made during F70 to actual F69 business transactions. These errors totaled $175,000. These adjustments are to profit since they represent discounts and/or adjustments to equipment shipped in F69. The minimum effect these credits will have on the current budget is a reduction of 2.6% of the profit before taxes.

Further, DECUK has recently asked DEC to credit them for labor charges on PDP-8 and 8/S kits which were built in 1967 and 1968. This credit is $36,650--again, against F67, 68, 69 income.

je

BUDGET REPORT - COST CENTER 641

July 29, 1969

	ACCOUNT	ACTUAL	BUDGET	DIFF.	1970 BUDGET
1.	PAYROLL	176	111	(65)	137
2.	INSURANCE	102	88	(14)	--
	OCCUPANCY	8	12	4	30
3.	SUPPLIES:				
	STATIONERY	129	108	(21)	104
	BRUNING	25	--	(25)	50
4.	TRAVEL	8	5	(3)	1
5.	EQUIPMENT RENTAL	58	53	(5)	29
	REPAIRS	7	6	(1)	2
	DEPRECIATION	2	1	(1)	2
6.	LEGAL FEES	49	20	(29)	--
7.	TELEPHONE	18	10	(8)	18
8.	FILE FEES	2	--	(2)	--
	OTHER	10	--	(10)	--
		594	414	(180)	373

1. Payroll account incease due to $25,000 payment to IRS by Ed Schwartz and addition of (1) Lawyer and (1) Secretary. Office Services additions of (1) Communications Engineer and (2) Receptionists.

2. Property Insurance over $14,920, but not controlled by Office Services.

3. Stationery over partly due to conversion from Xerox to Bruning Copiers.

4. Travel by lawyers not controlled by Office Services - Office Services travel for year approximately $500.00

5. Six (6) months of Xerox Invoices held by Jim Meyers, totalling $23,000, carried over into 1969.

6. Legal Fees controlled by Legal Department.

7. Telephone charge-back system completely incorrect. Charge should be approximately $1000.00

8. File Fees controlled by Legal Dept. Funds not budgeted.

Nick LoRusso

OPERATIONS COMMITTEE MEETING

August 4, 1969

AGENDA

1. Additions and Corrections to Minutes of July 28th Meeting
2. Duplicate material for Dr. Odiorne's visit - (Graydon Thayer)
   (See attached Report)
3. Leominster Plant Startup Plan - (Ken Schlenker)
   (See attached Report)
4. Overdue Orders - (Win Hindle)
5. PDP-15 Budget - (John Jones)

COMPANY CONFIDENTIAL

digital INTEROFFICE MEMORANDUM

DATE: August 5, 1969

SUBJECT: OPERATIONS COMMITTEE MINUTES OF AUGUST 4, 1969

TO: Operations Committee FROM: Nick Mazzarese

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

1. Additions and Corrections to Minutes of July 28th Meeting

   Minutes were accepted as submitted with one change - remove the first sentence in Section 4 (Pete does not agree with this statement).

2. Duplicate material for Dr. Odiorne's visit (Graydon Thayer)

   The material was distributed to all the members of the Operations Committee.

3. Leominster Plant Startup Plan (Ken Schlenker)

   Pete stated this plan would not cause a production delay of items being shifted to Leominster.

4. Overdue Orders (Win Hindle)

   We continue to have problems with Burroughs and Memorex. This is a major problem in PDP-10 shipments.

5. PDP-15 Budget (John Jones)

   John's proposal was to increase the PDP-15 shipping budget from $14,800,000 to $21,500,000. His plan included no increase in his expense budget beyond manufacturing cost and warranty and installation. He will not make customer commitments against this increase until three months prior to planned delivery (to insure that we can, in fact, build-up). This proposal was approved.

6. Display Budget Proposal (Bob Collings)

   (From last week's agenda). Pending review by Ed Savage, additional funds were granted to complete light pen (8K) and VR-12 (25K). It was also agreed that a proposal to develop an alphanumeric terminal could be made to the Operations Committee for development under shared project funds.

digital INTEROFFICE MEMORANDUM

DATE: July 28, 1969

SUBJECT: Dr. Odiorne's Visit - August 4th

TO: Operations Committee FROM: Graydon Thayer

Attached is a duplicate set of the material previously forwarded to you in preparation for Dr. Odiorne's visit.

GAT/lw

DR. GEORGE S. ODIORNE'S VISIT

August 4, 1969

PROGRAM OUTLINE

10:00 - 12:00 (Ken's Office)	-	Discussion with Operations Committee Theme: Utilizing Management-by-Objectives to improve manager and organizational effectiveness at Digital.
12:00 - 1:00 (Ken's Conference Room)	-	Buffet luncheon and informal discussion with Operations Committee.
1:00 - 3:00 (Bldg. 11 - Flr. 2 Classroom 8)	-	Dr. Odiorne's talk to management group - Managers/Supervisors
3:00 - 3:30	-	Questions/Informal Discussion

PROGRAM OBJECTIVES

1. To provide managers with an in-depth insight into the concept of "Management-by-Objectives" and what it can do for them.

2. To establish a foundation in Digital for considering "systems approach" to management, whereby company objectives are translated into departmental goals and ultimately into individual work plans and tasks. With such an approach, individual effort allocation is steered to the attainment of Corporate objectives and away from meaningless activity.

3. To provide an effective method for increasing the motivation of individuals/groups to improve performance.

4. To create a meaningful system of performance evaluation which focuses on job accomplishment versus goals not on traditional personality factors.

BIOGRAPHICAL SKETCH: GEORGE S. ODIORNE

George S. Odiorne is Dean of the College of Business and Professor of Management at the University of Utah in Salt Lake City. Prior to joining the Utah institution, he was Director of the Bureau of Industrial Relations at the University of Michigan for ten years. His experience also includes positions with General Mills Inc., American Management Association, and American Can Company. He has taught management and economics at Rutgers and New York Universities. His education includes a bachelor's degree from Rutgers, and an MBA and Ph.D. degree from New York University. He serves on several boards of directors of corporations and civic institutions. A member of several learned societies, he is also author of seven books and a hundred articles. His most current books include Green Power--The Corporation and the Urban Crisis (1969); Management Decisions by Objectives (1969); and Management by Objectives--A System of Managerial Leadership (1965).

MANAGEMENT BY OBJECTIVES

General Introduction

1. Management by Objectives is a way of getting improved results in managerial action. It's not an addition to a manager's job, it's a way of doing it.

2. It's based on observations of what successful executives do in many companies and organizations. (General Mills, General Motors, Minneapolis-Honeywell, IBM and General Electric to name a few).

3. It is especially pertinent in managing managers, and most applications have been limited to upper levels of management. It can extend down as far as first line supervision, provided top management endorses and supports it through using it.

4. It relates to several key problems in managing an organization.

   a. What is expected -- in terms of objectives.

   b. Obtaining teamwork -- by identifying common goals.

   c. Programming work -- by setting terminal dates for tasks.

   d. Recognizing process -- through mutual agreement on goals and accomplishments against them.

   e. Salary administration -- how would increases be allocated?

   f. Assessing promotability -- by identifying potential for it.

5. In its briefest form, management by objectives can be described as a managerial method whereby the superior and the subordinate managers in an organization identify major areas of responsibility in which the man will work, set some standards for good -- or bad -- performance and the measurement of results against those standards.

6. The advantages of this kind of management are in better results, lower costs, improved performance, more promotable people, improved quality of service, more business-like management of salaries, and the development of subordinates' best abilities.

SOME COMMON AREAS OF MANAGEMENT CONCERN IN MANAGING MANAGERS

In managing managers there are some areas of concern which are chronic, recurring, and although often postponeable, are not cancellable. They include those things which can seldom be delegated to subordinates since they are about those very subordinates and matters of interest to them.

1. Pay raises. Should the pay of a subordinate be increased, decreased, or left the same? How should salary increase funds be allocated among the respective subordinates?

2. Bonuses. Upon what basis should available funds for managerial bonuses be distributed? How can this distribution be made so as to reflect actual contribution to the surplus which created the bonus? How can windfalls be prevented? How can hard luck be taken into consideration?

3. Promotability. What are the elements in present performance which can be used to predict success or failure of the man who is promoted to a higher level job? How does his present performance stack up against these indicators? To the extent that bad performance would be a bar to promotion, how good is his most recent performance record?

4. Performance reporting. For purposes of filing accurate records of the performance of the man in his job for the past period, what entries should be made about his achievements and his failure to achieve?

5. Coaching and improvement counseling. What matters in his recent performance should be discussed with the man? What results areas need betterment? In which ones is he doing an exceptionally fine job?

6. Management development. Is there any kind of formal educational effort to which he might be sent which could promise to improve his performance? Should he go to seminars? Should he attend a course? Should he join an association? Should he be given assignments which would enlarge his experience?

7. Assignment for the future. With respect to future jobs or tasks within his present job, are there any changes which should be made? Should new responsibility be delegated?

THE ONE COMMON ELEMENT IN ALL OF THESE AREAS OF CONCERN IS THAT THEY REQUIRE DISCRIMINATORY JUDGEMENT ABOUT THE MAN'S JOB PERFORMANCE AND HIS PROFESSIONAL CAPACITY AS A MANAGER.

THE GOAL SETTING PROCESS IN MANAGEMENT BY OBJECTIVES

1. Goals should be stated in a form that facilitates their use in measurement of results at a future time.

2. They should be stated in a way that will probably affect his behavior and results, not simply to get out in writing that activity which he would have performed anyway, even if they hadn't been discussed and confirmed in writing.

3. The two basic tools for setting the goals are a dialog and a memo. The dialog comes first since cold memoes have a cold and often damaging effect. The memo is a confirmation in writing of what has been agreed upon between man and boss.

4. The goals should be stated in a form which permits their use during the period for self guidance and self feedback, and not etched on copper and buried in a cornerstone to be disinterred a year later when the personnel department calls for the annual performance report.

THE THREE CLASSES OF GOALS

1. Goals should be prepared to fit three classes of performance.

Kind	How to measure	When
Routine or regular duties	By exception	When exceptions occur with an annual review
Problem solving	Solutions as promised in time	When committed
Innovative goals	By stages of commitment	When each stage is completed

2. These goals should be arranged to comprise an ascending scale of managerial excellence. Regular performance is the minimum acceptable standard. Excellence emerges when the manager begins to display problem solving and innovative behavior, and should be reflected in the areas of concern (when decisions are being made on pay, bonus, promotion, and performance reportion).

THE RESPECTIVE ROLES OF BOSS AND SUBORDINATE IN GOAL SETTING

Subordinate Proposes	Superior's Actions
Set standards for his job	Insist's upon realistic ones that challenge ability
Define measures for results	Ask how arrived at
Do detailed analysis	Question methods
Suggest alternative actions	Suggest other possible actions where germane
Propose one course of action	Force a recommendation from subordinate
Predict effect of goals	Get committments and make them to subordinate

BE LAISSEZ FAIRE WHEN.....

Leader:

- Has no power to compel action
- No time pressure exists
- Tenure based on pleasure of group
- He has no sanctions to exert on followers
- Has no special knowledge

Followers:

- Have more power than the leader
- Dislike orders
- Will rebel successfully if they so choose
- Are Volunteers, loosely organized or in short supply
- Scientists-rare skills typical jobs
- Choose own goals and methods

Situation:

- No clear purpose apparent
- No control exists
- No time pressures
- Few changes or gradual
- Safe, placid environment
- High skill or concetual required

BE DEMOCRATIC WHEN.....

Leader:

- Power is limited
- Restraints on use
- Group might reject his authority and succeed at it
- Some time pressures
- Has some sanctions he can exert

Followers:

- Expect to have some control over methods used
- Middle class values dominant
- Engineers, managers, staff persons typical titles
- Scarce skills
- Like system but not authority
- Rather scarce labor supply but not drastic

Situation:

- General goals understood
- Controls self imposed but checked
- Some time pressures
- Gradual Changes or regularly spaced
- Occasional Hazards
- Moderate skills called for

BE AUTOCRATIC WHEN.....

Leader:

- Has complete power and...
- No restraints on its use
- In an emergency he has a way of saving matters
- Has some unique knowledge
- Firmly entrenched in position

Followers:

- Are leader-dependent persons
- Never been asked opinion
- Lower Socio-economic background
- Realize the emergency
- A labor surplus exists
- Are autocrats themselves
- Low on independence

Situation:

- Tight discipline is normal
- Strong controls are ordinary
- Time pressures are constant
- Low profit margins or tight cost is prevalent
- Physical dangers present
- Low skill required of workers
- Frequent changes must be made quickly

OPERATING GUIDE FOR THE CONSTRUCTION
OF OBJECTIVES STATEMENTS

The following pages ask for you to think about your present job, with your present boss NOW and for the coming year ....

Three kinds of responsibilities will be discussed and you'll be asked to think through some questions about your plans for your job in the coming year. As a start you may want to set quarterly objectives, or you may wish to set them for a longer period (no more than a year).

1. The first sheet calls for you to define your regular, ordinary routine, or recurring responsibilities, and to state the range of acceptable outcomes in each area of responsibility.

2. The second sheet grows out of the answers to the first and asks you to define two or three present managerial problems you face in your job, and your plan for solving them in the year ahead. (List only the 2-3 that are most pressing or have the highest priority in your bosses eyes).

3 The third sheet asks for your statements on what innovations, changes, improvements to present conditions, your own managerial practices, or other internal departmental management you wish to study, work on or install during the coming year.

CATEGORY I

List below your regular, routine, (Job description) kinds of responsibilities. Refer to your job or position description if available. List the responsibilities down the left hand column. Always include the"trade-off" responsibilities, for example you can't shoot for production alone, you must consider quality.

Across the top of the next three columns you'll note that a <u>single</u> goal won't do. List a range of outcomes.

List your major regular responsibilities below. Include all trade off responsibilities.	Indications of success in results		
	Minimum permissible or acceptable	Expected Average	Maximum Probable
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
Joint accountabilities (list major ones) 1. For: With: 2. For: With:			
4.9			

II. What are the major managerial problems you face in your job now? (Any indicator of success that's gone wrong is a problem)

List 2 or 3 of them	What are the present conditions?	What would you like it to be?
1.	1.	1.
2.	2.	2.
3.	3.	3.

III. Innovative Goals

What new ideas do you plan to work on: Study, suggest or install in your area of authority during the coming year?
Innovation can be thought of as "a new idea from outside" which adds to results

1.

Idea:

When:

How:

Results:

2.

Idea:

When:

How:

Results:

HOW TO STATE YOUR REGULAR OR ORDINARY DUTIES AND RESPONSIBILITIES IN TERMS OF RESULTS EXPECTED

1. The first step in defining your regular responsibilities is to outline the management structure reporting to you. By this is meant a rough organization chart. The titles of subordinates usually are a general indicator of an area of responsibility you hold. The execution of these responsibilities has been delegated to another, but that subordinate and his objectives comprise one of your ordinary responsibility areas.

2. There may also be programs which are commitments of you and your subordinates. For example in a medical research lab the lab director has three subordinates, directing the virology, microbiology, and chemistry labs. All work on programs to develop such drugs as an anti-schistosomiasis vaccine, an anti-arteriosclerosis compound, and an oral contraceptive. The latter three would be programs. They should be stated in output (results) terms.

3. An alternative way of defining regular duties would be to list the functions performed by you. (This is especially true of first line supervisors.) This would include such responsibility areas as production, quality, and housekeeping. A function is a cluster of activities which leads to a cumulative result.

4. Equate the results with outputs or end results. Don't mix inputs or activities with outputs. Money and programs are inputs. Sales volume, lives saved, people trained (behavior changed) would be the consequences of that effort and input.

5. The effects sought should be things you hope to make happen, and should include the significant areas in which you would desire your performance to be measured and judged. The results stated should be attainable.

6. For illustrative purposes, as a trial, it sometimes helps to list two or three things you made happen on your job in the last six months. New project or other things for the next quarter, six months or year you expect to make happen.

7. If there are any programs of a company-wide or divisional nature which you must tie in to be relating upward, these must be checked with your boss before you can divide responsibility among your subordinates.

GUIDELINES FOR THE NEW BOSS EXERCISE

Questions You Should Ask Your Subordinates

1. What are your major areas of responsibility?

2. How is your performance in each of these areas measured?

   What are the indicators for each?

3. For each of the major areas you have listed:

   A. What is the lowest permissible (acceptable) level? i.e. the level when you would be in trouble. This level goes under "minimum" on the chart.

   B. What was your average level during the past year; or what do you expect to be the average for the next year? This figure is inserted under "average".

   C. What is the best level you could reasonably expect? Perhaps this would be the best you have ever done. This becomes the "maximum probable."

4. Do you see any trade offs between major areas of responsibility? Do you want to reverse any of your levels of performance (given in answer to question #3) on the basis of the trade offs you have identified.

5. Are you certain all joint areas of responsibilities have been isolated and shown in the proper location on the chart?

What You as a Boss Should Look For

Make sure your subordinate describes each responsibility in quantifiable terms. For example, "customer relations" should not be measured in terms of "pretty good, very good," etc. Instead it should be measured by number of complaints received, dollar cost of satisfying complaints, volume of reject business, etc.

What You as a Boss Should Not Look For

Do not try to get improved performance during this phase. Improved performance will come during the problem solving and innovative phase.

SETTING GOALS TO MEASURE THE UNMEASUREABLE

1. It is often necessary to devise measurements of present levels in order to be able to estimate or calculate change from this level.

2. The most reliable measures are the real time or raw data in which the physical objects involved comprise the measures to be used. (Dollars of sales, tons of output, number of home runs hit.)

3. When raw data can't be used, an index or ratio is the next most accurate measure.
   This is a batting average, a per cent, a fraction or a ratio.

4. If neither of the above two can be used, a scale may be constructed. Such scales may be "rate from one to ten," a nominal rating against a check list of adjectives such as "excellent, fair, poor," or one which described "better than" or "worse than" some arbitrary scale. (These are useful but are far less precise than the above.)

5. Verbal scales are the least precise but can be extremely useful in identifying present levels and noting real change. Verbs such as "directs", "checks" and "reports" are indicative of actions to be taken.

6. General descriptions are the least useful, but still have value in establishing benchmarks for change. "A clear, cloudless fall day" is obviously not the same as a "cloudy, foggy, misty day" and the two descriptions could be used to state conditions as they exist and conditions as they should be.

7. The statements of measurement should be directed more toward results than toward activity. (Much activity may prove impossible to state in specific terms, whereas results of that activity can be so stated.)

8. In stating results sought or in defining present levels, effort should be made to find indicative, tangible levels and convert verbal or general descriptions into such tangible scales, ratios or raw measures where possible.

9. If you can't count it, measure it, or describe it, you probably don't know what you want and often can forget it as a goal.

SAMPLE OBJECTIVE STATEMENTS

The following is a sample set of objectives of an international freight company with head offices in the United States.

The company operates approximately 75 freight stations throughout the world. The sample objectives shown below are those of a station manager. Routine responsibility objectives are established each quarter.

Each station manager is directly involved in formulating these objectives, and the stations' progress, and thus the manager's performance, is evaluated against these objectives

The objectives and indicators have been taken from the company. Some of the material has been disguised to insure anonimity.

1. Routine Responsibilities

AREA OF RESPONSIBILITY	MINIMUM ACCEPTANCE	EXPECTED AVERAGE	MAXIMUM PROBABLE	ACTUAL PRODUCTION
1-Station Revenue	$375,000	$425,000	$510,000	
2-Operating Cost Per Unit	$ 1.90	$ 1.85	$ 1.79	
3-Salary Cost Per Unit	$ .80	$ .75	$ .71	
4-Accounting Cost Per Unit	$ .20	$ .17	$ .15	
5-Sales salaries as a percentage of sales	3.15%	3.00%	2.75%	
6-Pick Up Service	90%*	95%	97%	
7-Delivery Service	90%*	93%	95%	
8-Increase in Operating Units	18%	21%	24%	
9-Increase in Total Station Costs (should be less than #8)	19%	18%	17%	
10-Development of Station Staff**				
1) Replacement	once	twice	three times	
2) Personnel Development program	Number and type of training			
3) Clerical Turnover	12%	8%	4%	

*Measured on the basis of percentage of pickups and deliveries accomplished in the specified time period. (i.e., shipments must be picked up or delivered within 90 minutes of their ready time.)

**The indicator here is the number of times a subordinate is allowed to take over the responsibilities of his immediate superior for a period of five working days each time this occurs For example expected average would be for two weeks per year. Another indicator used here is the number and type of personal development courses or seminars each immediate subordinate will take during the next period. Personal development objectives of subordinates are determined after a careful examination of his needs. The final indicator is turnover of staff.

2. Problem Solving Objectives

The following are statements of problem objectives agreed upon between the boss and subordinate. They are shown in order of priority as agreed upon by the boss and subordinate.

Accompanying each of these general problem statements is a problem solving outline designed after the one used in the seminar.

1. Delivery service performance during the last quarter fell to 85%. (see item 7 of routine responsibilities). The minimum acceptable performance is 90%. This means that at the minimum 90% of our deliveries must be completed within 90 minutes of their ready time. The expected average is 93%.

   Given the present level of performance (85%) and the desired level of performance (93%) investigate causes and present a workable solution to this problem. This problem is very serious, and we should aim for a solution in four months.

2. Turnover of clerical staff has increased from 10% to 16% per year. (see item 10 of routine responsiblities). This increased turnover results in significant increases in our cost structure, and must be reduced. Our expected average turnover has been 8% per year, and the best it has been is 4%. The minimum acceptable is 12%.

   Given the present level of turnover (16%) and the average expected (in this case the desired level), investigate the causes and work out a solution to this problem. We should aim for a solution in 6 months time.

3. Innovative Solving Objectives

1. Write an "Emergency Procedure Manual". It must contain details of:
   a. Whom to notify (and in which order) in event of:
      1. Accidental death on our premises to either: a company employee or other person. Included (but not limited to) are: Company officials; county and state officials; next-of-kin.
      2. Whose sole responsibility it should be to handle the notification.
      3. Accidental death to an employee which occurs while he is away from our premises but on company business.

   b. Emergency procedures to be followed and responsible parties notified in event of:
      1. Fire within our premises
      2. Destruction of company property
      3. Civil disorders interrupting our normal business pattern.

   This manual should be prepared in 4 months time, and in use in 6 months time.

FRAMEWORK-PROBLEM SOLVING MODEL

1. IDENTIFY PROBLEM AREA

2. DEFINITION OF PRESENT LEVEL

3. DEFINITION OF REASONABLE DESIRED LEVEL

4. RE-EVALUATION

5. EXAMINATION OF CAUSES OF PROBLEM

6. SELECTION OF MOST LIKELY CAUSES (if possible)

7. IDENTIFICATION OF PROPOSED SOLUTIONS

8. EVALUATION OF PROPOSED SOLUTIONS - CRITERIA

PROPOSED SOLUTIONS	CONTRIBUTION TO OBJECTIVES	COST	FEASIBILITY	SIDE EFFECTS D & U
1.				
2.				
3.				
4.				
5.				
6.				

9. TIME CONTROL

PROBLEM SOLVING ANALYSIS

1. IDENTIFICATION OF PROBLEM AREA
   Turnover at the XYZ Freight office is too high. More specifically, upon analysis of turnover data of our clerical staff it was found that 77% of the turnover has been occuring in the billing department. Further, turnover is highest for those working on the 4-12 shift.

2. DEFINITION OF PRESENT LEVEL
   At the present time turnover is 16% per year, most of which is occuring in the billing department on the second shift.

3. DEFINITION OF REASONABLE DESIRED LEVEL
   In the past, turnover has been running at 8% per year. The best it has ever been was 4%; the minimum acceptable is 12%. A reasonable desired level should be our former average of 8%.

4. RE-EVALUATION
   The nature of this problem is very serious, both in cost of turnover and disruption of work flow. It has been agreed that both the delivery service problem and the turnover problem will receive equal priority. These are the only problems which will be worked on during the next period.

5. EXAMINATION OF CAUSES OF PROBLEM
   As a result of investigation and some group discussion, the following is a list of likely causes:

   1. Poor transportation facilities at end of shift
   2. Poor working condition on second shift
   3. Inadequate eating and leisure facilities on second shift
   4. Poor supervision of second shift

   A number of other causes were suggested, but eliminated after further investigation.

6. SELECTION OF MOST LIKELY CAUSE
   As a result of further examination of the causes, including a detailed study of the exit interviews, it was concluded that the most probable cause of the problem was poor supervision (see my memo to you 8-5-6-)

7. INDENTIFICATION OF PROPOSED SOLUTIONS
   The solution put forward to solve our problem of high turnover is as follows:

   1. Fire the supervisor
   2. Provide training for him
   3. Promote supervisor
   4. Transfer to another shift
   5. Demote from supervisory ranks

8. EVALUATION OF PROPOSED SOLUTIONS

PROPOSED SOLUTIONS	Contribution to Objectives	Cost	Feasibility	Side Effects: D or U
1. Fire Supervisor	H	L	L	D: Have replace-
2. Provide Training	M	M	H	ment on staff-can
3. Promote him	H	L	L	take over in one
4. Transfer him (1st shift)	H	L	H	month
5. Demote him	H	L	H	U: He would quit- Excellent man- don't want to lose him.

As a result of this analysis the fourth solution is the most desirable.

9. TIME CONTROL

As we agreed, I will meet with you on the following dates to discuss progress toward the solution to the problem (current date 9/1/6_).

DATE	OBJECTIVE
10/1/6_	Replacement fully trained in take over
11/1/6_	Report on work quality of replacement: Turnover should be down to annual rate of 12%
12/1/6_	Report on turnover: Should be down to annual rate of 10%
1/5/6_	Report on turnover: Should be down to 8% per annual.

FUNDAMENTAL ASSUMPTIONS NECESSARY FOR AN INNOVATIVE ATMOSPHERE

1. Must get a commitment from the individual.

2. Build innovation into the reward system.

3. Status quo should not be allowed.

4. Must have necessary climate for innovation.

5. Manager has the right to expect innovation.

6. Manager has the responsibility to see that he does his part to see that innovation takes place.

7. Subordinates who take advantage of innovation are given added responsibility.

FRAMEWORK FOR WORKING THROUGH AN INNOVATIVE TASK

1. Pick a job, process, procedure, responsibility, work flow etc.
   - goal - this job can be improved.

2. Define an ideal improvement.

3. List every detail of the job or process
   - sequence, procedure, flow etc.

4. Question every detail which has been listed above
   - is it necessary, who should do it, does it need to be done.
   - see the check list.

5. Evaluate new approaches, new ideas, and eliminate
   - measure
     1. contribution to objectives
     2. cost (profit)
     3. feasibility
     4. acceptance
     5. time

6. Write up the improvement or change for purposes of presentation.

7. Install - use a pilot department if necessary.

8. Evaluation - select a method of evaluation at the outset.

Creativity Assistance

-Osborn's check list for new ideas-
guide to stimulate the individual thinker

(1) MODIFY -
- -what to add
- -more time, greater frequency
- -stronger, higher, longer, thicker
- -duplicate, multiply, exaggerate

(2) MINIFY -
- -what to subtract
- -smaller, condense
- -omit, streamline, split up, under
- -lower, shorten, lighten

(3) SUBSTITUTE -
- -other process, ingredient, material
- -other place, other approach, form of approach

(4) REARRANGE -
- -interchange components
- -other sequence, schedule, other pattern, layout
- -other person

(5) REVERSE -
- -transpose positive & negative
- -try opposite, turn backward, upside down
- -reverse roles

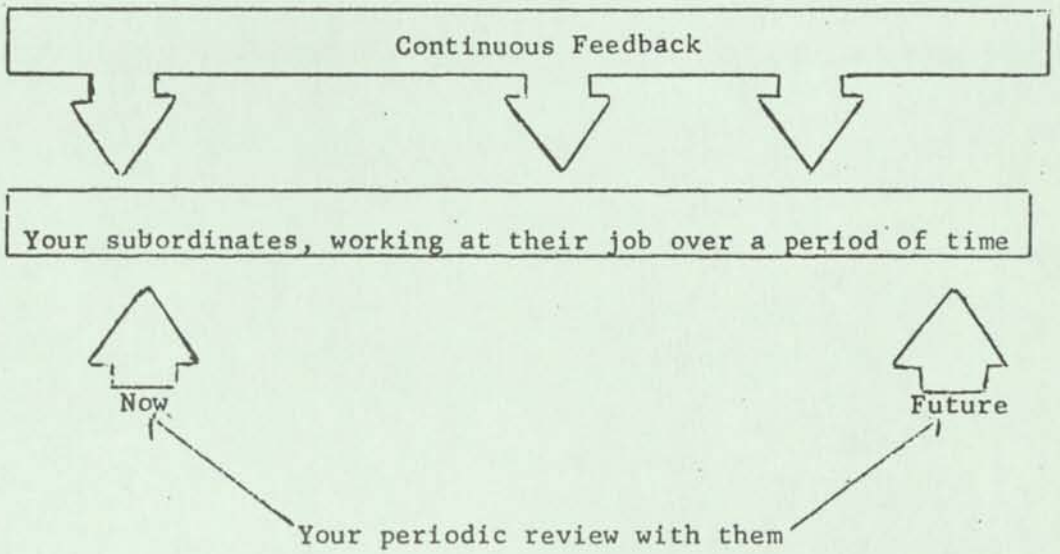
(6) COMBINE -
- -combine uses, purposes, ideas, approaches

(7) PUT TO OTHER USES -
- -new ways to use
- -other uses - if modified
- -what else is like this

Performance Appraisal and Management By Objectives

A. W. Schrader

Feedback affects people's job performance. One kind of feedback your subordinate receives is the information, praise, criticism, and reward you give them during periodic performance reviews. But this kind of feedback isn't enough to get people performing the way they should and to keep them performing that way. This is true because your subordinates receive another kind of feedback -- continuous feedback. It comes from their co-workers, from customers, from their families, or from the job itself. The situation can be pictured something like this:



Sometimes, this continuous feedback competes with the feedback you provide. There are several possible reasons for this. First, there's simply more of it. The chances are pretty good you -- the boss -- will simply be outweighed by the massive amount of feedback your subordinates receive from other sources. A second, closely related reason continuous feedback may have more influence in its immediacy; it happens immediately after a person does something. And, people are influenced more by feedback they've just received than by the same feedback they've received hours, days, or months ago.

A third reason continuous feedback may have more influence is that it is often in direct conflict with the goals and standards you have set up with them in periodic review sessions. For example, if you want a man to conform to safety regulations but he figures out that he can make more money by violating these regulations, you may discover someday that he is systematically ignoring the rules. He can and does identify the favorable and unfavorable consequences of performing in a desired and undesired way.

To counterbalance the effects of continuous feedback coming from co-workers, the job, etc., you have to set up a continuous feedback system of your own for each of your subordinates. And this is how feedback and appraisal fit into the Management by Objectives system. Once you and your subordinate have agreed upon his major areas of responsibility and have established standards of performance in each, you set up a continuous feedback system by identifying some indicators both you and he can watch continuously so each of you can compare actual results with planned results.

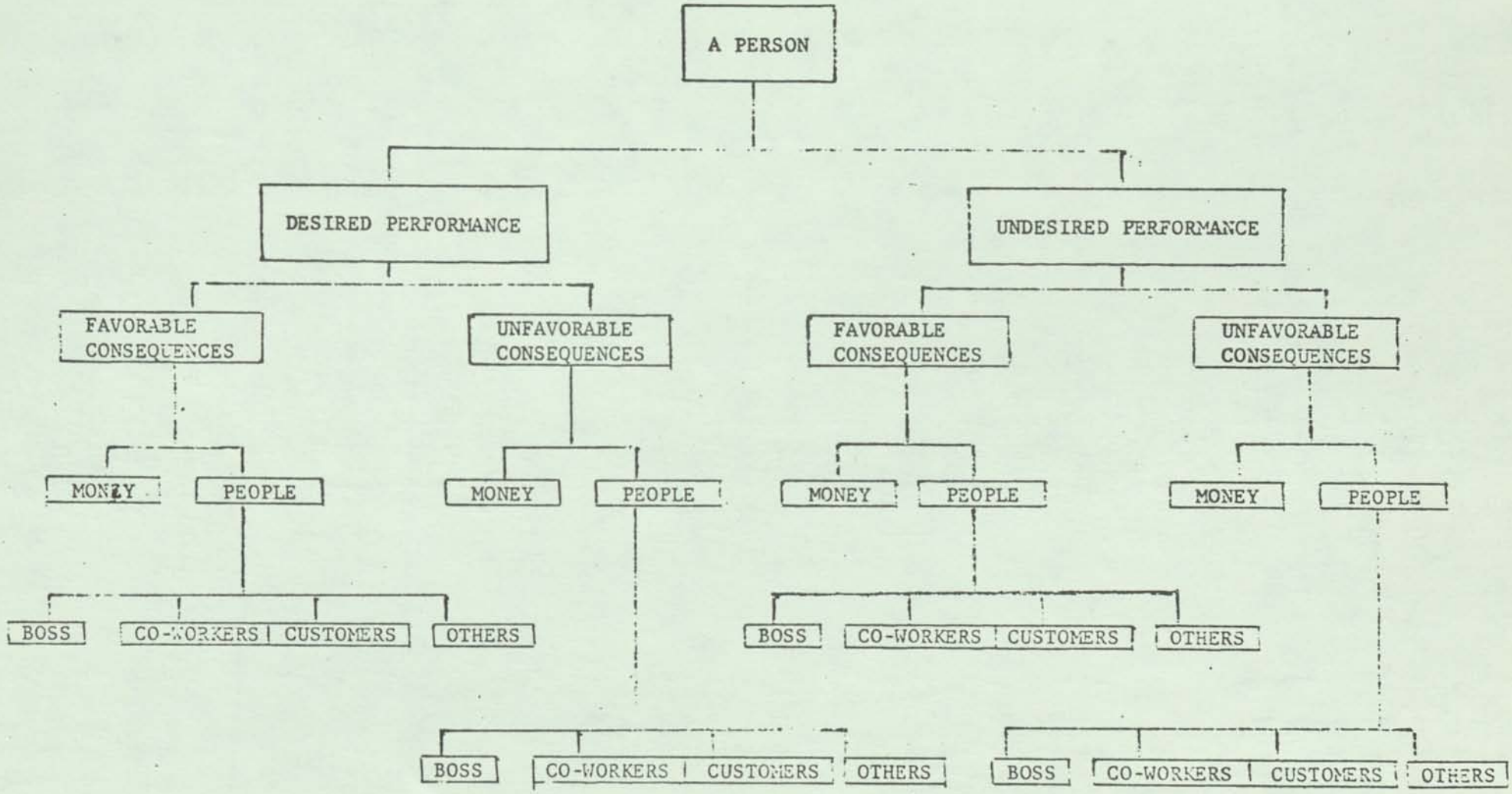
Now that you and he have a means for knowing how he stands at all times, it's up to you to provide some favorable consequences when he meets standards and some unfavorable consequences when he fails to meet them. If you know in advance that you can't do this -- or that the consequences you can provide simply aren't strong enough to compete with those that come from other sources -- recognize that the chances of getting desired performance are pretty slim. So, don't set goals that fly in the fact of reality.

Because both you and your subordinate have a way to monitor his performance continuously, the annual performance review turns out not to be a review at all (you both already know how he's done). It's almost exclusively a planning and goal setting session. The only reason you look at the past is to see what a standard was -- and to determine whether this standard is the one you want to use for the future.

Appraisal forms are an extremely important aspect of this entire process. This is true for two reasons: (1) The appraisal form itself will undoubtedly affect the way you appraise people, and (2) it can be one of the mechanisms which will provide continuous feedback to your subordinates. It should include a clear statement of the man's objectives in terms of results anticipated. It can also specify the plans he will follow to meet those objectives. The form should be set up in such a way as to provide a running account -- a <u>progress</u> record -- of the man's achievements. Finally, an appraisal form should not attempt to classify, categorize, label, or rate a man's performance in some abstract way. It should specify what a person agreed he would attempt to achieve and then record what he actually did achieve.

4.25

CONSEQUENCES OF PERFORMANCE



digital INTEROFFICE MEMORANDUM

DATE: July 9, 1969

SUBJECT: LEOMINSTER PLANT STARTUP PLAN - 60K LEASED FACILITY

TO: P. Kaufmann

FROM: K. Schlenker

cc: J. Smith

The attached report outlines a complete plan for phasing production into the Leominster facility, including detail plant layouts.

Pending your approval, I will coordinate implementation plans with Jack Smith.

COMPANY CONFIDENTIAL

jb

TABLE OF CONTENTS

ASSUMPTIONS AND DEFINITIONS

1. This plan covers the time period through fiscal 1970. Planning beyond fiscal 1970 is dependent upon the outcome of Digital's plans for building a permanent facility in Leominster.

2. The physical structure of 60,000 square feet has been committed for completion on October 15 with an additional four weeks required for fitup. Construction status as of July 3 is four weeks ahead of committed completion. Production phase in has, therefore, been moved up to START between October 15 and October 22.

3. The facility has been leased from Orangewood Development Company for thirty (30) months with an option to extend an additional five years or buy at approximately $5.50 per square foot. The lease is under a net/net agreement at $.90 per square foot. Six months from notice the facility could be expanded an additional 60,000 sq. feet to provide a total facility of 120,000 sq. feet.

4. Hiring of personnel for Leominster will be handled through Maynard. The staffing objective is to minimize the number of permanent transfers from Maynard and maximize on hiring from the local Leominster labor market. Transfer requests to Leominster will not be honored during fiscal 1970.

5. Technician and operator formal training classes will be at Leominster. A classroom will be available for training purposes on September 15.

6. Material control will be administered through Maynard. Parts will be kitted and sent to Leominster

7. Start of production is targeted for late October on peripherals with complete sourcing of shipments scheduled for December. Limited shipments from Leominster to balance total output with Maynard will be made in November. The following peripherals will be assembled at Leominster.

   a) teletypes
   b) PCO
   c) PTO 8
   d) CR
   e) typesetting
   f) line printer
   g) DECtape

8. Final Assembly and Systems Test, including systems integration, will begin with the PDP-12. Start of production build is targeted for November 15 with initial shipments in December.

9. Start of production build on the PDP-15 is targeted for December 15 with 15 system shipments scheduled for January. Complex systems for January shipments will be built and shipped from Maynard. Shipments will be completely sourced from Leominster by February 1970.

10. The initial ten (10) PDP-11 systems will be built at Maynard by Leominster personnel. Hiring will begin in September to allow adequate leadtime for classroom and on the job training. The basic build of the ten (10) systems will be at Maynard with final basic checkout completed at Leominster. The first thirty (30) production machines will be basics and will be completely assembled and tested at Leominster. Testing of macro modules will be transferred to module production in February 1970.

11. Maximum plant capacity, based on a 90/10 shift ratio and 60,000 square feet, will be reached in early first quarter fiscal 1971 (July 1970) with a total plant population of approximately 200.

KMS 7/9/69

LEOMINSTER PLANT STARTUP

PRODUCTION SHIP SCHEDULE FORECAST

		FISCAL 1970				
	2 Qtr		3 Qtr			4 Qtr.
SYSTEMS	NOV	DEC	JAN	FEB	MAR	JUN
PDP-15			15	30	30	40
PDP-12		15	30	30	30	40
PDP-11				10	30	100
PERIPHERALS						
TELETYPE	150	465	465	465	465	
PCO		244	244	244	244	
CR		6	6	6	6	
PT08		120	120	120	120	
TYPESETTING (NOTE 3)		60	60	60	60	
LINE PRINTERS		3	3	3	3	
DECTAPE		250	250	250	250	

TEN PERCENT PROJECTED INCREASE PER QUARTER BEGINNING WITH 4TH QTR.

NOTES:

1. Production schedules based upon the 6 month forecast through Feb. 1970.
2. Schedule for PDP-11 per W. Vaillancourt per PDP-11 Production Plan, April 2, 1969. Schedule adjusted for 2 month slip.
3. Peripheral production during November will be for preparation of December shipments. Based upon the success of startup limited shipments to balance total company output will be made from Leominster in November.

KMS 7/8/69

LEOMINSTER PLANT STARTUP

MANPOWER FORECAST

FISCAL 1970

DIRECT MANPOWER	FISCAL 1970 SEPT	OCT	2 QTR NOV	DEC	JAN	3 QTR FEB	MAR	4 QTR JUNE
BASICS								
PDP-15		6	10	24	27	26	26	30
PDP-12	6	10	25	27	29	26	26	30
PDP-11	5	15	21	23	29	32	32	32
PERIPHERALS								
TELETYPE		13	19	20	20	21	22	23
PAPERTAPE/TYPESETTING/LINE PRINTERS		14	17	17	17	18	19	21
DECTAPE		6	8	8	8	9	10	11
MISC PERIPHERALS						;5	20	23
TOTAL - DIRECT	11	64	99	119	130	148	155	170
INDIRECT MANPOWER	2	5	8	10	10	11	12	13
PLANT MFG. POPULATION	13	69	107	129	140	159	167	183

NOTE:

Maximum plant capability will be reached in first quarter Fiscal 1971. This is based on a 90/10 shift ratio.

KMS 7/8/69

LEOMINSTER PLANT

INDIRECT MANUFACTURING MANPOWER REQUIREMENTS

	FISCAL 1970										
	1 QTR			2 QTR			3 QTR			4 QTR	
	J	A	S	O	N	D	J	F	M	JUNE	
PLANT MANAGER & SEC'Y	1	2		2	2	2	2	2	2	2	
FINANCE											
MFG. SUPERVISORS				2	3	4	4	5	5	5	
QUALITY CONTROL				1	1	1	1	1	1	1	
PRODUCTION CONTROL/STOCKROOM/ EXPEDITERS				1	2	3	3	3	4	5	
TOTAL INDIRECT	1	2		5	8	10	10	11	12	13	
TOTAL DIRECT		11		64	99	119	130	148	155	170	
PLANT POPULATION	1	13		69	107	129	140	159	167	183	

NOTE:

1. Indirect manpower is for manufacturing functions only and does not include personnel, traffic, engineering and plant maintenance. Support for these functions would represent increases.

KMS 7/8/69

LEOMINSTER PLANT

SPACE SUMMARY

Total space requirements are based on the actual layout drawing included in this report (ref. Leominster Plant, architectural print, July 9, 1969)

Office Area		1,800 sq. ft.
Production		
1. PDP-12	8,400	
2. PDP-15	9,600	
3. PDP-11	9,600	
4. Peripherals	15,600	43,200
Stockrooms and Finished Goods		7,200
Lunch Area		1,200
Maintenance		1,200
Other		5,400
Total Plant		60,000 sq. ft.

KMS 7/9/69

TRAINING REQUIREMENTS

1. Formal classroom training will be required for all new hire techs. Approximately 80 percent of new hire techs will be Tech School grads with no work experience; therefore, requiring a 10 week training course.

Sept	11	Tech New Hires
Oct.	15	
Nov.	7	
Dec.	2	

Total to Year End = 35

NOTE:

A classroom will be available at the Leominster facility on October 1.

2. Wiremen and assembly training of new hires will be primarily on job training.

KMS 7/8/69

LEOMINSTER PLANT

FITUP ESTIMATE

Busduct (own) Boxes (sub)		$10,000
Braces Conduit Hardware Wire Outlets	Material & Switch Boxes (sub)	6,000
Labor	6 weeks; 4 men @ $22/hour	5,500
Switch gear (Main)		2,880
	Estimate Total	$24,380
Alternator	20 weeks delivery	7,000
Compressor and piping		4,000
Benches, tables, desks, etc.		15,000
Outdoor lighting - sign, etc.		5,000
	TOTAL	$55,380

NOTE:

1. Fitup expenses does not include capital test equipment or expense tooling.
2. Transportation and training expenses are not included

7/3/69
J. Woulters

HIRING/TRANSFER PLAN

LEOMINSTER MANPOWER STARTUP PLAN

DIRECT MANPOWER

MANPOWER SUMMARY

FISCAL 1970

	1ST QTR	2ND QTR			3RD			4TH QTR
	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	JUN
NEW HIRES								
TECHS	11	26	33	35	40	43	45	51
WIREMEN		16	20	26	28	38	44	48
ASSEMBLERS		17	21	25	28	37	41	47
TOTAL	11	59	74	86	96	118	130	141
TEMP. XFERS								
TECHS		0	1	3	4	3	1	0
WIREMEN		0	2	4	4	2	0	0
ASSEMBLERS		0	1	2	2	0	0	0
TOTAL		0	4	9	10	5	1	0
PERM XFERS								
TECHS		4	11	13	13	13	13	13
WIREMEN		1	10	10	10	10	10	10
ASSEMBLERS		0		1	1	1	1	1
TOTAL		4	21	24	24	24	24	24
TOTALS								
TECHS	11	30	45	51	57	59	59	64
WIREMEN		17	32	40	42	50	54	58
ASSEMBLERS		17	22	28	31	38	42	48
TOTAL	11	64	99	119	130	147	155	170

[redacted] STARTUP PLAN

DIRECT MANPOWER

TELETYPES

FISCAL 1970

	1ST QTR SEPT	2ND QTR OCT	NOV	DEC	3RD JAN	FEB	MAR	4TH QTR JUN
NEW HIRES								
TECHS		0	0	0	0	0	0	0
WIREMEN		6	6	6	6	7	8	8
ASSEMBLERS		5	5	6	6	6	6	7
TOTAL		11	11	12	12	13	14	15
TEMP. XFERS								
TECHS								
WIREMEN								
ASSEMBLERS								
TOTAL		0	0	0	0	0	0	0
PERM XFERS								
TECHS		2	2	2	2	2	2	2
WIREMEN		0	6	6	6	6	6	6
ASSEMBLERS		0	0	0	0	0	0	0
TOTAL		2	8	8	8	8	8	8
TOTALS								
TECHS		2	2	2	2	2	2	2
WIREMEN		6	12	12	12	13	14	14
ASSEMBLERS		5	5	6	6	6	6	7
TOTAL		13	19	20	20	21	22	23
PRODUCT SHIP SCHEDULE (SYSTEMS/MONTH)								
@ Leominster		0	150	465	465	465	465	515
@ Maynard		0	315	0	0	0	0	0
Total		0	465	465	465	465	465	515

NOTES:

1. Start of production build targeted for October 15 with shipments in November. November production will be primarily for December shipments.

2. Six of the eight permanent transfers are Ft. Devens personnel.

3. Manpower required at Maynard during the phase out period will be as follows:

   October - 20 people November - 14 people

KMS 7/8/69

LEOMINSTER MANPOWER STARTUP PLAN

DECtape

DIRECT MANPOWER

FISCAL 1970

	1ST QTR SEPT	2ND QTR OCT	NOV	DEC	3RD JAN	FEB	MAR	4TH QTR JUN
NEW HIRES								
TECHS		0	0	0	0	0	0	0
WIREMEN		2	2	2	2	2	3	3
ASSEMBLERS		3	3	3	3	4	4	5
TOTAL		5	5	5	5	6	7	8
TEMP. XFERS								
TECHS								
WIREMEN								
ASSEMBLERS								
TOTAL		0	0	0	0	0	0	0
PERM XFERS								
TECHS		0	0	0	0	0	0	0
WIREMEN		1	3	3	3	3	3	3
ASSEMBLERS		0	0	0	0	0	0	0
TOTAL		1	3	3	3	3	3	3
TOTALS								
TECHS		0	0	0	0	0	0	0
WIREMEN		2						
ASSEMBLERS		4						
TOTAL		6	8	8	8	9	10	11

PRODUCT SHIP SCHEDULE (SYSTEMS/MONTH)

@ Leominster	0	0	250	250	250	250	300
@ Maynard	250	250	0	0	0	0	0
Total	250	250	250	250	250	250	300

NOTES:

1. Start of production build targeted for Oct. 15 with committed shipments in December. Based upon success of startup limited shipments to balance total output will be made from Leominster in November.

2. Manpower required at Maynard during phase out period will be as follows:

   Oct. - 8 people Nov. - 5 people

   Two of the three permanent transfers are Ft. Devens personnel.

KMS 7/8/69

[illegible] MANPOWER STARTUP PLAN

PAPER TAPE, TYPESETTING
AND LINE PRINTERS

DIRECT MANPOWER

FISCAL 1970

	1ST QTR SEPT	2ND QTR OCT	NOV	DEC	3RD JAN	FEB	MAR	4TH QTR JUN
NEW HIRES								
TECHS		0	0	0	0	0	0	0
WIREMEN		5	5	5	5	6	6	7
ASSEMBLERS		7	8	8	8	8	9	10
TOTAL		12	13	13	13	14	15	17
TEMP. XFERS								
TECHS								
WIREMEN								
ASSEMBLERS								
TOTAL		0	0	0	0	0	0	0
PERM XFERS								
TECHS		2	4	4	4	4	4	4
WIREMEN		0	0	0	0	0	0	0
ASSEMBLERS		0	0	0	0	0	0	0
TOTAL		2	4	4	4	4	4	4
TOTALS								
TECHS		2	4	4	4	4	4	4
WIREMEN		5	5	5	5	6	6	7
ASSEMBLERS		7	8	8	8	8	9	10
TOTAL		14	17	17	17	18	19	21

PRODUCT SHIP SCHEDULE (SYSTEMS/MONTH)

@ Leominster							
PCO's	0	0	244	244	244	244	
CR	0	0	6	6	6	6	350
TTPE.	0	0	60	60	60	60	
@ Maynard							
PCO's	244	244	0	0	0	0	0
CR	6	6	0	0	0	0	0
TTPE	60	60	0	0	0	0	0

NOTES:

1. Start of production build targeted for October 15 with committed first shipments in December. Based upon the success of the startup limited shipments could be made in November.

2. One of the 4 permanent transfers is from Ft. Devens.

3. Manpower required at Maynard during phase out period will be as follows:
   October - 16 people November - 10 people

KMS 7/8/69

[illegible] MANPOWER STARTUP PLAN

DIRECT MANPOWER

Misc. Peripherals (undefined)

FISCAL 1970

	1ST QTR SEPT	OCT	2ND QTR NOV	DEC	JAN	3RD FEB	MAR	4TH QTR JUN
NEW HIRES								
TECHS								
WIREMEN						0	0	0
ASSEMBLERS						7	10	11
TOTAL						8	10	12
						15	20	23
TEMP. XFERS								
TECHS								
WIREMEN								
ASSEMBLERS								
TOTAL								
PERM XFERS								
TECHS								
WIREMEN								
ASSEMBLERS								
TOTAL								
TOTALS								
TECHS								
WIREMEN						0	0	0
ASSEMBLERS						7	10	11
TOTAL						8	10	12
						15	20	23

PRODUCT SHIP SCHEDULE (SYSTEMS/MONTH)

NOTES:

1. Approximately 3,600 ft^2 is available for misc. peripheral workload. Space and manpower will be utilized for expansion of defined peripheral workload above forecast or for additional peripheral products.

KMS 7/8/69

PDP-11

DIRECT MANPOWER

FISCAL 1970

	1ST QTR SEPT	2ND QTR OCT	NOV	DEC	3RD JAN	FEB	MAR	4TH QTR JUN
NEW HIRES								
TECHS	5	10	10	10	15	18	18	18
WIREMEN	0	3	4	5	5	5	5	5
ASSEMBLERS	0	2	3	4	5	5	5	5
TOTAL	5	15	17	19	25	28	28	28
TEMP. XFERS								
TECHS								
WIREMEN								
ASSEMBLERS								
TOTAL			0	0	0	0	0	0
PERM XFERS								
TECHS			2	2	2	2	2	2
WIREMEN			1	1	1	1	1	1
ASSEMBLERS			1	1	1	1	1	1
TOTAL			4	4	4	4	4	4
TOTALS								
TECHS	5	10	12	12	17	20	20	20
WIREMEN	0	3	5	6	6	6	6	6
ASSEMBLERS	0	2	4	5	6	6	6	6
TOTAL	5	15	21	23	29	32	32	32

PRODUCT SHIP SCHEDULE (SYSTEMS/MONTH)

@ Leominster					10	30	100
@ Maynard					0	0	0
Total					10	30	100
Reference:							
Maynard Manpower	16	20	6	6	6	0	0

NOTES:

1. Initial 10 systems will be built at Maynard by Leominster personnel. Systems will be shipped from Leominster. All new hires to be transferred to Leominster in December.

2. Testing of MACRO modules will be transferred to Module Production in Maynard by March.

3. Production layout will be available from W. Vaillancourt on August 1, 1969.

KMS 7/3/69

PDP-12

DIRECT MANPOWER

FISCAL 1970

	1ST QTR AUG	SEPT	2ND QTR OCT	NOV	DEC	3RD JAN	FEB	MAR	4TH QTR JUN
NEW HIRES									
TECHS		6	10	13	13	13	13	14	17
WIREMEN		0	0	3	4	5	5	6	6
ASSEMBLERS		0	0	2	2	3	3	3	4
TOTAL		6	10	18	19	21	21	22	27
TEMP. XFERS									
TECHS				1	2	2	1	0	0
WIREMEN				2	2	2	1	0	0
ASSEMBLERS				1	1	1	0	0	0
TOTAL				4	5	5	2	0	0
PERM XFERS									
TECHS				3	3	3	3	3	3
WIREMEN				0	0	0	0	0	0
ASSEMBLERS				0	0	0	0	0	0
TOTAL				3	3	3	3	3	3
TOTALS									
TECHS		6	10	18	18	17	17	17	20
WIREMEN		0	0	6	6	7	6	6	6
ASSEMBLERS		0	0	3	4	4	3	3	4
TOTAL		6	10	25	27	29	26	26	30
PRODUCT SHIP SCHEDULE (SYSTEMS/MONTH)									
@ Leominster		0	0	0	15	30	30	30	40
@ Maynard		30	30	30	15	0	0	0	0
Total		30	30	30	30	30	30	30	40

NOTES:

1. Start of production build at Leominster targeted for Nov. 15 with 15 systems shipped in December. Complex systems for December shipments will be built and shipped from Maynard.

2. September and October techs required for formal classroom training.

KMS 7/8/69

LEOMINSTER MANPOWER STARTUP PLAN

PDP-15

DIRECT MANPOWER

FISCAL 1970

	1ST QTR SEPT	OCT	2ND QTR NOV	DEC	JAN	3RD FEB	MAR	4TH QTR JUN
NEW HIRES								
TECHS		6	10	12	12	12	13	16
WIREMEN		0	0	4	5	6	6	8
ASSEMBLERS		0	0	2	3	3	4	4
TOTAL		6	10	18	20	21	23	28
TEMP. XFERS								
TECHS				1	2	2	1	0
WIREMEN				2	2	1	0	0
ASSEMBLERS				1	1	0	0	0
TOTAL				4	5	3	1	0
PERM XFERS								
TECHS				2	2	2	2	2
WIREMEN				0	0	0	0	0
ASSEMBLERS				0	0	0	0	0
TOTAL				2	2	2	2	2
TOTALS								
TECHS		6	10	15	16	16	16	18
WIREMEN		0	0	6	7	7	6	8
ASSEMBLERS		0	0	3	4	3	4	4
TOTAL		6	10	24	27	26	26	30

PRODUCT SHIP SCHEDULE (SYSTEMS/MONTH)

@ Leominster	0	15	30	30	40
@ Maynard		15	0	0	0
Total		30	30	30	40

NOTES:

1. Start of production build at Leominster targeted for Dec. 15 with 15 systems shipped in January. Complex systems for January shipments will be built and shipped from Maynard.

2. October and November techs required for formal classroom training.

KMS 7/8/69

digital INTEROFFICE MEMORANDUM

DATE: July 28, 1969

SUBJECT: AN ADDITION TO DISPLAY PRODUCT LINE PROPOSAL

TO: Operations Committee FROM: Bob Collings

Nick has requested that I clarify some of the budget figures included in my proposal of July 17, 1969. The Engineering and Development expense for the year is anticipated to total $200,550 (this is detailed on the last page of the proposal). This is the total of the expenses incurred in cost center #375 (Display Engineering) and it compares to last years expenditure of $174,372.

Of the $200,550, the PDP-8 group has already funded $121,000 and I anticipate the remainder will be funded from either shared projects or the other product lines. Specifically, the amount allocated to complete the VR-12 and Light Pen will contribute to the difference ($200,550 - $121,000). Also, the A/N terminal and other display projects yet unapproved will also contribute.

In addition to the expenses incurred directly in cost center #375 the Display Product Group will occur expenses with the service group (drafting, production engineering, etc.). These expenses are expected to total approximately $100,000. Of this amount the PDP-8 group has funded $55,000. It is anticipated that the remainder will be funded from either shared projects or the other product lines.

	Amount	Status
Display Engineering and Related Expenses	$300,555	
PDP-8 funded	176,000	(Approved)
	124,555	
Completion of VR-12	25,000	(Proposed to Operations Committee)
	99,555	
Completion of the Light Pen	7,500	(Proposed to Operations Committee)
	92,055	
Technical Feasibility of ANT	50,000	(about to be proposed)
Other Display Products	$ 42,055	(not proposed yet)