dec INTEROFFICE MEMORANDUM

DATE October 30, 1962

SUBJECT Foxboro Sales lead & Medical Computer

TO Nick Mazzarese

FROM Arthur Hall

The status of Foxboro as a past and future customer is as follows:

Foxboro-Nabisco — Computer with printer-keyboard, reader, punch, RTO and A-D has been accepted and remains in-house until Foxboro wants to send it to Nabisco.

Corning — This computer with printer-keyboard, reader, punch, RTO and special I/O interface has been accepted and remains in-house until Corning wants it. This machine has been bought by Corning to be used with Foxboro equipment and with Foxboro engineering assistance.

Foxboro is working on bids to Boston Edison, Monsanto and probably other manufacturers as well. They have been making some kind of a decision about what computer they will use for their control system. While we have not been told, it looks as though DEC has been selected.

If this is the case, we can expect momentarily to receive an order for one computer for Foxboro's own use and up to 4 more for proposed business. They would do this to take advantage of the liberal discount with advantageous cancellation privileges.

If memory serves me correctly, Foxboro's projected sales would mean about 4 computers for 1963 and perhaps 10 for 1964.

Foxboro is interested in the PDP-4 Extended Arithmetic Element and the Drum, both under development. Drums will probably be a part of most future orders from Foxboro. They have to the best of my knowledge displayed no interest in card handling equipment. In reply to my specific question, most of their customers are not interested in line printers although some interest might be generated if we had a printer in the range of $7-15K. (There might be a possibility of making a printer in this price range by using the Kleinschmidt printer)

Pertinent to this subject (although not to Foxboro) is the medical field. Harlan Anderson, Gordon Bell and I met yesterday with Stephen Lorch and Frank Irvin of Massachusetts General Hospital to discuss the computer they will be receiving.

They spoke during the discussion of the increasing interest in computers for medical work that has developed over the last two years. They mentioned computers being used at Johns' Hopkins in Baltimore (maybe as many as 10), at Sloane-Kettering and Einstein Hospitals in N. Y. and at some other locations I don't remember. CDC apparently has a two year

jump on us in this field with perhaps 6 computers in use.

Classes being given by Stephen Lorch at the Harvard Medical School have revealed a great deal of interest in computer use for diagnostic medicine. Some of the students have already done some medical programming during last summer and are eager to do more involved work next summer. With this type of interest and the large amount of money available to medicine from foundations and the government, there may be an explosive expansion of computer-oriented medical research. The National Institute of Health apparently has half a billion dollars to spend on research and is very favorably inclined towards computers for this purpose.

If Dr. Irvin may be taken as representative of the field, then there is a need for fast A-D equipment with 8 bit accuracy as an <u>average</u> (biological-type sensors apparently have no better accuracy) and an accuracy ranging from 4 to 10 bits depending upon the case. Some people are using the very fast Raytheon A-D equipment to tape the information so it can be processed later. Dr. Irvin spoke of having 0 to 1.5v positive outputs from the tape equipment he is using, this necessitating a DC amplifier for each channel of input. Channel requirements may go above 100 in some instances.

Immediate and thorough exploratory work in this field might well put us on the ground floor of a business bonanza of the near future.

cc: Ken Olsen
Harlan Anderson
Gordon Bell

INTEROFFICE MEMORANDUM

DATE October 31, 1962

SUBJECT Computer Sales Leads

TO Nick Mazzarese

FROM Bob Savell

PDP-1 Systems Research Laboratories, Dayton, Ohio

I contacted Mr. Roy Griffis, who is the only one who I have had anything to do with at Systems Research Lab, in connection with their computer orders. He said that they have included PDP-1 in a proposal to an Air Force group at Wright-Patterson, and at present have a second Tape Unit 50 on order from us. Other than this there were no immediate prospects for more PDP-1's. They are pleased with the present installation. I would suggest that someone in computer sales or Harlan Anderson get in touch with one of the people higher up in the organization whom they have had contact with before to pursue this a bit further.

PDP-1 Lawrence Radiation Laboratory, Livermore, California

In three talks with Ed LaFranchi, who is the head of the Digital Systems Department for the entire laboratory, and with Glenn Strahl, who is the engineer in charge of our installation at PDP, I find that prospects do not look as bright as they once did for another PDP at least in the immediate future. LaFranchi, who is the one who drew up the specification for the original PDP, is quite satisified, however, he relates that Mr. Sid Fernbach, whose title I don't recall right now but is the man who controls all the money, is quite unhappy about the whole system. The points of unhappiness are as follows:

1. The Uptime card reader still does not work very well. Operaters have to try 2 or 3 times to get a deck of cards to run through the reader. LaFranchi feels that part of this is the fault of the operators, however, he says that the Uptime circuitry still contains many problems some of which Uptime is working on, some of which Uptime does not want to believe really exist. LaFranchi feels that as it stands now they will probably keep the Uptime. He feels that further education of the users will cause more satisfaction with the system.

   The Uptime was not supplied by us as part of the system but is being rented by LRL from Uptime. Of course, most of the users don't know anything about the financial arrangements, and so a black eye for Uptime is a black eye for the whole system. I don't believe that there is much we can do about this with the possible exception of trying to tell them all we can about the Burroughs 800 Card-a-Minute Reader and hope that they may decide to get rid of the Uptime one of these days.

2. The Potter 906 II Tape Units: It seems that Fernbach has never liked Potter, and he is not any happier now than he ever was. This again looks as if it is a problem that we cannot do too much about unless we were to replace them with other transports on an exchange price basis. LaFranchi says that electrically things are working nicely. They have had at least one trouble with the tape units since they have been installed but this was cleared

up to the best of my knowledge quite quickly so that they do not have any real complaints electrically. Fernbach's main complaint is that these things just are not as simple to operate as the IBM Transports which appears to be true. LaFranchi gave me the indication that they were going to do something about getting rid of the 906 II's. They do not know as yet exactly what they are going to do though.

LRL is interested in our new tape control for the IBM high density tapes. There is a good possibility we could sell them at least one of these to go on their system.

3. The Ultra-Precision CRT: The main source of trouble here, of course, is the fact that they mysteriously suffered a burned out tube a while back and that during the course of installing a new tube Glenn Strahl make an error which caused another tube to burn out. They admit to their error on the second tube, however, it would be nice if we had a cathode ray tube protection circuit installed to prevent these goofs which result in $1200 catastrophic failures on which there is no salvage. We are at present working on a circuit that will do this. One more point of unhappiness on the precision is the mechanism for adjusting the focus coil which we admitted at the time of installation was not as good as it could be. We are in the middle of designing a new one which I think I mentioned at the EJCC meeting today. We will be testing that one out during this week.

They are very happy with the results they have been getting using the Ultra-Precision CRT, however. The most recent eyeball program they have been experimenting with is used to detect shades of gray. They have been able to detect 25 shades. For a simple single photo-multiplier eyeball arrangement this is pretty darn good.

I told Ed that we wanted to make sure they were satisified with the system and especailly so if their unhappiness was the prime reason for not ordering another PDP at this time. They have been very nice in all our dealings with them, and many times when we have offered to do things for them or come out and help them they have said, no, no don't do that, but I feel that we should discuss the problem further and possibly take the initiative on our own to improve the situation asmuch as possible even if they don't insist on it. It is certainly worth some investment of time and money if it will result in another system sale.

Mrs. Dorothy Monk, who has also swung quite a bit of weight out there in the past and also has been quite unhappy about the whole system but primarily about the Uptime card reader, is leaving on November 8th. She and Mr. Fernbach are the two people who have swung the most weight as far as the original purchase and purchase of another PDP are concerned.

With regard to the new tape control unit for the high density tape, Ed is concerned because in the proposal for this tape unit that we sent to them we gave them the option of permanently selecting two out of three possible densities. He feels that this is a drawback over the IBM unit which offers programmable selection of two out of three. He says they would gladly pay a few extra dollars for this added selection privilege.

I quizzed them about the possibility of selling them a 16" Display for their 7090. It turns out that in another month they are getting a DD-80 from Data Display to hang on the 7094. The price for this unit Ed tells me is between 50 and 100K. They are also buying a precision display from Data Display (Data Display's first precision) with a Vought camera. He didn't say how much this assemblage was going to cost. They are using a direct data input which is going to cost them 100K for the direct data input alone exclusive of the data channel cost, and will tie up one of their regular data channels full time. However, they will be able to plot points at a 2 microsecond rate and point characters at about a 50KC rate, he said. The 2 microseconds sounds too fast to be correct to me.

He also brought up the interesting information that he had been down to visit Trans-data in San Diego a couple of months ago as they were readying a display to be delivered, he thinks, to MITRE Corporation with a 33KC point-plot rate and a 62 1/2KC character mode. The price for this unit was to be over 100K, so it looks as if I'll have to get on the ball and see what I can find out about both of these units as we are thinking about building something along the same line.

cc: Stan Olsen
Ken Olsen
Harlan Anderson
Ben Gurley
Bob Beckman
Ted Johnson -- West Coast Office

dec INTEROFFICE MEMORANDUM

DATE 30 October 1962

SUBJECT Conference Papers

TO ✓Ken Olsen
Harlan Anderson
Stan Olsen
Dick Best
Ben Gurley
John Fadiman

FROM Stu Grover

Attached is a copy of the technical meetings notice compiled and distributed in the MITRE Corporation each quarter. I thought you might be interested in both its form and substance. Note that it gives abstract deadlines in each month's listing. If we have enough technical development to warrant it, I could

1. Continue to obtain copies of the MITRE compilation and forward them to you and others you might designate (e.g., Russ Doane, Gordon Bell)

2. Compile a list narrowed to DEC's interests and distribute it as above

3. Continue my present practice of sending notes to Dick whenever I see deadlines coming.

I'd appreciate your comments.

# OCTOBER -- DECEMBER 1962, TECHNICAL MEETINGS

## OCTOBER

| MEETINGS | Date | Organization | Place | Sponsor |
|---|---|---|---|---|
| Monday | 1-3 | 8th Nat'l Communication Symp | Hotel Utica & Municipal Aud, Utica, NY | PGCS, Rome-Utica Section |
| Monday | 1-4 | Annual Mtg Air Traffic Control Assn | Flamingo Hotel, Las Vegas, Nev | PGSET |
| Sunday | 7-12 | 3rd Annual Symp on Switching Circuit Theory & Log Design | Chicago, Ill | AIEE Computing Devices Committee |
| Monday | 8-10 | Nat'l Electronics Conf | McCormick Place Chicago, Ill | IRE, AIEE, et al |
| Friday | 12-13 | 7th Annual Electronic Symp | Greensboro Coliseum Greensboro, NC | North Carolina Section |
| Monday | 15-18 | Symp on Space Phenomena and Measurement | Statler-Hilton Detroit, Mich | AEC, PGNS, NASA |
| Monday | 22-24 | ECCANE (East Coast Conf on Aerospace & Navigational Electr) | Emerson Hotel Baltimore, Md | PGANE, Balt, Md Section |
| Wednesday | 25-27 | 1962 Electron Devices Meeting | Sheraton Park Hotel Washington, D.C. | PGED |
| Tuesday | 30-31 | Conf on Spaceborne Computer Eng | Disneyland Hotel Anaheim, Cal | PGEC |

| ABSTRACTS | Due Date | Organization | Mtg Place & Date | Contact |
|---|---|---|---|---|
| Friday | 12 | 1963 Nat'l Winter Conv on Mil Elec | Ambassador Hotel Los Angeles, Calif Jan 31--Feb 1, 1963 | 100 word unclass, abstr 500 word summary, sketch of author; Fred P. Adler, Manager, Space Systems Div Hughes Aircraft Co Culver City, Calif |
| Friday | 19 | IRE Internat'l Conv | Coliseum & Waldorf-Astoria Hotel, NY Mar 25-28 | Dr. D. B. Sinclair, IRE Hdqrs, 1 E 79 St., NY |

## NOVEMBER

| MEETINGS | Date | Organization | Place | Sponsor |
|---|---|---|---|---|
| Sunday | 4-7 | 15th Annual Conf on Engineering in Bio and Medicine | Conrad Hilton Hotel, Chicago, Ill | PGBME, AIEE, ISA |

NOVEMBER (continued)

| MEETINGS | Date | Organization | Place | Sponsor |
|---|---|---|---|---|
| Thursday | 1-3 | Symp on Continuum Mech | MIT, Cambridge, Mass | SIAM |
| Monday | 5-7 | NEREM (Northeast Res and Engineering Mtg) | Commonwealth Armory, Somerset Hotel, Boston | Region 1 |
| Wednesday | 7-9 | National Mtg, Operations Research Society of America | Sheraton Hotel, Phil | ORS |
| Monday | 12-15 | 8th Annual Conf on Magnetism and Magnetic Materials | Penn-Sheraton Pittsburgh, Pa | PGMTT, AIEE, AIP |
| Tuesday | 13-15 | NEREM (Northeast Res and Engineering Mtg) | Boston, Mass | NEREM |
| Friday | 16-17 | 2nd Canadian IRE Communications Symp | Queen Eliz Hotel Montreal, P.Q. Can | Montreal Section |
| Monday | 19-20 | MAECON (Mid-America Electronics Conf) | Hotel Continental Kansas City, Mo | Kansas City Section |
| Wednesday | 28-30 | 1962 Ultrasonics Symp | Columbia Univ, New York City | PGUE |

| ABSTRACTS | Due Date | Organization | Mtg Place & Date | Contact |
|---|---|---|---|---|
| Thursday | 1 | Int'l Solid State Circuits Conf | Sheraton Hotel and Univ of Penn, Phil, Pa, Feb 20-22, 1963 | S. K. Ghandi, Philco Scientific Lab, Blue Bell, Pa |

| PAPERS | Due Date | Organization | Mtg Place & Date | Contact |
|---|---|---|---|---|
| Thursday | 15 | 4 th Joint Aut Cont Conf | Univ of Minn, Minneapolis, Minn June 19-21, 1963 | Hdqrs: AIEE, IRE, ASME, OR AIchE |

DECEMBER

| MEETINGS | Date | Organization | Place | Sponsor |
|---|---|---|---|---|
| Tuesday | 4-6 | FJCC (Fall Joint Computer Conf) | Sheraton Hotel, Phil Pa | AFIPS, (PGEC, AIEE, ACM) |
| Friday | 6-7 | PGVC (PG on Vehicular Communications) Conf | Disneyland Motel Los Angeles, Calif | PGVC |

DECEMBER (continued)

| MEETINGS | Date | Organization | Place | Sponsor |
|---|---|---|---|---|
| Wednesday | 26-31 | Annual Nat'l Mtg & Exp of Sci & Ind | Amer Assoc for Advancement of Sci, Phila, Pa | AAAS |

| ABSTRACTS | Due Date | Organization | Mtg Place & Date | Contact |
|---|---|---|---|---|
| Monday | 17 | AIEE/IRE Int'l Conf on Nonlinear Magnetics | Shoreham Hotel, Wash, DC, April 17-19, 1963 | IRE Hdqrs |

# INTEROFFICE MEMORANDUM

DATE October 30, 1962

SUBJECT PACKAGE TYING MACHINE

TO G. T. O'Dea FROM J. L. Atwodd

CC: K. H. Olsen
R. Mills

In order to qualify for the bulk rate on our general mailings, we must tie the mailing pieces together in ten's by destination. Done by hand, this is a tedious operation - with efficiency dropping off steadily as fingers tire, "rope burns" develop and boredom sets in. Even our most company-minded girls find it hard to maintain a steady production rate over a period of several hours.

In the past, we have bought special tying twine and cotton work gloves to reduce the incidence of burns. These have helped, but the loss of proficiency in handling the twine, the cutters and the mailing pieces with gloves on caused a very marked drop in output and morale.

Our mailing group has asked to be provided with a package typing machine to handle this operation. They feel it would reduce both the time required to make a mailing and the need for peak-load temporary help. I endorse this proposal and recommend the machine they have selected. (See attachment.) Having such a machine would result in some reduction in overall mailing costs. Even more important, it would show our appreciation for the hard work these girls are doing day in and day out on mailings and publications.

While it is difficult to make an exact comparison between the cost of hand typing and the cost of machine tying without actual performance data, our best guess is that machine tying is about three times as fast and, therefore, 67% cheaper with respect to labor expense.

On a 20,000-piece mailing requiring 2,000 bundles, the comparative costs would be:

Hand tying: $\frac{2000}{3/\text{min}}$ = 666 mins or 11 hrs @ \$1.75 = \$19.25

Machine tying: $\frac{2000}{9/\text{min}}$ = 222 mins or 3.7 hrs @ \$1.75 = \$6.48

Thus the saving on bulk mailings alone (not counting other mailing and packaging applications) might be in the neighborhood of \$13.00 per mailing or \$130.00 a year. If so, the \$695.00 cost of the machine might be offset in approximately five years.

dec INTEROFFICE MEMORANDUM

DATE October 29, 1962

SUBJECT Taper Pin Crimping Procedure
Reference your memo of Sept. 28

TO Ken Olsen

FROM Klaus Doering

cc: Cy Kendrick

Even after your memo, we had trouble with these pins, and had to reject a considerable amount out of finished goods.

Production added a special inspection station for these taper pins and has been fully instructed about the criteria.

In addition to that, we have made up the enclosed drawing which is being put up above the taper pin crimping machine to give the operator a pictorial view of what whould be rejected.

CURRENT ENGINEERING DEVELOPMENT AND FIELD SERVICE NUMBERS

FROM: Richard L. Best DATE: October 26, 1962

| | |
|---|---|
| EN 1000 | General Engineering |
| EN 1010 | 5 MC System Modules |
| EN 1011 | 500 KC System Modules |
| EN 1012 | Non-Compatible Low Speed B. B. |
| EN 1013 | Current Drivers (vacuum tube) |
| EN 1014 | Digital-to-Analog Converter |
| EN 1015 | Typewriter |
| EN 1016 | Core Memory Development |
| EN 1017 | Signal Converters |
| EN 1018 | Memory Tester Development |
| EN 1019 | Modules Sales |
| EN 1020 | PDP-1 Development |
| EN 1021 | Core Handler |
| EN 1022 | Power Supplies |
| EN 1023 | Mounting Panels |
| EN 1024 | Paper Tape Reader |
| EN 1025 | Paper Tape Punch |
| EN 1026 | Magnetic Tape Equipment |
| EN 1027 | Large Tube Display |
| EN 1029 | 10 MC System Modules |
| EN 1030 | Educational Building Blocks |
| EN 1031 | Computer Development |
| EN 1032 | Utility Programming, PDP-1 |
| EN 1033 | Sales Programming, PDP-1 |
| EN 1034 | PDP-1 Sales |
| EN 1036 | Light Pen Development |
| EN 1037 | Core Tester and Memory Tester Sales |
| EN 1038 | Special System Sales |
| EN 1039 | Solid State Current Drivers |
| EN 1040 | Drum Circuit Development |
| EN 1041 | Drum System Development |
| EN 1042 | Current Driver Power Supply 766 |
| EN 1043 | VHF Building Blocks |
| EN 1044 | Analog-to-Digital Converter |
| EN 1045 | Digital Average Response Computer |
| EN 1046 | Punched Card Equipment for PDP-1 |
| EN 1048 | Test Equipment Headquarters (RH) |
| EN 1049 | Engineering Stockroom |
| EN 1050 | Data Phone |

| | |
|---|---|
| EN 1051 | Classroom Modules |
| EN 1052 | Memory Stack Assembly |
| EN 1053 | Computer Cabinet |
| EN 1055 | PDP-1 Production Test Equipment |
| EN 1057 | Core Tester Development |
| EN 1058 | Anelex Development |
| EN 1062 | PDP-4-1 Operation |
| EN 1064 | Display 31 Development |
| EN 1067 | Information International (Ed Fredkin) |
| EN 1068 | Burroughs Card Reader |
| EN 1069 | PDP-1 Computer Administration |
| EN 1072 | Standards |
| EN 1073 | Quality Control |
| EN 1074 | Memory Tester Field Service |
| EN 1075 | Core Tester Field Service |
| EN 1076 | Memory Exerciser Field Service |
| EN 1077 | Misc. Special System Field Service |
| EN 1078 | ITT Prototype Rework |
| EN 1086 | Telex Printer (BS) |
| EN 1087 | Relay and Switch Investigation |
| EN 1088 | Module Packaging for Shipment |
| EN 1089 | Line Unit Tester (GB) |
| EN 1090 | 4203 Development |
| EN 1091 | 4204 Development |
| EN 1092 | 10 MC Laboratory Modules |
| EN 1093 | 5 MC Laboratory Modules |
| EN 1094 | 500 KC Laboratory Modules |
| EN 1095 | PDP-4 Sales |
| EN 1096 | PDP-4 Programming |
| EN 1097 | Modules Construction Development |
| EN 1098 | M odule Test Development |
| EN 1099 | Field Service, General |
| EN 1100 | Power Controls |
| EN 1116 | Memory Tester Field Modification |
| EN 1122 | 3 KC Power System Development |
| EN 1123 | Core Tester 2114 Development |
| EN 1127 | Current Calibrator Development |
| EN 1128 | PDP-1 Checkout Training |
| EN 1129 | Character Generator Development |
| EN 1130 | 1521 Development |
| EN 1131 | Anelex Prototype Construction |
| EN 1132 | ADX Systems Administration |
| EN 1133 | PDP-4 Systems Administration |
| EN 1134 | PDP-4 Flexowriter Prototype |
| EN 1135 | Display 30-D Prototype (PDP-4) |

| | | |
|---|---|---|
| | EN 1136 | Link Tape Unit |
| | EN 1137 | Type 56 Tape Control Development |
| * | EN 1138 | Prototype A-D for PDP-4-1 |
| * | EN 1139 | Serial Drum System Development |
| * | EN 1140 | Serial Drum Prototype |
| * | EN 1141 | Fortran |
| * | EN 1142 | Serial Drum Circuit Development |
| * | EN 1143 | Delay Line Memory Development |
| * | EN 1144 | Quality Control: Test Equipment labor, materials |
| * | EN 1145 | Quality Control: Model Test |
| * | EN 1146 | Quality Control: Module Repair-field failure |
| * | EN 1147 | Quality Control: Module Repair-salvage |
| * | EN 1148 | Teletype line unit modules |

Supercedes Memo Dated September 19, 1962

* Indicates New Numbers Added

dec INTEROFFICE MEMORANDUM

DATE October 29, 1962

SUBJECT PERSONNEL MEETING - 10/3/62 and 10/4/62

TO K. Olsen
H. Anderson
S. Olsen
M. Sandler
G. O'Dea
R. Best
B. Gurley
J. Fadiman
W. Hindle
R. Mills
B. Charnock

FROM Bob Lassen

The following is a summary of the decisions made at the meeting held on 10/3/62 and 10/4/62 and a report of the status of various personnel projects:

GROUP INSURANCE--Items discussed

a) Establishing an age limit for new employees with respect to group life insurance eligibility.

b) Inclusion of Private Room Coverage under Major Medical to a maximum of $28.00 per day. (This would be subject to the $50.00 deductible and the 80%-20% clause.)

c) Review present method of processing medical claims with particular emphasis on eliminating inconvenience of filling out forms.

I have met this week with the representative of Blue Cross-Shield for the purpose of comparing our plan with theirs.

I will next meet with Mr. DeYorio, John Hancock Group Representative, to further emphasize our intent to establish an age eligibility requirement for new employee life coverage. We will also ask them to consider more carefully possibilities of eliminating some of the undesirable features of processing claims. A proposal made to me earlier on this matter was not satisfactory; however, by using Blue Cross as a wedge, we may be able to come up with something more desirable.

I will also instruct Mr. DeYorio to amend our contract to include Private Room Coverage under Major Medical to a $28.00 per day

maximum--DEC to assume the entire additional cost (approximately $800.00 per year). We have been holding off the printing of new insurance booklets until this coverage was put into effect. We will also issue a notice to all of our employees announcing this as a new company benefit.

WAGE ADMINISTRATION

A formal wage structure was accepted as follows:

Hourly (non-exempt)--Required to record all working time by punching a time card. Eligible for company benefits and privileges for hourly employees including time and one-half pay for all authorized scheduled time worked in excess of 8 hours in a working day or 40 hours in a week, whichever is greater. The Annual Wage Review will be at the time of the company's Annual Review for Hourly Employees. Hourly employees include: Assemblers (female), Wiremen, Technicians, Machinists, Sheet Metal Workers, Mechanics, Maintenance Men, Silk Screeners, Dip Solderers, Photographers, Carpenters, Stock or Tool Crib Attendants, Painters, Shippers, Receivers, Janitors, Production-Clerical, Inspectors, Mail Clerks, etc.

Weekly (non-exempt)--Required to record all working time by filling in (in writing) a time card. Eligible for company benefits and privileges for hourly employees, including time and one-half pay for all authorized scheduled time worked in excess of 8 hours in a working day or 40 hours in a week, whichever is greater. The Annual Wage Review will be at the time of the company's Annual Review for Hourly Employees. Weekly employees include: Clerks, Clerk-typists, Secretaries, Junior Administrative, Librarians, Accounting Clerks. (Weekly people are normally assigned to a clerical or administrative area).

Salaried-Overtime (exempt)--Not required to record time worked during normal working hours. Eligible for company benefits and privileges for salaried employees. Eligible for straight time pay for all authorized scheduled overtime in excess of 40 hours in a week up to a maximum of 48 hours in a week until attainment of a base salary of $120.00 per week. Overtime hours must be recorded and approved. The Annual Wage Review will be at the time of the company's Wage Review for Salaried Employees.

Salaried-Straight (exempt)--Not required to report time worked. Eligible for company benefits and privileges for salaried employees. Not eligible for overtime pay. This category will include all exempt personnel who are receiving a base salary

of over $120.00 per week. The Annual Wage Review will be at the time of the company's Wage Review for Salaried Employees.

It was decided to initiate this program on January 1, 1963. At that time all DEC employees will be classified in one of the above wage classes (by code as suggested by Dick Mills). New employees will be classified in the appropriate wage class when the offer is made. The Personnel Dept. will notify the Accounting Dept. of the new employee's wage class (by code) on the Addition to Payroll notice. I feel this information should be included in our regular IBM salary run sheets.

It was also decided to reclassify the following administrative people from Weekly (non-exempt) to Salaried (exempt) on January 1, 1963, thereby making them eligible for the Salaried Review and other benefits and privileges for salaried personnel:

| | | |
|---|---|---|
| R. Maroney | J. Rutchman | B. Charnock |
| W. Farnum | T. Whalen | H. Shebak |
| F. MacLean | F. Mariani | L. Boucher |
| F. Kalwell | R. Blackwood | R. King |

Their overtime status will, of course, depend upon their salary after the January review.

JOB CLASSIFICATION, MERIT RATING AND WAGE REVIEW PROGRAM FOR ALL HOURLY AND WEEKLY (NON-EXEMPT) PERSONNEL

It was decided to start quarterly merit ratings immediately. This program will be administered by the Personnel Office through the department heads. Merit rating forms and employee listings by departments will be distributed this week with a November 16th deadline. Ratings for all hourly and weekly (non-exempt) employees will eventually be on a regular December, March, June and September basis.

We will continue our regular program of conducting an Annual Job Classification and Wage Review for hourly and weekly (non-exempt) employees. However, I will periodically meet with department heads to keep abreast of individual classification changes during the year.

I am currently outlining a Wage and Benefit survey which we plan to conduct after the first of the year. At that time we will review our current job classification (descriptions) and rate structure and recommend whatever changes are necessary through the department heads and the Personnel Committee.

We agreed that I should set up a planned schedule of meetings with supervisors for the purpose of providing better communication between the company and its people, and vice versa. This program must be designed to be interesting and informative and will require some planning. I am not sure when we'll start; however, I hope to begin around the first of the year after a few of the current projects are cleaned up.

I am working with Dick Mills and Fred MacLean in planning periodic IBM runs pertaining to hourly personnel. The information contained in these runs, together with personal histories of all hourly and weekly (non-exempt) personnel, will be of tremendous help in better evaluating the performance, capabilities, interests, background and training of each employee. (Perhaps something similar should be done with salaried employees.) Many of our present methods rely too much on memory and chance.

Unless there are any questions concerning the activities outlined above, we shall continue proceeding with these projects.

/jfr

# INTEROFFICE MEMORANDUM

DATE October 26, 1962

SUBJECT Effects of Engineering Change Notices on Inventories

TO Ken Olsen

FROM Harlan Anderson

cc: Dick Best
Maynard Sandler
Dick Mills
George O'Dea

It is apparent that there are some major loopholes in our past procedure for examining the effect of Engineering Change Notices on inventories. This was dramatically displayed by suddenly finding almost $70,000 worth of raw material inventory items that had been obsoleted in the first quarter of 1963. There appeared to be no routine method of finding these problems at a time when some preventive action or attention could be focused on it. It is obvious that too much of the coordination of this type in the past has depended on verbal contact rather than a procedure which was more automatic. In view of this, I would like to propose that the following procedure be followed.

1. Production does not implement any engineering changes which obsolete any inventory item without having first received the formal Engineering Change Notice in writing approved by the Engineering Department.

2. The engineering change notice should indicate what raw materials, sub-assemblies, and finished products are obsoleted or replaced by this Change Notice.

3. The Engineering Department should continue to alert production of any pending changes or effects on inventory. This is not a substitute for the formal Engineering Change Notice but is in addition to it.

4. The Production Department should make its own determination of the effect of Engineering Change Notices on present inventories. This includes the privilege of delaying the introduction of an Engineering Change Notice until existing inventories are consumed. The obvious exception to this is when an Engineering Change Notice is required because the old method of producing the item is totally unsatisfactory.

5. The Production Department is responsible for making sure that obsolete inventory is written off on a current basis meaning month to month.

6. Any individual inventory writeoff of more than $1,000 should be reported to the Works Committee.

7. Any specific problem in this area which cannot be resolved in a mutually satisfactory way by Engineering and Production should be brought up at the Works Committee at an early date.

H.E.Anderson

SUBJECT: REPAIR OF RETURNED MODULES

DATE: OCTOBER 22, 1962

TO: Ken Olsen

FROM: JIM CUDMORE

THE FOLLOWING IS A LIST OF MODULES RETURNED FOR REPAIR DURING THE WEEK OF OCTOBER 15.

| UNIT | SERIAL NO. | CUSTOMER | DEFECT |
|---|---|---|---|
| 1105 | 60845 E | E.G. & G. INC. | NONE |
| 1111 | 69209 D | E.G. & G. INC. | D001 CLAMPED LOAD DIODE OPEN |
| 1150 | 0039261 C | E.G. & G. INC. | MA90 OPEN, D001 OPEN |
| 1201 | 58980 P | E.G. & G. INC. | CHANGED DIODES 001 TO 003 |
| 1201 | 0032569 P | UNKNOWN | NONE |
| 1201 | 0050528 P | ADX-8 | SHORTED TRANSFORMER LEADS |
| 1201 | 0051395 P | A.E.C. | TRANSFORMER IN WRONG |
| 1213 | 56568 D | CORNELL UNIV. | MD27 TRANS. LEAKING. REPLACED BROKEN PLUG. CHANGED CAPACITORS |
| 1310 | 43336 C | UNKNOWN | NONE |
| 1310 | 03224 E | UNKNOWN | NONE |
| 1538 | 0048895 C | D.E.C. | MD95-(2-08) EXCESSIVE ICBO |
| 1538 | 007692 C | D.E.C. | MD95 EXCESSIVE ICBO |
| 1538 | 0007085 C | I.T.T. | NONE |
| 1538 | 0045418 | I.T.T. | NONE |
| 1538 | 0010290 | D.E.C. | NONE |
| 1538 | 0045407 | I.T.T. | NONE |
| 1538 | 0010290 | D.E.C. | MD95 IN BACKWARDS, SDA-1 EXCESSIVE ICBO |
| 1538 | 0046693 C | D.E.C. | SHORTED WW RESISTOR |
| 1607 | 0019125 B | UNKNOWN | NONE |
| 1607 | 0019129 B | UNKNOWN | NONE |
| 1607 | 0012176 B | UNKNOWN | NONE |
| 1607 | 0018539 B | UNKNOWN | NONE |
| 1607 | 0019118 B | UNKNOWN | NONE |
| 1607 | 0019119 B | UNKNOWN | NONE |
| 1607 | 0019123 B | UNKNOWN | NONE |

REPAIR OF RETURNED MODULES (CONT.)

| UNIT | SERIAL NO. | CUSTOMER | DEFECT |
|---|---|---|---|
| 1607 | 0018192 B | UNKNOWN | NONE |
| 1607 | 0019116 B | UNKNOWN | NONE |
| 1607 | 0019120 B | UNKNOWN | NONE |
| 1607 | 0019132 B | UNKNOWN | NONE |
| 1607 | 0019128 B | UNKNOWN | NONE |
| 1607 | 0019115 B | UNKNOWN | NONE |
| 1607 | 0018541 B | UNKNOWN | NONE |
| 1677 | 0029181 C | J. DUFFY | MA90 RED PUNCHED THROUGH. CHANGED TO MA90 BROWN |
| 1677 | 0036022 C | J. DUFFY | SAME AS ABOVE |
| 1677 | 0056187 C | J. DUFFY | SAME AS ABOVE |
| 1677 | 0036024 C | J. DUFFY | SAME AS ABOVE |
| 1677 | 0036033 C | J. DUFFY | SAME AS ABOVE |
| 1684 | 84301 C | D.E.C. | NONE |
| 1684 | 82469 C | D.E.C. | NONE |
| 1684 | 84304 C | D.E.C. | NONE |
| 1684 | 70587 B | D.E.C. | NONE |
| 1685 | 99564 B | D.E.C. | NONE |
| 1685 | 99360 B | D.E.C. | NONE |
| 1685 | 94704 B | D.E.C. | NONE |
| 1685 | 94517 B | D.E.C. | NONE |
| 1685 | 0035181 B | UNKNOWN | NONE |
| 1685 | 0020512 B | UNKNOWN | NONE |
| 1685 | 0020543 B | UNKNOWN | NONE |
| 1685 | 0026129 B | UNKNOWN | NONE |
| 1685 | 0020523 B | UNKNOWN | NONE |
| 1685 | 0026130 B | UNKNOWN | NONE |
| 1685 | 0020522 B | UNKNOWN | NONE |

REPAIR OF RETURNED MODULES (CONT.)

| UNIT | SERIAL NO. | CUSTOMER | DEFECT |
|---|---|---|---|
| 1685 | 0020518 B | UNKNOWN | NONE |
| 1685 | 0020562 B | UNKNOWN | NONE |
| 1685 | 0020528 B | UNKNOWN | NONE |
| 1685 | 0020516 B | UNKNOWN | NONE |
| 1685 | 0035176 B | UNKNOWN | NONE |
| 1685 | 0020506 B | UNKNOWN | NONE |
| 1685 | 0020507 B | UNKNOWN | NONE |
| 1685 | 0020527 B | UNKNOWN | NONE |
| 1685 | 0020515 B | UNKNOWN | NONE |
| 1685 | 0020525 B | UNKNOWN | NONE |
| 1685 | 0020517 B | UNKNOWN | NONE |
| 1685 | 0020530 B | UNKNOWN | NONE |
| 1685 | 0020511 B | UNKNOWN | NONE |
| 1685 | 0026128 B | UNKNOWN | NONE |
| 1685 | 0020520 B | UNKNOWN | NONE |
| 1685 | 0020531 B | UNKNOWN | NONE |
| 1685 | 0020519 B | UNKNOWN | NONE |
| 1685 | 0026137 B | UNKNOWN | NONE |
| 1685 | 0026131 B | UNKNOWN | NONE |
| 1685 | 0026132 B | UNKNOWN | NONE |
| 1685 | 0020529 B | UNKNOWN | NONE |
| 1685 | 0020509 B | UNKNOWN | NONE |
| 1703 | 0049329 A | D.E.C. | D001 SHORTED & OPEN |
| 1703 | 0049321 A | D.E.C. | D662 OPEN, D001 OPEN |
| 1972 | 0037758 B | E.A. | MD114 (SPRAGUE 2-28)--EXCESSIVE ICBO |
| 1972 | 0044816 B | E.A. | SAME AS ABOVE |
| 1972 | 0044764 B | E.A. | D001 OPEN, MD114 (SPRAGUE 2-28) OPEN |

REPAIR OF RETURNED MODULES (CONT.)

| UNIT | SERIAL NO. | CUSTOMER | DEFECT |
|---|---|---|---|
| 1973 | 0046394 C | ADX-6 | OBSOLETE--2N1204'S REPLACED WITH 2N2099'S |
| 1973 | 0055804 C | UNKNOWN | SAME AS ABOVE |
| 1973 | 0051313 C | ADAMS ASSOC. | SAME AS ABOVE |
| 1973 | 0037321 C | ADAMS ASSOC. | SAME AS ABOVE |
| 1973 | 0051316 C | D.E.C. | SAME AS ABOVE |
| 1973 | 0037437 C | ADX-6 | SAME AS ABOVE--D003 SHORTED, M094 SHORTED |
| 4202 | 64549 C | E.G. & G. INC. | 2N1754 OPEN--2N412 CHANGED TO 1305 |
| 4213 | 71542 | MINN. HONEYWELL | D001 MOVED BETWEEN D662 & D662 |
| 4603 | 96827 D | M.I.T. | 2N1305 OPEN |
| 4603 | 0017253 D | ADX-6 | NONE |
| 4603 | 0053505 D | UNKNOWN | NONE |
| 4603 | 0017263 | D.E.C. | 2N1305'S (T.I. 980-215) OPEN EMITTER TO BASE -- D001 OPEN |
| 4603 | 59915 C | UNKNOWN | NONE |
| 4603 | 02437 D | UNKNOWN | NONE |
| 4603 | 59916 C | UNKNOWN | NONE |
| 4603 | 0052941 D | A.E.C. | TRANSISTORS (G.E. 1305'S) EXCESSIVE ICBO |
| 4603 | 0053384 | UNKNOWN | NONE |
| 4677 | 0026367 C | UNKNOWN | NONE |
| 4677 | 0026373 | PDP-4 | T.I. 2N1305 980 226 - EXCESSIVE ICBO |

OF A TOTAL OF 98 MODULES RETURNED, 66 HAD NO DISCERNIBLE DEFECTS.

COMPANY CONFIDENTIAL

dec INTEROFFICE MEMORANDUM

DATE 10/19/62

SUBJECT Suggestions for Improving DEC Computer Sales

TO H. Anderson
J. Atwood
R. Beckman
G. Bell
B. Gurley
N. Mazzarese
R. Mills
G. O'Dea
K. Olsen ✓
S. Olsen
R. Savell

FROM John Koudela, Jr.

DEC Computer Sales are beginning to suffer and will continue to suffer and decline unless certain definite actions are taken regarding our sales organization and its functions. The purpose of this paper is to briefly outline a plan of action that will lead to improved computer sales. Actually, it is an outline of many plans and requirements that need to be implemented in our sales department. It is divided into four broad areas as follows:

1. Sales Organization
2. Sales Administrative Tools
3. Computer Sales Plans
4. Sales Aids

The justification and detailed expansion of many of the ideas presented here are already well-set in the mind of the writer. Many of the details have already been written out in rough draft form. There is no point, however, in continuing the detailed expansion work until these ideas are more fully discussed and endorsed.

## Sales Organization

Happily, some sales reorganization and definition has already taken place; however, it is only a meager beginning. A great deal of work still remains to be done. For example, what exactly is the relationship between the LA Office and the Computer Sales Manager? What is the relationship and responsibilities of the remainder of the personnel in the computer sales group to those in the field? What about sales staff expansion? New offices, we know, should be opened up as soon as possible. These should probably be located in Cleveland and/or Chicago and possibly Denver.

It is interesting to note that we know we should have these offices, but apparently we keep telling ourselves that it is very difficult to find the right kind of people to staff them. Yet, on the other hand, we have passed up several good people who have been seeking employment for just such positions. For what reason they have been passed up I do not know; but I do know in several specific instances that these men were well qualified to staff such field offices. In any event, if it is truly vital to open new offices, why not consider the two or three qualified personnel now in the sales department to staff these offices. In addition to organizing what is presently in existence in the sales department, some consideration should be given to organizational planning for the future.

As a matter of fact, such planning should have been taking place ever since, say, about a year ago.

Regarding the subject of planning in general, we have probably not done an adequate job in any of the areas which are discussed in this outline. The lack of planning in the past is hurting us now and will continue to hurt us until good planning, done in the very near future, has time to take effect. The time lag may be as long as six months assuming we get started now.

Another problem with our sales organization is that our present field office personnel are well experienced to do applications work and sales work for our modules, but they are not anywhere as near as qualified to sell computers against tough competition. Fortunately, however, we have not had any really tough competition to date.

Let us try to evaluate the abilities of our present sales personnel to really sell computers, and not merely act as information passers and computer order takers. Assume that each of our present salesmen only sell DEC computers. Assume further, that each salesman has a fixed monthly salary of $500. and is capable of earning say 2% of the total purchase price of each computer he sells. How would each of our salesmen fare under such a system say after 3 months, 6 months, 9 months, and 1 year.

Perhaps our offices should be dual-headed---one person to handle module sales and another to handle computer sales. An alternative to this problem would be to retain the single-headed type of office with the manager being primarily concerned with module sales and to have a strong field liaison operating out of the home office who devote their full time to helping the present field office personnel to sell computers. This latter suggestion would perhaps point toward having a field Computer Sales Regional Manager in addition to the overall Computer Sales Manager.

We should concentrate our computer sales support at the home office and not add support personnel to the field offices. We should be on the look-out for more sales-type personnel for the field offices. Since the home office has complete details of all the technical aspects of the computer, this is the most logical place for computer sales support to originate.

Further expansion of this outline will distinguish between a suspect, a prospect, a marginal customer, and a firm customer. Sales support work helps to convert a prospect into a customer. What is needed so badly now, however, are salesmen to find suspects and convert them into prospects. That is why I say salesmen are needed, not support personnel.

What we need is the so-called "broad base". It has been shown that for our class of computer roughly 10 out of 100 suspects are converted to prospects and 1 from those remaining 10 is converted to a customer. If each of our salesmen is constantly working with about 100 suspects, he will be working with the required "broad base" that will bring in computer orders.

Another organizational problem concerns the tremendous overlap of the functions and responsibilities of the Computer Sales Group and the Customer Relations Group. Judging from other successful computer sales organizations, these two groups should be called the Sales Group and the Field Maintenance and Engineering Group. The development of good customer relations is the responsibility of both groups and many other people at DEC as well. As a matter of fact, because of our present organization, as soon as the salesman has sold a computer his job is finished because the Customer Relations Group takes over from that point on. The problems that this has already generated in the past, and the problems that will be created in the future, are tremendous. For example, many customers like to be able to always contact one man for all problems concerning his installation; namely, the man that sold him the computer. This has been historically true and has been proven to be an efficient system with most other computer manufacturers. A salesman should be allowed to follow-up after an order and after installation to learn of the problems he may have created by his sales pitch. If the salesman has created bad problems he has not passed them on. In short, the salesman that made the sale acts as a central clearing house from the point of first contact through installation, and in fact, until the installation is given up by the customer. This does not mean that the salesman has a tremendous amount of authority but merely that he acts as a clearing house and as an expediter. Similarly, this kind of responsibility does not take a large amount of time away from the salesmen's precious selling time. There are prime selling times (9:30 to 11:30 a.m. and 1:30 to 3:30 p.m.) in each work day. The non-prime time is normally used for responding to phone calls, answering letters, and making good will calls to nearby customers.

Also, a salesman should spend one full workday per week in his office to take care of the small amounts of sales support work he must do plus the administrative obligations of his position (filling-out reports, doing telephone screening to find new suspects, etc.). A salesman should visit each of the installations that he has sold at least once a month to keep abreast of the functioning of these installations and to obtain first-hand information that can be used to improve his future sales efforts.

## Sales Administrative Tools

Certain forms, reports, and files are necessary for the effective operation of a sales group. Salesmen can do a better job with effective administrative-type tools and sales management has a definite way of measuring and controlling the company's sales efforts.

We all talk about the hodge-podge that we call our customer files; however, nobody seems to be doing anything about it. In addition to just cleaning up these files, which is job enough in itself, computer sales have become important enough to us that two files should be in existence: A file for prospects and customers who are concerned with our module line and another separate file for prospects and customers concerned with our computers.

A great deal of valuable statistical information can be derived from such files, but this cannot be done until the files are cleaned up and separated according to module interest and computer interest.

About six months ago, an incoming log of inquiries and requests for proposals was established. Since, however, this log was not endorsed properly it was not kept up-to-date as it should have been, and it was only recently that it became an effective administrative tool. The incoming log can still be improved. For example, it does not record inquiries that have been received by phone or by personal contact. Since outgoing information can be generated from a large variety of inquiry sources, the incoming log does not suffice as an outgoing log. There should, therefore, be a separate incoming and outgoing log. Both of these logs can provide valuable information concerning the effectiveness of our sales efforts.

The only sales report forms that have been in existence to date are the Sales Call Report and the Expense Report. Both of these should be redesigned because they are inadequate. In addition, it is recommended that three additional report forms be developed and implemented.

The first is the Sales Agreement Form. Certainly no salesman should be out selling without a blank order form in his pocket. To be without such a blank order form or Sales Agreement Form, as it is sometimes called, is essentially a cardinal sin for salesmen. We cannot expect to always get every computer order with the customer's purchase forms alone. If a responsible prospect verbally agrees to purchase one of our computers, the order is still quite shaky. By the time the ball gets rolling in their purchasing department, another computer salesman can "get in", unsell our computer, and get an order for his company. A formal Sales Agreement Form gets the responsible prospect's signature at the very moment he has been completely sold, and it is a stronger commitment and more difficult to "break" than a verbal agreement.

The most precious commodity that every salesman works with is time. To help the salesman use his time most effectively and to show management how effectively the salesman is using his time, it is recommended that a Sales Appointments Schedule Form be developed. Such a schedule form is to be used by the salesman to plan, say his next two weeks sales calls. When this schedule form is compared two weeks later with the resulting stream of call reports, the salesman can evaluate and hopefully improve on his use of time in the field. On the other hand, management should not make this kind of comparison for purposes of criticizing the salesman. These tools are primarily for the salesman so that he can more effectively carry out his job.

Finally, a Sales Forecast Report should be developed. Each salesman, once a month, should fill out such a report. When all such reports are summarized, they provide a basis for sound, managerial decision-making. Regarding the requirement for good planning, a report such as a sales forecast is invaluable to inventory planning, personnel planning, and financial planning.

## Computer Sales Plans

Historically, well designed computers newly introduced by new entrants to the computer industry have initially been sold with little or no real sales effort.

After the first year or two continually greater sales effort must be exercised, and this effort must be strongly supported by sound sales plans. If we wish to remain content with the sale of one or two computers per month, these plans are not necessary. If we wish to grow large, on the other hand, and survive in the computer market, these plans must be implemented in the near future. Without these plans we will lose many sales and without these plans it will be difficult to hire qualified sales engineers.

First, is the Educational Discount Plan. Rumor has it that such a plan is being developed, however, since it is unknown to the salesmen in the field and even those at the home office it must be concluded that we do not indeed have a firm policy regarding educational discounts. If we wish to compete equally, with the other computer manufacturers in the market, we must be in a position to offer a 40% educational discount. The types of institutions that may take advantage of such a discount plan must, of course, be clearly defined.

A Lease Plan and a Lease Plan with Option to Purchase must also be established. Past experience has shown that we have lost a number of computer sales simply because we do not lease our equipment.

The usual type of lease arrangement found in the computer market is that the equipment is leased for 1/40 of its total purchase price per month. This lease price almost invariably includes complete maintenance service.

The Lease Plan with Option to Purchase usually involves the same monthly payments as the straight lease plan and the option for purchase must be taken within one year. When it is taken, 35% of all the paid-in lease money is applicable toward the purchase of the equipment.

Most important to the future growth of our computer sales is the establishment of a Commission Plan. It is believed that a simple, easy to administer commission plan can be formulated. Such a commission plan would be capable of accomplishing the following:

1. Provide a means of financial advancement to sales representatives which is primarily independent of the opinions and judgements of DEC management.

2. Strengthen the progress of DEC through improved sales volume and profits.

3. Improve the competitive position of DEC as compared to CDC, SDS, ASI, and CCC (they all have commission plans).

4. Strengthen the progress of DEC by attracting well experienced business- and sales-type personnel.

Modest, yet effective, commissions would be as follows: for the Sales Representative, 3/4 of 1% of the purchase price for every machine sold in his specified territory; for the Computer Sales Regional Manager, 1/2 of 1% of the purchase price of every computer sold in all territories; for the Computer Sales Manager, 1/4 of 1% of the purchase price of every computer sold in all territories. These commissions would apply only to the standard PDP-1 and the standard PDP-4 computers (not computer options and other DEC products). The present salaries of our field sales engineers would not be changed. I trust that these salaries are attractive enough to obligate the salesmen to continue to vigorously sell modules even though commissions would not be paid on these.

## Sales Aids

One could probably develop an almost endless list of sales aids. I have tried to list here the several sales aids which I feel are most important and those which should be developed and made available to the salesmen as soon as possible.

Sales meetings are probably one of the most important sales aids. To date, we have had sales meetings and no doubt they have been better than no sales meetings at all. However, they have left a lot to be desired. Sales meetings should be <u>well</u> planned. They take a great deal of time away from the salesman, whose time is at a premium, and they should, therefore, provide a tremendous amount of information in as little time as possible.

Computer sales meetings should be separate from sales meetings concerned with modules or special equipment. With our present organization, they should probably last one full day and be held approximately once every other month.

Agenda should be developed at least one month prior to the actual sales meeting and assignments should be made to those attending the meeting to develop certain ideas and subject matters and prepare these for presentation at the meeting.

For example, at each of the meetings one of the attendees should have prepared a technical discussion concerning one of our competitive computers. Following this discussion, the person who presented the competitive equipment should pose as a computer prospect who has been swayed into buying the computer which was just discussed.

Another member of the group who will act as a PDP salesman will try to sell this prospect on a PDP-1 computer. The ensuing discussion should intentionally be argumentative to strongly bring out the kinds of objections and obstacles our salesmen may actually run into and also to bring out ways in which our salesmen can effectively overcome these objections and obstacles.

Following this "simulated sales pitch" should be an open discussion among all attendees to evaluate everything that happened during the sales pitch. The preceding represents only one of the many ways in which sales meetings can be made more effective than they have been in the past.

To help salesmen make effective presentations of DEC computers to suspects and prospects, it is recommended that a Standard Sales Portfolio be developed and furnished to each of our field sales representatives. Such a portfolio is not merely a collection of all available handout materials. Instead, it should be an original and well-organized set of pictorial and graphic information that highlights the verbal presentation in outline form using large, easy-to-read type.

Although it is well known that a sales portfolio should be tailored to each salesmen's own personality, a standard portfolio can, nevertheless, be very useful in helping the salesman to develop his own personalized portfolio.

Following each sales call, a salesman should review, in his mind, all that took place. This exercise helps to continually improve his presentation and to clarify the status of the prospect (i.e., what remains to be done to get the order). Along these lines, two sales aids are being developed to help the salesman to solidify his thoughts: the Presentation Analyzer and the Check List for Computer Salesmen. Since many sales aids of this type can be continually developed, perhaps they should be included in a monthly "Computer Sales Pointers" letter. Such a letter may also include the minutes of each computer sales meeting and abstracts of the papers that were presented.

Each salesman should be furnished with a notebook concerning information about our competitors and their equipment. This notebook should perhaps be started with a simple computer comparisons chart. As competitive information becomes available, it should be properly prepared, distributed to the field, and added to the notebook.

Probably some of the most useful competitive information will come from the sales meetings as previously described. It should be pointed out that computer comparisons that are now in existence such as the Adams Report are not really adequate for our salesmen. What we require is comparisons and detailed information which will point out the defficiencies of competitive computers in such a way that our salesmen can most effectively highlight our advantages and capabilities. Generally speaking, this kind of information is difficult to obtain and to develop if it is to be done properly. In short, what we would like to have is some real inside information concerning our competition.

In addition to our presently available computer manuals and advertising brochures, there are many more hand-out-type materials that can and should be developed; for example, a chart indicating running times for various arithmetic routines in single precision fixed point, double precision floating point, etc.

Another important kind of hand-out is the applications note. This was once started and then dropped. Now we see that it has been started again for the PDP-4, but what about the PDP-1? Certainly, many of our present customers would be more than happy to describe some of their applications to us such that we may develop an effective applications note.

Application notes should not be done haphazardly. The subject matter should be well-chosen and well-developed. The application described should be of fairly general interest.

Even though an application is particularly intriguing, it may be too highly specialized to have any real sales value. Four application notes that should be developed immediately are:

1. Analog-Digital Computer Systems
2. Universal Converter (in the IBM 1401 sense)
3. Closed-Loop, Real Time Process Control
4. PDPs as Straight Scientific Computational Computers

A salesman should have available to him many kinds of hand outs. One of the most important uses of such hand outs is that they provide the salesman with an excuse to drop in and see a prospect. In general, it provides a way for the salesman to keep the fire burning.

Finally, there are many special sales techniques that are employed in selling computers. Techniques such as these should constantly be written up and distributed to the field. If we feel we are short of suspects for computers, let there be just one well placed ad and we will probably have more suspects than we can handle.

## Conclusions

We are entering a period in our computer marketing efforts that we should have been able to forsee some time ago. Now it seems that to cope with the situation that has developed we virtually require a crash program of market development and active computer selling in the field.

Competition, for example, is growing keener by the day. We have probably already begun losing sales and will continue to lose sales unless we become highly active. Computer Control Corporation, for example, is creating a stiff competitive obstacle with their $95,000 price tag for the DDP-19.

In addition, the two new computer manufacturers, Scientific Data Systems and Advanced Scientific Instruments, are growing stronger by the day. Each of these companies has already sold and installed two computers. They probably have many more orders in-house.

Control Data Corporation has taken sales away from us in a number of instances. Due to their increasingly active sales efforts and superb software package for the 160A, CDC is becoming a greater and greater threat to us.

Taking all such facts into consideration, we should not be casually approaching the computer market, but indeed we should be in a virtual crash program to find and hire more qualified personnel to do more market development work and perhaps to begin an active advertising campaign for our computers.

The above outline has indicated some of the projects that I feel should be started immediately to meet competition head-on.

These ideas plus many more should be greatly expanded and concentrated effort should be exerted on these projects to get them accomplished as soon as possible.

JK/jr

Ken Olsen

# INTEROFFICE MEMORANDUM

SUBJECT: 22nd Meeting of the Test Equipment Committee

DATE: October 18, 1962

TO: Richard L. Best

FROM: Russell Doane

Members of the Committee:

Robert Hughes, Chairman
Russell Doane, Secretary
Donald White
George Gerelds
Dave Dubay
Dick Tringale
Jim Cudmore
Larry White

1. The 545 oscilloscope at BB&N is now seven months out of calibration.

2. Our second Tektronix 575 curve tracer is here.

3. Two of our new current probes have arrived--one is still to come.

4. The automatic in-circuit transistor tester has arrived and is available for the use of anyone who wants to try it out for locating faulty transistors without removing them from a module.

5. Our Tektronix oscilloscope camera is back in use.

6. We have borrowed a type 291 diode switching time tester from Tektronix for evaluation. It will be available sometime in March at a cost of $250.

7. Our order for a Tektronix type 661 sampling oscilloscope was not approved. The demand on the time on the two 567's now in production has been less than was anticipated and therefore, one of these is to be made available to engineering.

8. Both our Washington office and possibly computer checkout here could use a portable oscilloscope with a wider band pass than the Tektronix 321. We will keep our eyes open for such an instrument.

9. Bob Hughes is considering the need for a limit bridge for incoming inspection of passive components and decade boxes for use with such a bridge and for other engineering purposes. This will be looked into by Jim Cudmore.

10. A 10 NS resolution diode tester will soon be delivered from Contronics for use in the production test area.

11 Dave Dubay reports that we own 59 type CA Tektronix dual trace plug-in units for use in 60 scope sockets. The committee decided not to take any action as at least one of these positions can be filled with one of our special purpose plug-in units on a regular basis.

12. Our meter calibrator is due for a calibration as we have now had it for just a year. Our older Flukemeter may need calibration as well, but we will try to hold off until a substitute is available in view of the heavy usage of Flukemeters.

13. Dave Dubay reported that he has managed to account for all but one of our current probes.

14. Dick Tringale mentioned a use for a strip-chart recorder in special systems on a very low duty factor basis. Since we do not know of any other specific needs for a chart recorder, no action will be taken at this time.

15. The secretary received only one reply (from Jim Burley,DCO) to his memo asking for one-year estimates on test equipment needs. We do not believe that this truly means no more test equipment will be required in the coming year, so we are taking a different approach to determining an estimate. Larry White for computers, Dick Tringale for special systems, Jim Cudmore for production test and quality control, Russ Doane for circuit design, and Dave Dubay for test equipment headquarters will talk to everyone concerned to try to determine the following data:

| ITEMS | NO. OF DAYS PER MONTH | IS PRESENT EQUIPMENT ADEQUATE |
|---|---|---|
| 567 Digital Readout Sampling Oscilloscope | | |
| Flukemeters | | |
| Kintel .01% Power Supply | | |
| Hewlett-Packard VTVM | | |
| Hewlett Packard Audio Oscillator | | |
| Dual Beam Oscilloscope | | |
| ESI Resistance Bridge | | |
| Controlled temperature ovens | | |

This survey is absolutely necessary before we can order test equipment since the company is now too large for the committee to know as a matter of course what pieces of test equipment are really needed.

For instance, several people have expressed strong feelings that our present facilities for measuring voltages with very high accuracy are inadequate. We have two precision flukemeters, but people who use these meters complain that often both are in use when they want one. However, until we know better what all the needs are, we do not know whether we should order another VTVM to be used with the Kintel power supply to allow .01% measurements, or whether we should order one of the .01% flukemeters, or whether both of these are needed, or some entirely different equipment. If our work is to go smoothly, we must have sufficient equipment of the right types; but if our financing is to be reasonably comfortable, we must not buy unneeded equipment. Accurate information is essential.

16. Jim Cudmore and Larry White are new members of the Test Equipment Committee. Larry replaces Bob Savell on the committee.

The next meeting of the Test Equipment Committee will be on Tuesday, November 13, at 1:30 P.M. in Bob Hughes' office.

cc: Ken Olsen
Maynard Sandler
All Engineers
All Technicians

K. Olsen

# INTEROFFICE MEMORANDUM

DATE October 17, 1962

SUBJECT Food Service at DEC

TO Works Committee

FROM Cafeteria Committee

The Cafeteria Committee proposes the following ground rules for the operation of food services at DEC:

## I. General Principles

1. DEC will make food service available for all employees. This service should include coffee before work and at coffee breaks and lunch at the cafeteria during the noon hour. Service in the cafeteria will be limited to sandwiches, soups and desserts; no full meals will be offered.

2. Coffee should be available at separate locations throughout the plant, but lunch should be served in only one location in order to bring employees from different departments together once a day.

3. The cafeteria should have facilities and staff so that all employees who choose to do so may be served during the normal lunch period without excessive waiting.

4. DEC will provide floor space and equipment for proper operation of food service.

## II. Scope of Food Service Operations

1. Four areas will be used for food service:

| | | | |
|---|---|---|---|
| a. | Central cafeteria | - | Building 5, 4th floor |
| b. | Vending machines | - | Building 12, 2nd floor |
| c. | Vending machines | - | Building 3, Near tool crib |
| d. | Tea cart | - | Building 5, Production area. |

2. Hours, type, and location of food service:

| Hours | Service | Location |
|---|---|---|
| 7:30 to 8:15 | Coffee and pastries | Cafeteria |
| 10:00 to 10:10 | Coffee and pastries | All four areas |
| 12:00 to 12:45 | Lunch | Cafeteria |
| 3:00 to 3:10 | Coffee and pastries | All four areas. |

III. Management

1. A contract for food service should be written with a clause allowing either party to terminate on 30 days notice. The contractor will provide personnel, food, vending machinery and supervision.

2. Tobin Vending Service will be the contractor.

3. Financial records must be kept by the contractor and DEC must have the right to audit these records.

4. The food service operation must conform to all public health requirements of the state and town.

5. Henry Crouse will act as DEC contact for Tobin.

IV. Rules of Operation – Cafeteria

1. The menu must be approved in advance by the Cafeteria Committee.

2. Prices must be competitive with all local restaurants and should be posted throughout the plant.

3. Quality of service must be equal to or better than local restaurants.

4. Cafeteria should be arranged physically so that up to 300 employees can be served over a period of 15 minutes.

5. Two service lines should be in operation: one, a line for soups and sandwiches made on request, and the second, an "express" line in which pre-wrapped sandwiches, beverages, and pastries are available.

6. Pre-wrapped sandwiches must be made after 10 a.m. each morning and no pre-wrapped sandwiches may be carried over to a second day. The selection of pre-wrapped sandwiches must be limited to one-half of the kinds of sandwiches available on request. All types of sandwiches available as pre-wrapped selections must also be available on request.

7. Any hot meats available for sandwiches should be prepared in advance of 12 noon. No "cooked-to-order" grille items will be offered.

8. The menu should be standard every day except that two hot sandwiches and one hot soup can be offered each ~~each~~ DAY. On Friday two soups can be offered.

9. All foods must be prepared in the DEC kitchen. All highly perishable foods (i.e., cream pies, cream puffs) will be served one day only.

10. All cafeteria and vending equipment and the dining area will be maintained and kept clean by the contractor.

V. Equipment and Space Recommendations – Total cost - $2,000

1. Racks for paper cups
2. Trays (400-500)
3. Bench type can openers (2)
4. Plexiglass cover for open foods
5. Silverware bins for knives, forks, and spoons
6. Ice cream chest (no cost rental)
7. Rubbish cans
8. Menu board
9. Condiment holders for tables
10. Maintenance supplies – brooms, sponges, buckets, mops, etc.
11. Meat slicer should be equipped with a safety stop – Loren Prentice will advise.
12. Coffee service cart - built by DEC
13. Room adjacent to cafeteria should be made available for storage space.

VI. Items Under Study

1. Contract for Tobin Vending Service – Dick Mills.

2. Cafeteria Layout – Bob Lassen will make recommendations on setting up regular and "express" lines.

3. Health certification and permit – Henry Crouse.

4. Accounting procedures – Dick Mills.

# INTEROFFICE MEMORANDUM

DATE October 17, 1962

SUBJECT Honeywell Visit

TO Ken Olsen
Harlan Anderson
Gordon Bell

FROM Winston Hindle

On Thursday, October 18, the following two men will visit DEC to discuss the PDP-4 for process control applications:

Samuel D. Harper, Manager of Engineering
Robert Moe, General Manager
Special Systems Division
Minneapolis-Honeywell
Pottstown, Pennsylvania

They plan to arrive at 9 a.m. and stay until 3 p.m.

Their division has been using the Honeywell 290 Computer in its systems and Mr. Harper feels that the PDP-4 may be more suitable.

W. R. Hindle

WRH:ncs

Ken Olsen

OCTOBER 17, 1962

REPAIR OF RETURNED MODULES

JIM CUDMORE

THE FOLLOWING IS A LIST OF MODULES RETURNED FOR REPAIR DURING THE WEEK OF OCTOBER 8, 1962

| UNIT | SERIAL NO. | CUSTOMER | DEFECT |
|---|---|---|---|
| 722 | 3969 | DEC | 2 CAPS. WERE FLOATING<br>2 LOOSE CLAMPS NOT SAT. |
| 749 | 4009 | INDIANA GEN. CORP. | FUSE HOLDER BROKEN |
| 1110 | 0045321E | A.E.C. | MA90 HIGH LEAKAGE |
| 1110 | 0052213E | ADX-8 | MA90 SHORTED EMITTER TO COLLECTOR |
| 1110 | 0045319E | ADX-8 | D-001 HIGH LEAKAGE |
| 1110 | 0052222E | ADX-8 | MA90 SHORTED EMITTER TO COLLECTOR |
| 1111 | 00301 01D | ADX-8 | MA90 SHORTED EMITTER TO COLLECTOR D-001 OPEN |
| 1201 | 0010673 P | DEC | NONE |
| 1201 | 0013214 P | DEC | T2029 TRANSFORMER LEADS WERE REVERSED |
| 1201 | 0050622P | ADX-8 | REPLACED 2 T2029 TRANSFORMERS |
| 1201 | 0013215P | DEC | NONE |
| 1201 | 0009225P | DEC | NONE |
| 1201 | 0029003P | DEC | NONE |
| 1201 | 0029184P | DEC | NONE |
| 1201 | 0032573P | DEC | NONE |
| 1201 | 0013218P | DEC | NONE |
| 1201 | 0032583P | DEC | NONE |
| 1204 | 0033532B | ADAMS ASSOC. | NONE |
| 1204 | 97116 B | ADAMS ASSOC. | NONE |
| 1540 | 0034739D | PDP-4 | NONE |

| UNIT | SERIAL # | CUSTOMER | REJECT |
|---|---|---|---|
| 1540 | 0020764D | PDP-1 | NONE |
| 1540 | 02786 D | PDP-4 | OUTPUT PULSES TOO HIGH |
| 1540 | 29033 | EN2290 | NONE |
| 1546 | 327250 | DEC | NONE |
| 1546 | 586800 | PROTOTYPE | NONE |
| 1546 | 28082 C | PROTOTYPE | NONE |
| 1546 | 28076 C | PROTOTYPE | OLDER TYPE CAPACITORS REPLACED |
| 1546 | 58676 D | PROTOTYPE | NONE |
| 1669 | 0012248 C | UNKNOWN | NONE |
| 1669 | 0012514 C | DEC | NONE |
| 1972 | 0038103 B | ADX-6 | MD114 TOO HIGH ICBO LEAKAGE |
| 1972 | 00380328 | ADX-6 | MD114 HIGH ICBO LEAKAGE MD114 OPEN |
| 1972 | 0037756 B | ADX 6 | MD114 HIGH ICBO LEAKAGE |
| 1972 | 0038522 | ADX 6 | NONE |
| 1972 | 0037760 | ADX-6 | MD114 HIGH ICBO LEAKAGE |
| 1972 | 0038040 B | ADX 6 | MD114 HIGH ICBO LEAKAGE |
| 1972 | 0037781 B | ADX 6 | MD114 HIGH ICBO LEAKAGE |
| 1972 | 0038034 B | ADX 6 | MD114 HIGH ICBO LEAKAGE |
| 1972 | 0044661 B | ADX 6 | NONE |
| 1972 | 004283 B | ADX 6 | MD114 HIGH ICBO LEAKAGE |
| 1972 | 0025834 B | UNKNOWN | NONE |
| 1972 | 0044318 B | ADX 8 | NONE |
| 1972 | 0034302 B | A.E.C. | NONE |
| 1972 | 005012 4 B | MEMORY CHECKOUT | GA212 SHORTED EMITTER TO BASE |
| 1972 | 00451155 B | ADX 8 | NONE |

| UNIT | SERIAL # | CUSTOMER | REJECT |
|---|---|---|---|
| 4111 | 42863 D | PDP 4 | NONE |
| 4111 | 42852 D | PDP 4 | NONE |
| 4111 | 0017498 D | DEC | NONE |
| 4128 | 0023709 A | M.I.T. | NONE |
| 4128 | 23712 A | M.I.T. | NONE |
| 4202 | 0015953 B | ADX 8 | D001 OPEN<br>MD114 AND 2N1305 OPEN |
| 4202 | 0013428 D | ADX 8 | MD114 LEAKAGE |

OF 52 MODULES TESTED, 20 HAD NO DISCERNIBLE DEFECTS.

dec INTEROFFICE MEMORANDUM

DATE October 12, 1962

SUBJECT New Outside Page Lines and Night Answering Procedure

TO All Concerned FROM Brad Towle

New Page Lines

Outside Phone Calls during normal working hours can be answered by dialing 480 or 482 when paged by the switchboard operator. Please begin the conversation after dialing either page line as the calling party will be waiting on the line.

Night Answering Procedure

All telephone calls coming into the plant after normal working hours and on week-ends must be answered in the following manner:

Local Calls (Maynard Line TW7-8821)

Dial 480 to answer incoming call.

To Transfer local calls within the plant Dial 260 from another extension and page the person to dial 481.

Boston Calls (Waltham Line TW9-0510)

Dial 482 to answer incoming call.

To Transfer Boston calls within the plant, Dial 260 from another extension and page the person to Dial 483.

REMEMBER

TO ANSWER LOCAL CALLS ------DIAL 480

TO ANSWER BOSTON CALLS ----DIAL 482

MEMORANDUM

DATE: October 12, 1962

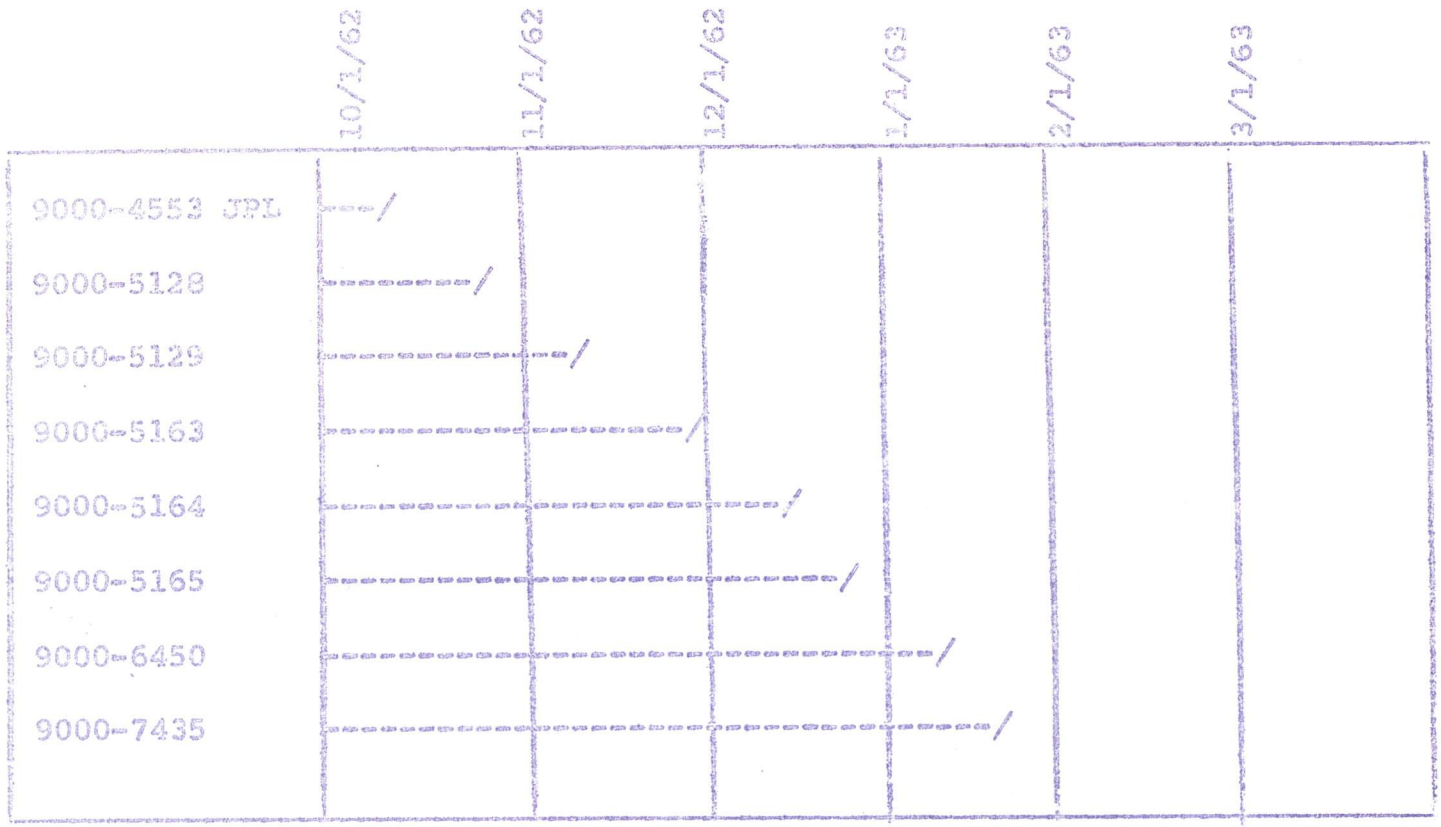
TO: K. Olsen
H. Anderson
S. Olsen
M. Sandler
B. Gurley
D. Best
G. Bell
G. O'Dea
D. Mills

FROM: J. Smith

Construction of two standard PDP-1's have been intergrated into our work schedule. Two will be completed this month and every month thereafter. PDP-4 prints are currently in Drafting for engineering changes. To date, I have not received a date on which they will be released and made available to me. I have issued orders for the construction of the cabinets and other mechanical parts.

Attached, you will find a copy of the completion dates of PDP-1 Computers. PDP-4 will be intergrated on release of prints.

# PRODUCTION SCHEDULE COMPUTERS



MEMORANDUM

DATE: October 11, 1962

TO: K. Olsen ✓
H. Anderson
S. Olsen
W. Hindle
G. O'Dea
D. Mills
D. Best
B. Gurley

FROM: J. Smith

Before trying to decide on a solution to our problem of the interchanging of customers and EN numbers, we can gain insight into the problem by reviewing our present procedures. In this way I hope the trouble areas will present themselves to us.

While undergoing construction the various machines and associated options are being constructed under either an EN or job number. Outside of this identifying number they have no other identity. Personnel working on these machines do not associate a certain machine with a particular customer. This was set up in this way to enable the interchanging of machines and options with a minimum of confusion. If we should decide to change a magnetic tape unit from one customer to another this does not call for the assignment of a new EN number nor is it necessary. The machine is completed under this number and all charges are made to this number. When complete, the charges to this number can be assigned to any customer. I do not feel that the construction area is a problem area because of the disassociation between customer and number. In this area the machines are being built to a number for stock and not for a particular customer. This attitude of disassociation between number and customer should be carried out throughout the plant. All personnel involved should be made aware of the purpose of an EN number. It is simply an accounting device for the gathering together of material, labor and overhead charges. We should not regard it as an indication of a particular customer.

When the systems move into checkout they do seem to pick up an identity with a particular customer. Checkout personnel hearing there has been a customer change have at times been confused because they do associate a machine with a customer. But I do feel that this problem has been taken care of. They have been instructed to use the EN number posted on the machine and not attempt to look up a particular customer's number. Special option EN numbers are also posted on the machine.

It is my opinion that the two above areas, Construction and Checkout, are not the problem areas. Most of the problems that take place in these areas in relation to changes have been ironed out. I feel that most of the confusion is taking place in accounting and in the area controlled by Jim Myers. The reason for this confusion could be a lack of communication. Many times these two areas are not informed that any customer change has taken place until after the

systems have been shipped. In most cases they learn of this change through informal conversation rather than formal channels. It is my feeling that most of our problems would be eliminated if there was a formal channeling of information to these two areas. I have talked with both Jim and Ed Simeone and they agree that if they were supplied with the necessary information when a change took place, there would be no problem.

I would like to suggest the following procedure for the channeling of change information. Most changes take place at a meeting and there is no official documentation of the change, consequently no distribution of information. Information concerning the change is transferred from one person to another verbally. Here lies the problem area. It would seem that if we appointed one person to be the clearing house for all this information flow we would be well on the way to solving our problem. This person would be supplied with a list of personnel to be notified when a change took place. It would be his responsibility to see that these people received all the necessary information. It is my feeling that Peter Bonner who issues all the original Construction Requisitions is the logical person to handle this channeling of information. The vehicle for this information could be our present amendment form or a new form could be designed. Pete presently has a list of personnel that the original Construction Requisition is sent to. This list could also be used for generating change information. Personnel receiving this information must be made aware that no action is required on their part; this notification is simply to keep them informed. The only person required to actually change any records would be Bob Dill in accounting. It is very important that every one be made aware that the change is a simple accounting function.

Everyone that does have reason to look up EN numbers on the issued EN list should be made aware of our accounting procedure by his supervisor. Supervisors can refresh their memories on the procedures with someone in the accounting department. There are still quite a few people using closed out EN numbers. This shows a lack of understanding of accounting procedures. It would maybe help everyone concerned if a bi-weekly list of closed out EN numbers were issued. But it still is each supervisor's responsibility to see that his people are using the right EN number. This is easily accomplished by reviewing the daily job tickets.

If everyone is in agreement, and I receive no negative replies within the next few days, I will speak to Pete Bonner on information flow procedures. This centralized clearing of information along with a more enlightened personnel on basic accounting procedures will, I hope, eliminate a long time problem.

# INTEROFFICE MEMORANDUM

DATE 10-8-62

SUBJECT J.P.L. PDP-1

TO Ted Johnson
Western Regional Manager

FROM Bob Oakley

The last three weeks I was with J.P.L. and to the present date a unique problem exists with the J.P.L. PDP-1. This problem is that of time. Since the successful launching of "Mariner-2" the PDP-1 has virtually been in operation continuously. Only short period interruptions of data from the three world wide tracking stations permit maintenance and adjustments to be made without a basic loss of prestige to the PDP-1. Most of the failures encountered could be justified by one means or another. However, they did occur and it is very unfortunate that they happened at this crucial time, because the existence of the PDP-1 being relied upon at J.P.L. for real time data processing is somewhat dependent upon the performance of this machine during the Mariner-2 flight. Therefore, I feel it is extremely important that we convince anyone concerned at J.P.L. that future PDP-1's will not contain the same type of problems because of our having solved these problem areas.

Because of the hardware back-up system at J.P.L., no spacecraft telemetry data was lost due to PDP-1 down time. Actually, the PDP-1 operated at good efficiency at the most critical time; just preceding the mid-course maneuver and the pre-launch period.

The following three items are the problems basically encountered at J.P.L. during the Mariner pre-launch and flight, listed in the order of significance (most significant first).

1. Magnetic tape system

The magnetic tape system was definitely the most detrimental to the whole operation. The people at J.P.L. do not have a good feeling about the tape system and in particular the Potter Instruments tape transports. The feeling is two-fold.
First: the tape transports are extremely difficult to load, which makes frequent tape changes awkward and slows down operations to the extent that if this operation were to continue with these transports, additional units would be required solely for the purpose of speed and ease of changing tapes.
Second: because of numerous failures, particularly with one unit, there is a feeling of unreliability. The replacement of the defective tape transport left a good impression of DEC at J.P.L., but did not improve the feeling about the Potter tape transport's reliability, primarily because so many attempts to repair it were unsuccessful.

Some problems still do exist at J.P.L. with the tape system. It is not understandable to me why other customers have not encountered similar problems. It may very well be that some do and haven't complained, which brings me to believe we should try to correct any possible problems before a situation occurs again that is similar to the J.P.L. situation. The problems that are still presently existent at J.P.L. must by all means be corrected at the earliest possible time. Still, we are virtually handcuffed because of the continuous computer usage. Furthermore, it is my feeling that we will require a maximum amount of effort and time to completely investigate and solve the basic problems.

2. Programming problems

The programming problems encountered at J.P.L. were not in any way a reflection upon us. Actually the ease of PDP-1 programming was brought to a real test and in general it proved PDP-1 programs can be changed or modified simply and easily.

Several modifications were made as difficulties arose with the real-time acquisition program. Most of these changes were made between station transmission and were made to facilitate program manipulations from the sense switches, etc., and to ease the changing of quick-look magnetic tapes. One serious programming problem did exist and was very unique because it appeared almost completely random in nature and gave all the symptoms of an intermittent machine failure. The problem was actually this: in the case where a sequence of a particular subroutine broken by the input at one particular point and reset back by the JMP', if an index was initiated when the address was equal to 7777, a deferred condition caused a program change which in turn clobbered a large area in core. This problem occurred on the average of twice a day and was very difficult to isolate.

3. Computer main frame failures

Four failures have occurred in the computer since the launching of Mariner-2 (five weeks time to date). It is very unfortunate that these failures occurred during the time when continuous reliability is required because only three failures were encountered during previous four months. It is my feeling that fewer failures will occur in the future, particularly the type of failures previously encountered. Furthermore, it is my understanding that PDP-1 computers presently being manufactured do not have the quality control problems that were existent when the J.P.L. serial number 13 computer was being built. The four failures in question are listed below in chronological order.

A. Logical failure -- cycle one and power clear gates

A. (Continued)
   1. Resulting system down time -- two hours
   2. Cause of failure -- short on modules (inverter type 1105)
   3. Symptoms of failure -- no programs would operate including paper tape loader, program counter transferred to memory address during cycle one. Cycle flip-flop operated correctly but the output level at the control points was incorrect due to the short. During the period while trouble-shooting, the short caused the clamp reference voltage to go almost to ground which in turn opened the power clear gate making trouble-shooting even more burdensome at that time.

B. Telemetry Shift Register input
   1. Resulting system down time -- two hours
   2. Cause of failure -- shorted wiring, improper splice which was not correctly sleeved with an exposed area which would intermittently short to ground with vibration.
   3. Symptoms of failure -- the shift register would smear from bit 6 (point of short) intermittently. Removing of a module would eliminate the short because the frame of the module was shorting to the bad splice on the ribbon cable.

C. Core failure
   1. Resulting system down time -- three hours
   2. Cause of failure -- write driver transistor
   3. Symptoms of failure -- intermittent failures of core - particularly during manual manipulations of control. Checker-board would run reliably, but couldn't examine after read-in. Memory appeared to operate only in a continuous mode, any interruption would clobber a program. All signals appeared correct while checker-board was running and sense amp margins good. Trouble-shooting was very frustrating.

D. High speed channel address mixer
   1. Resulting system down time -- thirteen hours
   2. Cause of failure -- no solder connection
   3. Symptoms of failure -- all records written on magnetic tape contained same word with proper record word count. No pulse to HSC. address mixer.

9/21/62

Tea Party

Friday - 4 p.m. meeting (September 21)

Harlan Anderson
Jack Atwood

Bob Beckman
Gordon Bell
Dick Best
Al Blumenthal

Henry Crouse

Jon Fadiman

Ben Gurley

Ed Harwood
Winston Hindle
Bob Hughes

Bob Lassen

Roger Malenson
Nick Mazzarese
Dick Mills

George O'Dea
Ken Olsen
Stan Olsen

Alma Pontz
Loren Prentice

Maynard Sandler
Bob Savell
Jack Smith

Don White

# INTEROFFICE MEMORANDUM

DATE September 27, 1962

SUBJECT I S A Show

TO K. Olsen
H. Anderson
S. Olsen
G. Bell
D. Denniston
G. Rice
J. O'Connell

FROM H. O. Painter, Jr.

SHOW LOCATION: Coliseum, N. Y.

BOOTH NUMBER: 523

DATES & HOURS: October 15 - Noon to 9 P.M.
16 - 10 A.M. to 9 P.M.
17 - 10 A.M. to 6 P.M.
18 - 10 A.M. to 9 P.M.

HOTEL: Americana
52nd & 53rd Streets and 7th Avenue

Suite and two twins reserved, starting Sunday, October 14.

BOOTH: New 20' model

ON DISPLAY: PDP-4
Modules

BADGES: Will be available at 20 West 60th Entrance to Coliseum.
Please bring attached ticket with you for insurance.

*cordially invites you to attend*

# The International Instrumentation Event of the Year

## INSTRUMENT SOCIETY OF AMERICA'S

# *17th Annual Instrument-Automation Conference & Exhibit*

**NEW YORK COLISEUM - HOTEL NEW YORKER** **OCTOBER 15 - 18, 1962**

**At the Coliseum: See more than 400 stimulating displays from leading manufacturers in the United States and abroad of the newest products and application techniques spanning the entire instrumentation technology, including automatic control systems, components, accessories . . . the largest exhibit of its kind ever assembled under one roof.**

**At the Hotel New Yorker: Your once-a-year opportunity to attend any of 70 high level technical sessions, panel discussions, workshops with some 300 individual presentations covering the state of the art in instrumentation as applied to all segments of industry and the sciences.**

**EXHIBIT SCHEDULE**

**Mon., Oct. 15 . . 12 noon to 9 p.m.**
**Tue., Oct. 16 . . . 10 a.m. to 9 p.m.**
**Wed., Oct. 17 . . 10 a.m. to 6 p.m.**
**Thur., Oct. 18 . . 10 a.m. to 9 p.m.**

***Please fill in reverse side completely and bring with you!***

***For more complete Conference information write for Advance Program to:***
**Instrument Society of America — Penn-Sheraton Hotel — 530 William Penn Place — Pittsburgh 19, Pa.**

**IMPORTANT: Print in large, clear type and fill in completely. For the Exhibit, present at registration desk at the New York Coliseum; for the Conference, present at Hotel New Yorker registration desk.**

(*please PRINT clearly*)

**Name** _____

**Title** _____

**Company** _____

**Street** _____

**City** _____ **Zone** _____ **State** _____

(*Please check*) _____ **Send ISA membership information**

_____ **ISA Member** _____ **Non-Member**

## PLEASE CIRCLE ONE NUMBER IN EACH COLUMN!

| *Your Industry* | *Your Occupation* |
|---|---|
| 1. Aircraft—Missiles | 24. General Management |
| 2. Atomic—Nuclear | 25. Research—Dev. Dir. |
| 3. Chemicals—Plastics | 26. Production Manager |
| 4. Communications | 27. Chief Scientist |
| 5. Medical—Biological—Pharm. | 28. Chemist |
| 6. Educational Institution | 29. Educator |
| 7. Electrical Equipment | 30. Maintenance Mgr.—Engr. |
| 8. Engrg. Construction | 31. Physicist—Scientist |
| 9. Engrg. Consultants | 32. Product Designer |
| 10. Food—Beverages | 33. Purchasing |
| 11. Ceramics & Non-Metallic Minerals | 34. Sales & Advertising |
| 12. Government—Military | 35. Chief Engineer |
| 13. Industrial Machinery | 36. Computer Programmer |
| 14. Instrumentation—Control Mfg. | 37. Chemical Engineer |
| 15. Pulp—Paper | 38. Electrical Engineer |
| 16. Petroleum—Gas | 39. Instrument Engineer |
| 17. Research Institution | 40. Instrument Maintenance |
| 18. Rubber | 41. Mechanical Engineer |
| 19. Metals | 42. Metallurgical Engineer |
| 20. Textiles | 43. Process Engineer |
| 21. Transportation | 44. Research Engineer |
| 22. Utilities & Power | 45. Other Engineer |
| 23. Misc. (please specify) | 46. Misc. (please specify) |
| _____ | _____ |

## ADMISSION INFORMATION

**EXHIBIT:** ***Free*** **to holders of this invitation, Conference registrants, all members of ISA and cooperating societies (American Meteorological Society, Institute of Aerospace Sciences); all others $1.00**

**CONFERENCE: $10.00 for members of ISA and cooperating societies; all others $15.00**

dec INTEROFFICE MEMORANDUM

DATE September 21, 1962

SUBJECT ESTIMATED COST OF PROPOSAL "PACKAGING"

TO Nick Mazzarese
FROM Jack Atwood
CC: K. H. Olsen
H. E. Anderson
S. C. Olsen

It looks like $200.00 to package 25 copies of a proposal with the specifications listed below. This figure includes the prorated cost for 25 sets of preprinted covers, 25 sets of a five-page preprinted summary of company capabilities and 550 sheets of preprinted proposal paper. We assumed that we would design and preprint 500 sets of covers and write and preprint 500 sets of summary sheets.

Proposal Specifications

Editorial assistance 8 hrs.

Imprint 25 sets of proposal covers.
Type 15 pages of new text material and print 25 copies one side only.
Take four equipment photographs and print as single-page half-tone illustrations.
Draw three diagrams and print as single-page line illustrations.
Collate together with the five-page preprinted summary of capabilities.
Punch and plastic bind.

Covers to be printed in blue and black on a good grade of coated cover stock.
Text and illustrations to be printed in black on a standard proposal form preprinted in blue.

The production time for this type of package should be eight working days, may be five working days, and can be two working days.

# INTEROFFICE MEMORANDUM

DATE September 20, 1962

SUBJECT Memory Stack Specs.

TO Dick Best

FROM Bob Hughes

The only memory stack specifications which our stacks are tested to are those that the manufacturer decides to do on his particular stacks. You will perhaps recall that you and I worked on specifications with Ferroxcube and came to some conclusions, such as, that the memory stacks should be checked with a checkerboard program and have pre-read disturb and post-write disturb pulses. Then we decided that we really didn't know enough about memories to put the specifications on the stacks that we had in mind, and we felt that we needed a model 1516 memory tester and some data before we could really decide how to specify them.

I have memory planes from General Ceramics and RCA. I propose that Jon Fadiman tell us when the 1516 will be available ( I think we need about three days' time on the machine) and that you have one of his men make the experiments to determine how to specify our stacks.

This is a necessary thing to do because we reject stacks which won't work in our system and cannot give manufacturers concrete reasons for doing this. For the most part, they test the stacks with 1/2 microsecond rise and fall times and 2 - 4 microsecond pulse widths, and the normal current amplitudes (200 mils 1/2 select). We test them with 0.2 microseconds rise and fall times and 180 mil 1/2 select current.

When a manufacturer has to take back several stacks because our margins aren't high enough, it is very expensive for him, and perhaps the only reason that they don't complain, is that we order large quantities and they want our business badly.

I believe we should act on this very soon.

cc: Ken Olsen
Ben Gurley
Jon Fadiman
H. Crouse
J. Smith

dec INTEROFFICE MEMORANDUM

DATE September 20, 1962

SUBJECT Hourly Personnel Travelling Policy

TO K. Olsen
S. Olsen
M. Sandler
R. Mills
N. Mazzarese
E. Harwood
A. Blumenthal

FROM Bob Lassen

Switching hourly people from hourly to salary for travelling purposes is in violation of the Wage and Hour Act. We have checked National Metal Trades on this.

Sylvania pays time and one-half for over 8 hours up to 12 hours and double-time after 12 hours for hourly people who travel to customer locations. A policy along these lines sounds reasonable. However, I understand that Dick Mills is probing into the legal problems.

RTL/jfr

# INTEROFFICE MEMORANDUM

DATE September 20, 1962

SUBJECT Repaired modules

TO Jim Cudmore

FROM Bob Hughes

I found some units in finished goods the other day which we had retested and were returning to the customer, and they were very unsatisfactory. They all had Automation Component capacitors in them. One of them had its handle painted red, and apparently came from our Test Equipment Headquarters. Most units had flux around the lugs from soldering in new components, and one of them had a big blob of solder on it.

I requested Arthur Parks to get an inspector's stamp and to personally inspect all retested units. Will you make sure that Klaus Doering issues him an inspector's stamp so that he can do this.

Our criterion on repaired modules is we will return them to a customer only if they are as good as new, and if the Quality Control test men have a unit which is not as good as new, they will take it to you for disposition, and you will decide whether to scrap it or issue a new module or not. Please keep a record of all new modules that we have to issue to customers, so that we may determine whether anyone is abusing this system. If the etched board has chipped or cracked or excessive scratches; if any etched wires are missing or lugs broken, etc., we will issue a new module to the customer, and we will send the old module to Test Equipment Headquarters, all repaired.

For the record, the following components will never be shipped out in any modules either new or retested:

MA 45 transistors
MD27 transistors
2N412 transistors
6MFD, 25 V aluminum electrolytics
All Automation Component, Inc., capacitors
All Wilwrite resistors

and for Systems, we will never ship out any muffin fans, except Gold Seal muffin fans.

cc: K. Olsen, S. Olsen, D. Best, B. Gurley, K. Doering, D. Adams, G. McDonald, E. Reilly, B. Beckman, J. Myers, A. Blumenthal, B. Grey, A. Parks, R. Gagne

# dec INTEROFFICE MEMORANDUM

DATE September 18, 1962

SUBJECT Approved Open Requests for Personnel

TO ✓ K. Olsen
G. O'Dea
R. Mills

FROM Bob Lassen

| | | | |
|---|---|---|---|
| 3 | Technicians | Quality Control (R. Hughes) | $75. |
| 2 | Inspectors (female) | Quality Control (R. Hughes) | 65. |
| 1 | Office Services | Accounting (R. Mills) | $6,500. |
| 1 | Accounts Payable Clerk | Accounting (R. Mills) | 65. |
| 1 | Junior Accountant | Accounting (R. Mills) | 5,500. |
| 2 | Detail Draftsmen | Drafting (R. Melanson) | 65. |
| 1 | Mechanical Draftsman | Drafting (R. Melanson) | 80. |
| 3 | Electrical Draftsmen | Drafting (R. Melanson) | 80. |
| 1 | Secretary (replacement) | Drafting (R. Melanson) | 70. |
| 1 | Catalog Clerk | Purchasing (H. Crouse) | 70. |
| 1 | Photo Specialist | Advertising (J. Atwood) | 65. |
| 2 | Clerk-typists | Advertising (J. Atwood) | 65. |
| 1 | Repro-typist | Advertising (J. Atwood) | 70. |
| 1 | Advertising-trainee | Advertising (J. Atwood) | 65. |
| 1 | Public Relations Specialist | Advertising (J. Atwood) | 6,000. |
| 1 | Wireman | Magnetic Tape (R. Boisvert) | 65. |
| 1 | Sheet Metal Operator | K. Fitzgerald | 75. |
| 1 | Sheet Metal Trainee | K. Fitzgerald | 65. |
| 1 | Apprentice Machinist | K. Fitzgerald | 65. |
| 1 | Production Engineer (offer out) | Dick Best | 14,000. |

INTEROFFICE MEMORANDUM

DATE September 18, 1962

SUBJECT Approved Open Requests for Personnel - 2

TO K. Olsen
G. O'Dea
R. Mills

FROM Personnel

We have stopped hiring female assemblers. However, we are still hiring Wiremen ($1.55) and Technician Trainees ($1.80) for Maynard Sandler although we have no paper to cover these. I don't think our hiring rate on these people would materially affect cash flow.

RTL/jfr

COMPANY CONFIDENTIAL

dec INTEROFFICE MEMORANDUM

DATE September 17, 1962

SUBJECT Impact of Revolving credit term loan on DEC

TO Ken Olsen
Harlan Anderson

FROM George O'Dea
Dick Mills

Subsequent to our conversation of September 12 with Lincoln Barber this may be an appropriate moment to sum up our recent thinking on the matter of financing the company on other than a demand loan basis.

I believe all concerned agree that the revolving credit loan concept offers the greatest opportunity to a company in our position. By tacking a 2 year life on the agreement we will enjoy the benefit of improving our net working capital and current ratio. For example, our July 31 net working capital structure reads:

| | | |
|---|---|---|
| Cash | $ 563 | |
| Other Current Assets | 4,091 | |
| total current assets | | $4,654 |
| Short term notes | $1,100 | |
| Other current Liabilities | 1,922 | |
| total current liabilities | | $3,022 |
| Net Working Capital | | $1,632 |

If a 2 year revolving credit loan had been in existence at July 31 the following alterations could have been made.

a) borrow $587 to increase the cash to $1,150. (This would increase long term debt by $587).
b) pay off all short term notes, leaving $50 in the bank for working fund.
c) show a new net working capital of

| | | |
|---|---|---|
| Cash | $50 | |
| Other current assets | 4,091 | |
| total current assets | | $4,141 |
| Current liabilities | | 1,922 |
| Net Working Capital | | $2,219 |
| Current Ratio | | 2.2 to 1 |

As a further benefit interest would be accruing at an annual rate of 4-3/4% of $589 plus 1/4% of $1,411 (annual cost of $31,506) as opposed to the present structure of 4-1/2% of $800 plus 6% of $300 (annual cost of $54,000).

You realize of course, any balance in the revolving credit loan one year from the date of its inception would revert back to a current liability.

What then should we do?

a) Present the proposal to AR & D before this October 10 Board Meeting. If they wish to top it - fine.
b) If not, get the approval of the Board to proceed with negotiations.

We should approach the bank when our cash is at its best and the results of fiscal '63 are the most encouraging. Right now it looks like mid October is the time.

# # #

# INTEROFFICE MEMORANDUM

DATE SEPTEMBER 17, 1962

SUBJECT REPAIR OF RETURNED MODULES

TO Ken Olsen FROM JIM CUDMORE

THE FOLLOWING IS A LIST OF MODULES RETURNED FOR REPAIR DURING THE WEEK OF SEPT. 10

| UNIT | SERIAL NO. | CUSTOMER | DEFECT |
|---|---|---|---|
| 1103 | 0015852 G | ADX6 | Q 1 OPEN, D 1 OPEN |
| 1103 | 0019232 G | ADX6 | Q 6 SHORTED |
| 1103 | 0018943 | ADX6 | NONE |
| 1103 | 0018368 G | ADX6 | Q 6 SHORTED |
| 1104 | 50019 D | I.T.T. | Q 2 LEAKAGE TOO HIGH |
| 1104 | 62760 B | DEC-CALIF. | NONE |
| 1111 | 06607 D | I.T.T. | LEAKAGE TOO HIGH |
| 1111 | 76205 D | I.T.T. | LEAKAGE TOO HIGH |
| 1150 | 66636 B | I.T.T. | FAILED RISE TTT(TOO SLOW) |
| 1151 | 41899 C | I.T.T. | NONE |
| 1151 | 41902 C | I.T.T. | NONE |
| 1201 | 0032777 P | | EXCESSIVE $I_{CB}$ |
| 1201 | 0032636 P | DEC | EXCESSIVE $I_{CBO}$ |
| 1201 | 54929 P | BEN FIELD SERVICE | EXCESSIVE $I_{CBO}$ |
| 1204 | 70347 B | I.T.T. | NONE |
| 1204 | 79836 B | I.T.T. | NONE |
| 1204 | 74921 B | I.T.T. | NONE |
| 1204-B | 73522 B | I.T.T. | NONE |
| 1209 | 01697 K | I.T.T. | NONE |
| 1209 | 0016096 K | I.T.T. | NONE |
| 1209 | 0019237 | ADX6 | NONE |

REPAIR OF RETURNED MODULES (CONT.)

| UNIT | SERIAL NO. | CUSTOMER | DEFECT |
|---|---|---|---|
| 1209 | 94296 K | I.T.T. | HIGH SATURATION VOLTAGE |
| 1310 | 0008211 E | I.T.T. | NONE |
| 1546 | 64011 D | DEC | NONE |
| 1546 | 28198 C | DEC | FAILED RISE TTT |
| 1546 | 28078 C | DEC | NONE |
| 1546 | 28092 C | DEC | FAILED RISE TTT |
| 1546 | 28079 C | DEC | NONE |
| 1546 | 28203 C | DEC | NONE |
| 1546 | 28083 C | DEC | Q 6 OPEN EMITTER TO COLLECTOR |
| 1546 | 28200 C | DEC | Q 4 MISSING |
| 1546 | 28195 C | DEC | NONE |
| 1607 | 77417 B | I.T.T. | NONE |
| 1607 | 77741 B | I.T.T. | NONE |
| 1607 | 77790 B | DEC-CALIF. | NONE |
| 1972 | 70822 B | DEC-CALIF. | OPEN |
| 1972 | 6008745 B | I.T.T. | TRANS. SHORTED |
| 1972 | 0009994 B | I.T.T. | TRANS. SHORTED |
| 1972 | 06191 B | I.T.T. | TRANS. SHORTED |
| 1973 | 31528 A | | TRANS. BACKWARD |
| 1973 | 91905 C | I.T.T. | EXCESSIVE LEAKAGE |
| 1973 | 0008405 C | I.T.T. | NONE |
| 1976 | 73863 C | I.T.T. | C 7 OPEN |
| 1976 | 00891 C | I.T.T. | NONE |
| 1982 | 0034631 B | DEC-CALIF. | Q 6 SHORTED |
| 1982 | 0034632 B | DEC-CALIF. | Q 5 & Q 11 SHORTED |
| 4102 | 0022571 A | I.T.T. | NONE |

REPAIR OF RETURNED MODULES (CONT.)

| UNIT | SERIAL NO. | CUSTOMER | DEFECT |
|---|---|---|---|
| 4106 | 84467 F | I.T.T. | NONE |
| 4110 | 78192 E | I.T.T. | Q 1 LEAKAGE TOO HIGH |
| 4112 | 81317 A | I.T.T. | NONE |
| 4113 | 0015395 A | I.T.T. | Q 3 & Q 4 SHORTED Q 6 HIGH LEAKAGE |
| 4113 | 0010576 A | I.T.T. | Q 3 SHORTED |
| 4113 | 0014857 A | I.T.T. | Q 2 & Q 6 SHORTED |
| 4201 | 33509 K | | OBSOLETE TRANSISTORS REPLACE (2N412) |
| 4213 | 89247 E | I.T.T. | NONE |
| 4213 | 95970 E | I.T.T. | NONE |
| 4214 | 0017702 C | I.T.T. | NONE |
| 4214 | 93692 B | I.T.T. | NONE |
| 4214 | 0008723 C | I.T.T. | NONE |
| 4214 | 93690 B | I.T.T. | NONE |
| 4301 | 63537 E | I.T.T. | NONE |
| 4603 | 0010593 D | I.T.T. | NONE |
| 4603 | 0025124 D | I.T.T. | NONE |
| 4603 | 80617 C | I.T.T. | BROKEN CIRCUIT |

OF A TOTAL OF 64 MODULES RETURNED, 32 HAD NO DISCERNIBLE DEFECTS. THESE MODULES WERE TESTED AT ROOM TEMP. AND AT 55°C. MANY OF THE DEFECT TAGS WERE INCOMPLETE AND THIS LACK OF INFORMATION WILL GREATLY HAMPER OUR RECORD KEEPING.

INTEROFFICE MEMORANDUM

DATE September 14, 1962

SUBJECT General PDP-4 Information

TO Computer Sales Personnel FROM George Rice

Below is a list of the current options for the PDP-4 computer.

| | |
|---|---|
| Paper Tape Punch and Control | Type 75 |
| Printer-Keyboard and Control | Type 65 |
| Real Time Option | Type 25 |
| Visual 16 in. CRT Display | Type 30D |
| Magnetic Tape Transport | Type 50 |
| Magnetic Tape Control | Type 54 |
| Line Printer and Control | Type 62 |
| Card Reader and Control | Type 40-200 |
| Card Punch Control | Type 40-523 |

At present there are two DEC PDP-4's. One is at Maynard and has all of the above options. The second machine is at the DEC office in Los Angeles, and has the Type 75, Type 65, Type 25, Type 30D, and Type 54 options. A third machine, in addition to the two already sold, is being built for stock. This machine will be used at some of the Trade Shows during the month of October and will probably be sent to Massachusetts General Hospital later in November.

In addition to the above options DEC has proposed to build the following for use in Process Control Applications.

The drum system under consideration and proposed to Foxboro Company for Process Control is specified in the memo, Block Transfer Drum System Specifications. This system operates on a serial transfer basis in 256 word blocks, and requires the Real Time Option. The present state of this system is in the proposal form. Computation and drum transfers are concurrent. The prices for this drum are as follows:

| | |
|---|---|
| 16K word capacity | $ 31,600 |
| 32K word capacity | 36,300 |
| 65K word capacity | 43,400 |

Extended Memory - DEC has also proposed an expanded PDP-4 core memory Type 16 described in Permanent Memorandum M-1154. This unit will replace the present physical 4096 word core and 4096 word core memory modules will be placed in additional connected bays of the PDP-4.

Extended Arithmetic Control Unit - The proposed extended arithmetic control unit is in a very general form. The Arithmetic Control Unit (ACU) attaches to the PDP-4 and allows arithmetic operations to be performed faster. The ACU serves as an extension to the Accumulator (AC) and consists of control, a Multiplier-Quotient register (MQ), and a step counting register. The commands which will be available are:

1. Arithmetic Shift - right/left AC and MQ
2. Multiply/Divide - 34 bit variable length
3. Normalize
4. Load Step Counter from AC - specify shifts or length of Multiply/Divide
5. Read Step Counter into AC
6. Load MQ from AC
7. Read MQ into AC

The time required for the above operations will vary. The maximum time required to obtain a signed 36 bit product would be approximately 25 memory cycles or 200 microseconds. The price for the ACU will certainly be less than $15,000 and will more than likely be less than $10,000. At this time an exact specification of the ACU does not exist, although the general method is known. The chief variable in the design is whether or not to provide programmed or hardware sign control.

Following is a variety of information which should be

helpful in the marketing of the PDP-4.

The programs which we currently intend to supply with a computer plus their features are listed below.

1. Macro - 4 Assembly Program - This program is a one pass assembler. It allows mnemonic symbols to be used for addresses and instructions. Constants are automatically assigned. Text statements may be written for printing at run time, and a decimal mode may be specified. Up to 6 character symbols may be used, and the symbol table may be punched on paper tape for use with the DDT program.

2. DDT - 4 DEC Debugging Tape - This program provides communication with a program via the on-line typewriter. Registers may be examined (using nmemonic codes) and modified, communication is entirely in symbolic language. Programs may have break points inserted and then run under DDT control (similar to tracing routine). A program may be searched for particular words.

3. Double Precision Floating Point - This will provide floating point arithmetic with a 36 bit mantissa and exponent. These routines include +, -, $\div$, X, fix-to-float, and float-to-fix, decimal input and output, single and double precision fixed point X and $\div$ are also included in the package.

4. Maintenance Routines - There are five maintenance routines. These tests are also used as DEC's standard acceptance test routines.

a) Interminable Test - Verifies that all machine functions are operating properly. Each instruction is tested, a core checkerboard pattern is run, a message is typed and tape is punched and read. The test will then repeat itself.

b) Instruction Tests - These programs will test all machine instruction under various modes.

c) Checkerboard Program - Provides continuous checkerboard memory testing with four different patterns.

d) Reader and Punch Test - Checks the start time of the reader, and provides check of the reader using different patterns and variable times.

The punch is tested by providing tapes for the reader test.

e) Teleprinter Test - Provides for input and output test to be made on the printer-keyboard teleprinter.

5. Tape Reproducer -

6. Punch Routines - These routines allow for punching tape in either block format or read-in mode format.

7. Octal Debug - Simple debugging routine.

8. Miscellaneous input/output Routines - These routines allow octal, decimal, double precision input and output, also special teletype conversion routines.

9. Demonstration Programs -

a) Display Minskytron

b) Pen Follow

c) Character Display

d) Character Punch

10. Floating Point Functions (not completed) - This program will allow various functions to be computed such as - double precision sine, cosine, tangent, exponents, log base e and square root.

11. Algebraic Compiler (not completed, This compiler is now being specified and should be of the Fortran Type. The expected date of completion is sometime late spring 1963).

Purchase of a PDP-4 will enable customers to become members of the DEC Users Group known as DECUS. DECUS is an active users group whose aim is to facilitate the interchange of information on items of mutual interest to users of PDP-1, PDP-4, and their peripheral equipment. DECUSCOPE is a monthly technical bulletin which attempts to implement the goals and objectives of DECUS, by keeping "in-touch" with members.

The reader-punch cabinet as shown in the recent pictures of the PDP-4 can easily be separated. With the removal of the top part of the cabinet and the installation of rubber

feet then a reader only cabinet is available.

The PDP-4 prototype has about 1000 hours on it without a mainframe failure.

The ambient temperature range of the PDP-4 is between 50°F and 105°F. The computer has been run at temperatures considerably higher than 105, but the long term reliability at higher temperatures is unknown so at this time is not recommended.

There is an eleven instruction loader program which is inserted using the console switches. This program is generally left in memory and is used to read in program tapes.

The delivery time for a PDP-4 depends upon the date of the received purchase order. At the present time we can quote less than 3 months for delivery of a main frame. Most of the standard options can be delivered at the same rate, some of the more sophisticated options require more time.

The standard operating guarantee for a PDP-4 is as follows: The equipment is warranted to be free from design and manufacturing defects for a period of six (6) months following delivery. Parts and service necessary to repair any such defects and to maintain the equipment in proper operating condition during this period will be supplied free of charge. DEC liability under this warranty is limited to these parts and service and does not include any consequential damages. The warranty does not cover damage to the equipment due to service of the equipment by unauthorized personnel or due to unusual physical or electrical stress. This warranty does not cover systems outside continental United States, in this case a special warranty will apply. An "on call" service contract provision from the nearest DEC service area is available after the normal warranty period.

Acceptance procedures for computer systems are generally as follows: Acceptance testing and acceptance of the equipment shall be at Maynard, Mass. Upon satisfactory completion of the acceptance test by both parties the equipment will be shipped to the buyer's sight and again tested for proper operation. This date will be the invoice date and the commencement of the six months guarantee described above. The test shall consist of the standard DEC programs and procedures applicable to the specific equipment. Subject to DEC approval the buyer may include special test procedures and programs. The buyer must bear all cost of preparation and checking of any such special programs, and in no event can the final acceptance of the system be delayed by

nonavailability of such special programs. Final agreement on test procedures and programs must be reached no later than 30 days before scheduled delivery date of the equipment.

There are programming and maintenance manuals available for the PDP-4. There, also, is a one week maintenance course offered at Maynard. This course is usually run the first or second week of each month. A programming course, is also proposed, but no details have been decided upon as yet.

dec INTEROFFICE MEMORANDUM

DATE September 14, 1962

SUBJECT Fire Insurance

TO Kenneth H. Olsen

FROM Win Hindle

I have looked into the fire insurance coverage carried by DEC and conclude that we are very well protected. All of our assets, including the substantial inventories, are protected against loss by fire or by other standard calamities.

George O'Dea did a thorough study of the entire DEC insurance program in July. At that time he recommended and put into effect an increase in our use and occupancy insurance from $1,265,000 to $3,200,000 to reflect the expansion of the company. This insurance pays the company its normal gross profits and fixed expenses in the event that a fire or other catastrophe causes work to cease for a period. George has also initiated a regular quarterly review of our insurance coverage in view of the rapid changes in the level of operations. The entire insurance program is being watched very capably.

* * * *

dec MEMO

DATE 9/14/62

TO G. O'Dea
D. Mills

FROM J. Smith

SUBJECT: Outside Contract Expenditures (wiring)

During this month I will receive all outstanding orders from wiring vendors, including Power Supplies. This involves a total expenditure of $19,962.00. Our in-house capability should eliminate the need for outside contract help in Oct. and subsequent months.

cc; KHO
HEA

# INTEROFFICE MEMORANDUM

DATE September 14, 1962

SUBJECT Pricing of Real Time Option, Meeting with Foxboro; Friday, Sept. 14, 1962

TO Kenneth Olsen ✓
Harlan Anderson
Ben Gurley
Richard Mills

FROM Gordon Bell

Today Arthur Hall and I discussed the $8,000 price of the Real Time Option with Foxboro. They felt that its price was too high. Their investigation was started by Les Glickman, and pushed by Saul Dinman.

We initially priced an additional box for their interface at $3,000. This included -6 volt buffers and signal converters, etc. This was too expensive for them so they agreed to do the buffering. We still have to provide a quote to them with the modified interface. The difference between the new and old interface is about ± $100, making the cost $8,100 to Foxboro. Their cost analysis at our list prices was as follows:

| | |
|---|---|
| Modules | 3,573 |
| 3 mtg panel wiring (75 x 33) | 2,500 |
| (3 x 450) mtg. panel price | 450 |
| | $6,523 |

I will quote a new price of $8,100 to Foxboro for their proposed Foxboro Real Time Option.

We discussed the following topics:

1. DEC assisting Foxboro in the problems of signal transmission on long coaxial lines.

2. Give Foxboro overall dimensions of our cabinetry so units in an installation are physically similar.

3. Give Foxboro the specifications and vendor for our coaxial cables. We might also supply them with our coaxial connector or tell them how to cast them.

Foxboro's line of module and systems components are becoming stabalized. Their sub-system select modules are quite similar to ours in that codes for units are within the modules. Their flip-flops now include capacitor-diode gating, and input mixing is done with these gates I believe.

* * * *

dec INTEROFFICE MEMORANDUM

DATE September 13, 1962

SUBJECT DECUS EXECUTIVE BOARD MEETING
Friday Noon (September 14)

TO

FROM Elsa Newman

Ken Olsen
H. Anderson
S. Olsen

The following items will be disposed of:

1. The date of DECUS Annual Organization Meeting is set for 10, 11 October at Hanscom Field - Lawrence Radiation Lab will probably extend invitation for next technical meeting. Mrs. Monk telephoned me for details of host obligations.

2. Article by J. Sexton in August DECUSCOPE stimulated action on DECUS (?) double precision arithmetic routines. Mrs. Monk's letter of May 9 expressed need for them. I repeatedly tried to get Roland Silver, John K., Ed Fredkin, and Ben Gurley to do something. Mr. McQuillain will come to meeting (at my suggestion and with BBN's okay) to proxy for Bill Fletcher. Gordon Bell and Dit Morse have also been invited and will attend.

Ken Olsen
file

dec INTEROFFICE MEMORANDUM

DATE September 13, 1962

SUBJECT PDP-4 Drum Delivery

TO Ken Olsen ✓
Harlan Anderson
Dick Best
Ben Gurley
Gordon Bell

FROM George Rice

Today a letter was sent to Foxboro stating a five months delivery from receipt of purchase order for a block transfer drum system. The drum system quoted is the one described in Gordon Bell's letter dated Aug. 16 to Gardner Hendrie and as amended in John Koudela's letter dated Sept. 11 to Roy Fine.

A seven month figure was decided upon at a meeting attended by Dick Best, Ben Gurley, Gordon Bell, and myself. There are three major reasons for the seven month figure:

1) It takes a minimum of three months to receive a drum from Vermont Research.

2) This is the first time for a system of this nature and it will necessitate some new circuit design.

3) At the present time there is a shortage of personnel to be assigned to the project.

Foxboro came back to us requesting a five months figure, so at a meeting attended by the persons to whom this memo is addressed, a five month figure was agreed upon.

Kenneth H. Olsen Draft September 13th, 1962

PDP-1

| | | |
|---|---|---|
| (r) | CRC | HEA |
| (r) | NSA | JK |
| | Ottowa | GB |
| (r) | EA | HEA |
| | BBN | BG & GB |
| (r) | Boeing | Sales |
| | Link Av | KHO |
| | Melbourne | Sales |
| (r) | Livermore | BG & RES |
| (r) | Mitre | KHO |
| (r) | JPL | Sales |
| (r) | NAA | SCO |
| (r) | Geotech | SL |
| (r) | SRL | RES |

PDP-4

| | | |
|---|---|---|
| 1. | ST&C | NM |
| 2. | Sweden | GB |
| 3. | Foxboro | AH (4) |
| 4. | (r) Martin, Balt. | Sales |
| 5. | (r) AFIP, Wash. | Sales |
| 6. | Prince Albert, Canada | GB |
| 7. | (r) Frankfort Arsen | Sales (2) |
| 8. | (r) JPL | Sales |
| 9. | G. Washington U. (Medical) | KHO |
| 10. | U. of Wisconsin | HEA |
| 11. | (r) Camb. Accel | GB |

Harlan Anderson

PDP-1

(r) CRC

(r) EA

PDP-4

U. Of Wisconsin

John Koudela

PDP-1

PDP-4

(r) NSA

Ben Gurley

| PDP-1 | | PDP-4 |
|---|---|---|
| BBN | BG & GB | |
| (r) Livermore | BG & RES | |

Gordon Bell

PDP-1

Ottawa

BBN BG & GB

PDP-4

Sweden

Prince Albert, Canada

(r) Camb. Accel

## Sales

### PDP-1

(r) Boeing
Melbourne

(r) JPL

### PDP-4

(r) Martin, Balt.

(r) AFIP, Wash.

(r) Frankfort Arsen (2)

(r) JPL

Kenneth H. Olsen

PDP-1

Link Av

(r) Mitre

PDP-4

G. Washington U. (Medical)

Stan Olsen

PDP-1

PDP-4

(r) NAA

Steve Lambert

PDP-1

PDP-4

(r) Geotech

Bob Savell

PDP-1

PDP-4

(r) SRL

(r) Livermore BG & RES

Nick Mazzarese

PDP-1

PDP-4

ST&C

Arthur Hall

PDP-1

PDP-4

Foxboro (4)

COMPANY CONFIDENTIAL

# INTEROFFICE MEMORANDUM

DATE September 12, 1962

SUBJECT Summary of discussion with Lincoln Barber of National Shawmut

TO Kenneth Olsen
Harlan Anderson

FROM George O'Dea
Dick Mills

On September 12 Lincoln Barber responded to our invitation to pay us a visit and be brought up to date on affairs. He was given:

the fiscal 1962 audit report
the July '62 Financial Statements
the September 7 copy of our short term cash forecast
the details of our September 10 Accounts Receivable balance

Linc reviewed the history of the DEC line of credit with the Shawmut from inception to its present $800K ceiling and went on to volunteer to increase this based on the above information.

We described what we felt would be the DEC cash problems in the next few years - namely:

continued growth outstrapping current profits
wild peaks and valleys in the cash strain between periods

In face of these prospects we asked Linc's advice on the best method of raising the cash to meet the requirements. (Without offering additional shares).

Before answering he asked where we would be if ITT went to building their own ADX. The considered reply was that this couldn't happen without our having 6 months advance knowledge thereof-and even if it did happen we would hope by that time to have built up volume through Foxboro (PDP-4), through the Medical Field, or through the area of devising our computers to digest analog input.

Apparently consoled against the likelihood of complete collapse of sales Lincoln went on to recommend a revolving credit type term loan. The mechanics of such a device would be:

A. DEC and the bank would enter into an agreement (of 2 or 3 years duration) whereby the bank would reserve for our unchallengeable use a certain sum of money (tentatively discussed as between 1 and 2 million dollars) to be carried under the following terms.

1. Interest on the borrowed portion to be at roughly 1/4% above prime. (Actually the interest rate would be current prime of 4-1/2 ± 1/4% or 4-3/4% subject to increase if the prime rate increases, but limited to a ceiling of 5-1/2% prime ± 1/4% = 5-3/4% - and subject to decrease if the prime rate declines but limited to a minimum of 4-1/4% prime ± 1/4% or 4-1/2%).

2. Interest on the unused portion to be at 1/4% of the difference between the ceiling amount of the agreement and the actual loan balance at the close of any days business.

3. Interest rates quoted herein are on an annual basis.

4. The company has the right to adjust its loan balance as frequently as it chooses (could be daily - more likely weekly).

5. At the close of the term of the loan the balance actually borrowed is due.

B. In exchange for the unchallengeable right to borrow up to the ceiling at the rates quoted under A, DEC would agree to certain restrictions on their actions such as:

1. Maintaining a fixed minimum working capital
2. Maintaining a fixed minimum net worth
3. Limiting dividends
4. Limiting officers salaries
5. Limiting fixed asset additions
6. Providing financial information
7. Restricting borrowings to single source (would agree to AR & D borrowings)

Lincoln was quick to point out that these restrictions were subject to negotiation.

By way of conclusion we summarized our discussion and plans as follows:

A. Linc will give us a letter describing the revolving credit term loan (for purposes of confirming our understanding).

B. DEC will run the first three months of fiscal '63 at its present open account line of credit of $800.

C. Sometime in mid October, with three months of actual experience on the books, DEC will probably want to approach the bank with a firm request for a revolving credit type loan.

# # #

# INTEROFFICE MEMORANDUM

DATE September 12, 1962

SUBJECT Pinkerton Guard Service

TO K. Olsen ✓
H. Anderson
G. O'Dea
L. Prentice

FROM R. Mills

Attached you will find a copy of the Confirmation of Order from the Pinkerton people verifying the conference we had with them regarding the guard schedule and pay rates. It is somewhat startling to find that the weekly service totals out to 256 hours which at $2.35 per hour equals $601.60 per week. The total cost on an annual basis is approximately $31,000. plus holiday pay for nine (9) days at $3.90 per hour.

Billing will be made once per month.

A certificate of insurance has been requested from them regarding liability coverage on the guards and the statement was made that all of their guards were bonded. A question was asked regarding union activities and Mr. O'Madigan stated that they had no trouble with their union whatsoever. With one steward and 350 guards placed in so many plants, this seems like a reasonable statement.

We will have to pay for a Detex clock and keys for approximately $200., which is a one shot charge.

# # #

CONFIRMATION OF ORDER
for
GUARD SERVICE

This is NOT a bill

# PINKERTON'S NATIONAL DETECTIVE AGENCY, INC.

Address: 136 Federal Street
Boston, Mass.

Telephone: Liberty 2-1751

Date: September 7, 1962

To: Digital Equipment Corporation
146 Main Street - Bldg. 12
Maynard, Mass.

Attn: Mr. Richard Mills

## SERVICE AUTHORIZED

Guards as indicated below will proceed with Security Manager, Dennis T. O'Madigan to the Digital Equipment Corporation, Building 12, 146 Main Street, Maynard, Mass. and report to Mr. Richard Mills at 7:00 AM on September 10, 1962.

| | | |
|---|---|---|
| Monday thru Friday | 2 Guards | - 7:00 AM to 3:00 PM |
| | 2 Guards | - 3:00 PM to 11:00 PM |
| | 1 Guard | - 11:00 PM to 7:00 AM |
| Saturday | 2 Guards | - 7:00 AM to 3:00 PM |
| | 1 Guard | - 3:00 PM to 11:00 PM |
| | 1 Guard | - 11:00 PM to 7:00 AM |
| Sunday | 1 Guard | - 7:00 AM to 3:00 PM |
| | 1 Guard | - 3:00 PM to 11:00 PM |
| | 1 Guard | - 11:00 PM to 7:00 AM |

Rate for each Guard assigned - $2.35 per hour.
Rate on Holidays for each Guard assigned - $3.90 per hour.

In addition, when indicated below, charges shall be made for:

Expenses, as follows: None

Travel time, as follows: None

Service ordered in addition to the above will be rendered under the same terms and conditions.
Bills payable upon presentation.

PINKERTON'S NATIONAL DETECTIVE AGENCY, INC.
By J. P. McKenna
Manager.

Form 71A - 5M - 10-58 - Ptd. in U.S.A.

COMPANY CONFIDENTIAL

# INTEROFFICE MEMORANDUM

DATE September 12, 1962

SUBJECT August New Orders & Backlog

TO Kenneth Olsen
Harlan Anderson

FROM George O'Dea
Dick Mills

The financial statements for August will not be available for approximately another two weeks. In the interim we can check the status of our new orders and backlog position at the close of August since this detail is available from the weekly Progress Report. Insofar as new orders contribute to our basic assumption of $10,800 sales for fiscal '63 we can gain the consolation of two months actual performance toward that goal.

If you will recollect, the memo of August 30 spelling out the reasons for using $10,800 as a sales target went on to establish a minimum new order forecast needed to support that volume. To be conservative we assumed an overall reduction of the computer backlog (from $3,670 at 6/30/62 to $1,600 at 6/30/63) and the module backlog (from $430 at 6/30/62 to $220 at 6/30/63). A slight increase was forecast for systems.

Attached Schedule 1 indicates a clear cut gain of $222 over the budget for new orders in the combined months of July and August. This is a 15% increase over the $1,520 predicted for that 9 week period.

While the exact figure won't be available until the financial statements are published, net sales for July and August will be approximately $2,800. If to this we add our August 31 actual unfilled order position of $3,238 we get $6,038 of fiscal '63 sales in the bag at this writing.

In summary, August new order performance does not challenge last months conclusion that $10,800 net sales for fiscal '63 is a sound assumption.

# # #

Digital Equipment Corporation

Schedule 1

Analysis of Budget Variances - Fiscal '63: July & August Business

New Orders & Backlog

($000's omitted)

New Orders:

| Product Line | Actual | Budget | Variance (gain)/loss | Budget Realization |
|---|---|---|---|---|
| Modules | $599 | $560 | $(39) | 107% |
| Systems | 317 | 280 | (37) | 113% |
| Computers | 826 | 680 | (146) | 121% |
| Total: | $1742 | $1520 | $(222) | 115% |

Backlog:

| Product Line | | | | |
|---|---|---|---|---|
| Modules | $166 | $300 | $134 | 55% |
| Systems | 327 | 230 | (97) | 142% |
| Computers | 2745 | 2520 | (225) | 109% |
| Total: | $3238 | $3050 | $(188) | 106% |

dec INTEROFFICE MEMORANDUM

DATE September 11, 1962

SUBJECT Suggestions made by Pinkerton

TO Kenneth Olsen FROM Loren Prentice

1. They request:
   A list of air conditioners that they are to check.

2. They also suggest that we review our windows, particularly those that are vulnerable either from an outside access, or the possibility of things being tossed out the window and that we put locks on these particular windows. I told them I thought it would be impossible for us to lock all windows.

3. Confidential papers.
   They have noticed that people are leaving Company Confidential papers in open desk boxes and otherwise around the place. Could you discuss with me what you want to do in this area. I suggest that we reissue a memo pertaining to Company Confidential papers. Guards could remove the Company Confidential and leave a notice to the personnel to pick it up, and secure it in a safe place. At the very least, a notice will be given to me immediately to notify these people that they are leaving Company Confidential things around and I'll pass this information on to the necessary people, as part of their daily reports.

4. Safety.
   Fire extinguishers and their locations. Add a red plastic strip or some other means of designating a fire extinguisher location. This I think should be taken care of as quickly as we can.

5. The leaving of valuable equipment in an accessible or tempting location, particularly cameras and other items of high value and easy portability. I believe at the present time our photo labs are not locked and even our cameras in Stan's office and the Personnel offices are not put away, but are left out in sight.

6. The fire escape access ways in Building 12 do not have hand rails. The windows to the old fire escapes are not locked. These should be permanently locked or permanently secured so that people cannot get out from Building 12 onto the old fire escape.

7. Storage of cleaning material. I do not put a great deal of emphasis on this item. I don't believe while this is dispersed and left in an open location much of it will be pilfered.

8. Ammonia tank in the areaway in Building 3. This is ammonia used for Roger Melanson's drafting machines. This should be moved to a more safe place and possibly not one quite as accessible to drafting. We still have tanks of all kinds, ammonia tanks, oxygen acetylene tanks, and $CO_2$ cylinders which are not secured, particularly in shipping areas and in corridors. These should be tied up no matter where they are and should not be left standing against any wall unsecured. The shut-off of oxyacetylene and other welding equipment. A bulletin will be written and given to the guards regarding the proper shut-off of these tanks.

9. There is a 2 x 4 hanging from the ceiling in Building 5, 4th floor about 6 feet 6 inches above the floor. I see no reason why this can't be removed.

10. Elevators.
Particularly in Building 5, they feel that these gates are unsafe. This is an item we have already discussed.

11. Build an extension to down ramp from Building 3 to Building 12 top floor.

12. Power shut-off and door closing in the P.M., and the opening in the A.M. At present the maintenance people are continuing as in the past. Do you want these duties assumed by Pinkerton as soon as their guards are familiar with our door procedures?

###

dec INTEROFFICE MEMORANDUM

DATE September 11, 1962

SUBJECT To correct an error

TO Kenneth Olsen

FROM Russell Doane

Contrary to what I told you yesterday, Fred Shirley will graduate in January from MIT as you thought. He expects to go on for a Master's Degree at the University of Michigan, having been accepted already. He has also applied to MIT, but has not yet been notified.

My high opinion of his work is, of course, unchanged.

###

dec INTEROFFICE MEMORANDUM

DATE September 11, 1962

SUBJECT Muffin Fans

TO Loren Prentice

FROM Bob Hughes

Muffin fans which are used to cool memories should be shock mounted and have easily changed dust filters.

I believe that all Ferroxcube memories we have, have dust filters, but we don't have them on any other type of memory, because the hardware doesn't have this provision.

Those memories which are in the field will probably pack up with dust over a long period of time. We won't be able to cool them and the thermistors in the stack will not correctly compensate the memory current.

In discussing this with Ben Gurley, he recommended that the fans have better shock mounting than they now have. I believe we should take action on this immediately.

cc: Ken Olsen
Ben Gurley
Bob Beckman
Nick Mazzarese
Jim Cudmore
Al Blumenthal
Ed Harwood
Bob Savell
Klaus Doering
Q. C. Manual

# INTEROFFICE MEMORANDUM

DATE September 11, 1962

SUBJECT 770 Power Supply

TO Ken Olsen
Dick Best
Ben Gurley
Bob Savell
Derrick Chin
Bob Hughes

FROM Jim Cudmore

There has been a growing suspicion that the high voltage portion of the 770 power supply has been failing at high ambient temperatures.

A production 770 Power supply was tested at room temperature and then heated in the oven to 60° C and retested. The unit remained at 60° C for one hour and was then retested.

There was no significant change in the power supply's voltages or ripple. The high voltage supply increased approximately 5% and the ripple remained constant.

# INTEROFFICE MEMORANDUM

DATE September 11, 1962

SUBJECT Power Supply Wire Routing

TO Dick Best

FROM Jim Cudmore

✓Ken Olsen
George Gerelds
Bob Hughes
Dan Wardimon
Q. C. Manual

It has become apparent during the full load testing of power supplies that significant improvement in ripple can be realized if the wiring were re-routed.

On many supplies the diodes and the capacitors are wired to the output terminals through separate wires. If the diodes went directly to the capacitors and then to the output terminals, the filtering action would be greatly improved. A heavier gauge wire could also be used to some advantage in many of the supplies.

I would suggest that all power supply models be checked and re-wired as necessary.

# INTEROFFICE MEMORANDUM

DATE September 11, 1962

SUBJECT

TO Stan Olsen

FROM Kenneth H. Olsen

When you were out seeing the world I signed all the quotes. I'm still getting inquiries of them. This might be good because I sympathize with the problems of the Sales Department but it is somewhat of a chore.

One of the quotes I sent out was to the local Air Force Base on some power supplies and other things. Mr. Brothers called me this morning to say that they asked for the quote to be f.o.b. destination and we sent it with the catalog prices and the estimated charges for shipping separately. They would like the shipping charges added onto the cost of each unit. I explained what the problem was and he said that if we would send a letter to them requesting that the f.o.b. might be changed to point of origin that they would take care of it.

This letter should be addressed to The Electronic Systems Group, Attention: ESKKP-1. The request number is CRL-3640. The letter should say that we requested the f.o.b. be changed to point of origin and that we will prepay the transportation charges and will bill these charges separately.

# INTEROFFICE MEMORANDUM

DATE SEPTEMBER 10, 1962

SUBJECT REPAIR OF RETURNED MODULES

TO Ken Olsen

FROM JIM CUDMORE

THE FOLLOWING IS A LIST OF MODULES RETURNED FOR REPAIR DURING THE WEEK OF SEPT. 3,

| UNIT | SERIAL NO. | CUSTOMER | DEFECT |
|---|---|---|---|
| 1103 | 79438 F | I.T.T. | SHORTED TRANSISTOR |
| 1103 | 03593 F | I.T.T. | SHORTED TRANSISTOR AND SHORTED |
| 1103 | 87991 F | I.T.T. | NONE |
| 1103 | 81882 F | I.T.T. | NONE |
| 1105 | 00171 E | I.T.T. | NONE |
| 1105 | 00166 E | I.T.T. | NONE |
| 1105 | 76426 E | I.T.T. | NONE |
| 1105 | 00170 E | I.T.T. | NONE |
| 1105 | 017864 E | I.T.T. | NONE |
| 4105 | 03354 E | I.T.T. | NONE |
| 4106 | 99637 F | I.T.T. | NONE |
| 4106 | 01144 G | I.T.T. | NONE |
| 4106 | 74803 F | I.T.T. | NONE |
| 4106 | 0010953 G | I.T.T. | NONE |
| 4106 | 70335 F | I.T.T. | NONE |
| 4209 | 0015306 H | I.T.T. | LEAKY TRANSISTOR(BROKE DOWN UNDER HEAT) |
| 4209 | 0016780 H | I.T.T. | NONE |
| 4209 | 0016752 H | I.T.T. | NONE |
| 4209 | 97488 H | I.T.T. | NONE |
| 4209 | 75549 H | I.T.T. | NONE |
| 4209 | 006759 H | I.T.T. | NONE |

REPAIR OF RETURNED MODULES(CONT.)

| UNIT | SERIAL NO. | CUSTOMER | DEFECT |
|---|---|---|---|
| 4216 | 95736 B | I.T.T. | NONE |
| 4216 | 0028421 B | I.T.T. | NONE |
| 4216 | 0028532 B | I.T.T. | NONE |
| 4216 | 95737 B | I.T.T. | NONE |
| 4216 | 95769 B | I.T.T. | NONE |
| 4407 | 0073077 B | I.T.T. | REPLACED ORIGINAL XTAL WHICH WAS KNOWN TO BE OUT OF TOLERANCE |
| 4407 | 0012906 B | I.T.T. | REPLACED TRANSFORMER FOR PULSE WIDTH(TOO WIDE) |
| 4407 | 0012907 B | I.T.T. | NONE |

OF A TOTAL OF 29 MODULES RETURNED, 23 HAD NO DISCERNABLE DEFECTS. THESE MODULES WERE TESTED AT ROOM TEMP. AND AT 55 C. MANY OF THE DEFECT TAGS WERE INCOMPLETE AND THIS LACK OF INFORMATION WILL GREATLY HAMPER OUR RECORD KEEPING.

# INTEROFFICE MEMORANDUM

DATE September 10, 1962

SUBJECT Proposal to buy Burroughs Tape Unit Model 546

TO Ken Olsen FROM Roland Boisvert

cc. Ben Gurley

Reasons for Purchace:

From My Viewpoint:

The unit is simple, straight forward and rugged mechanism. It is a full vacuum machine whose vacuum columns are sensed by pressure switches. This machine has been in the field eight years. Considering these things, I feel that the unit is completely de-bugged, that maintenance costs are minimum, and that field service on this unit would be greatly reduced since the machine is mechanically simpler.

From the Customer's Viewpoint:

a. This machine is very gentle on tape; therefore, projecting tape life far beyond the tension arm type machine.

b. Tape loading is much simpler.

c. The right lock-out ring on the Burroughs is a standard item. It is a solenoid-type device which when pushed in does not rub against the right lock-out ring dropping particles of the ring onto the tape such as occurs in the Potter. The new right lock-out ring to eliminate this condition in the Potter is costing us at the present time $125 per unit.

d. Mechanically we do not have the banging of door against door when the units are grouped together.

e. We do not have the possibility of closing the door on the coupling plate of the head.

Cost:

From the Cost Viewpoint:

The cost of one Burroughs unit with IBM compatable head and IBM end-of-tape sensing for half-inch tape, with the door, would be $7,200. In quantities of 20 the cost would be $130,500. The present cost of 20 Potter's is $144,100. The net savings realized is $13,500. The point to really emphasize is that this 20th unit of the Burroughs has a discount schedule on it of 25%; that by ordering a larger quantity than 20, say 100 units, these could be scheduled out over a period of 18 months; that the total cost per unit including the head would be down to about $4500. This is quite good from the manufacturing standpoint and such a contract with Potter is not presently available - we cannot space out over a six

month period of time one order of tape units, therfore, we are held to this minimum - 20 tape units at a time and as a result we used eighty to a hundred tape units last year and paid considerably more per tape unit than we would if we could initiate some program with Burroughs to space out the tape units over a greater period of time.

Also there is the warranty item of the two companies. The present warranty with Potter reads ninety days FOB Poainview, New York. The warranty which Burroughs has is FOB Pasedena, one year on all components. Since we, in turn, stand behind these units for one year as far as our customers are concerned, in one case we are standing behind the units nine months on our own and in the other case we are completely covered by the actual machine manufacturer, and in terms of a large quantity of tape units in the field, this could become itself quite a sizable sum.

The third item under consideration is the (to consider under cost) actual spare part inventory itself. In the case of Potter we have to maintain a reasonable inventory to take care of our tape units in the field. In the case of Burroughs, Burroughs themselves maintains an inventory at their local office in Boston. In our particular case this inventory at the present time includes all motors, clutches, relays, everything that goes in a unit that we would be buying except for the half-inch guiding mechanism. This is quite different than what we presently stock with Potter, and this in itself having it physically available is quite nice where in the case of Potter, who is at times in somewhat the same situation we are as far as production is concerned, we have a little difficulty in getting the parts that we need at the proper time. The actual conversion to Burroughs and the physical location of components, such as the logic panel have not been worked out; however, many modules can be saved by a redesign of the tape unit logic.

This is the final item to consider under cost and one that must be kept in mind before any changes are really made, is that Potter has come out with a new transport which essentially has double vacuum buffers therefore doubling the length of the vacuum buffers which is 120-inch per second machine, and it is supposed to be, performance-wise, as far as programming and running it, quite a bit better than the 906-11 at the present time. Along with this we have had an indication from Potter that there will be a revision of the pricing on the 906-11 unit which we are presently using, and since the per unit basis savings for the Burroughs is about $680 per unit, if the Potter does come down a reasonable amount we would be far better off from the initial cost standpoint to stay with it. Of course we still have this problem of spare parts and the problem of warranty on the units and again service on the units.

Ken Olsen

dec INTEROFFICE MEMORANDUM

DATE September 7, 1962

SUBJECT Muffin Fans

TO Computer Group
Quality Control

FROM Jim Cudmore

All old muffin fans must be replaced where they are used with the newer Gold Seal version. These fans must be replaced immediately, and no system will leave with the old-style fans. The Gold Seal fan has provision for external lubrication and the life expectancy should be much longer than the older style.

dec MEMO

DATE 9/7/'62

TO Ken FROM L. O. Dea

Here is the ammunition for Monday's meeting with Harlan.

[attached to Short Term Cash Forecast - Sept., Oct., Nov., 1962]

DAP 984

COMPANY CONFIDENTIAL

dec INTEROFFICE MEMORANDUM

DATE September 7, 1962

SUBJECT Short Term Cash Forecast-Sept., Oct., Nov., 1962

TO Kenneth Olsen

FROM George O'Dea
Dick Mills

The attached short term cash forecast summarizes specific transactions as they appear at this writing.

The very substantial improvement over the forecast issued August 6 is commented on partially in Schedule 4. As you will note, approximately $400K of the August gain represents acceleration of collections due largely to Ben Gurley's wooing of MIT and Harlan Anderson's coaxing ITT. Another $100K arises from Dick Mills' screening payables. The last $100K is probably permanent gain arising from basic pessimism in forecasting disbursements.

If we look ahead to the October balance, today we are predicting a closing figure of slightly over $600K whereas last month the forecast only called for $6K. This difference is the consequence of

| | | |
|---|---|---|
| a) | the gain on August disbursements cited above | $100K |
| b) | reduction in Module Production Schedule (8K for the 2 mo.) | 240K * |
| c) | revision of estimated cost of System & Computer Production | 66K * |
| d) | reduction in tax provision in light of actual return | 116K |
| e) | net effects of other basic pessimism used in prior months forecast | 78K |
| | | $600K |

*before catching up on delayed payables.

Before we walk away all smiles, there are two specific transactions in the estimate of receipts which warrant hawk-eye attention. These are

| | | |
|---|---|---|
| CRC | $385 | promised for payment 9/14 |
| ITT | 377 | promised for payment before 9/30 |
| | $762 | |

If both of these promises are breached we are in trouble this month. Needless to say these will receive maximum follow-up.

Even if these customer promises are kept we should not feel overly satisfied. The current schedule reflects postponement of the following delivery promises formerly regarded as August business.

| | |
|---|---|
| CRC - A to D Converter | $60 |
| MIT - PEPR | 106 |
| MIT - Drum System | 43 |
| BBN - Drum System | 62 |
| ADX #2 (extra memory | 27 |
| EMI System | 21 |
| Sylvania System | 22 |
| Navy Dam Neck System | 23 |
| Total delivery delays: | $364 |

# # #

CC: Harlan Anderson

# DIGITAL EQUIPMENT CORPORATION

Short Term Cash Forecast

September, October, November, 1962

## INDEX



Issued September 7, 1962

DEC Short Term Cash Forecast — Exhibit A

September, October, November, 1962 — ($000's omitted)

| | September | October | November |
|---|---|---|---|
| Cash Beginning Balance | $686 | $455 | $607 |
| Add Receipts: Computers (See Schedule 1) | 999 | 418 | 708 |
| Systems (See Schedule 2) | 45 | 148 | 68 |
| Modules (See Schedule 3) | 260 | 490 | 307 |
| Total Receipts: | 1304 | 1056 | 1083 |
| Deduct Disbursements: | | | |
| Mfg. of Modules (8K per mo.) | 410 | 280 | 280 |
| Mfg. of Systems (4/mo.=$100 Sales Value x 25% non mod. cost) | 35 | 25 | 25 |
| Mfg. of Computers (3/mo.=$560 Sales Value x 25% non mod. cost) | 210 | 140 | 140 |
| Personnel Requisitions | 15 | 16 | 17 |
| SG & A | 130 | 130 | 130 |
| Development | 90 | 90 | 90 |
| AR & D - Principal & Interest | 5 | - | - |
| Federal Taxes | 370 | - | - |
| State Taxes | 110 | - | - |
| Special Equipment Purchases | 117 | 180 | 100 |
| Capital Equipment | 30 | 30 | 30 |
| PDP-4 O'hd. | 8 | 8 | 8 |
| Leasehold Improvements | 5 | 5 | 5 |
| Loan Repayments | - | - | 300 |
| Total disbursements: | 1535 | 904 | 1125 |
| Cash Ending Balance | $455 | $607 | $565 |

Note: Two notes payable aggregating $500 falls due during September. Their renewal is contemplated. The November repayment of $300 is shown as a retirement of the August note renewals.

DEC Short Term Cash Forecast

Schedule 1

Computer Receipts

($000's omitted)

| Customer | | September | October | November |
|---|---|---|---|---|
| Beckman (10% retention) | Billed 2/28 | $ | $ 12 | $ |
| Beckman (10% retention) | Billed 5/4 | | | 12 |
| U of Illinois | Billed 5/29 | 47 | | |
| LRL (last half) | Billed 7/13 | 177 | 10 | |
| CRC - Simulator | Billed 7/24 | 385 | | |
| MIT | Billed 8/28 | | 56 | |
| MIT - Drum System | Ship Sept. | | | 43 |
| MIT - PEPR | Ship Sept. | | | 106 |
| CRC - Sequence Break | Ship Sept. | | | 15 |
| CRC - Tape Unit | Ship Sept. | | | 18 |
| CRC - Tape Control | Ship Sept. | | | 7 |
| Foxboro - PDP-4 | Ship Sept. | | | 70 |
| GDC Leasing (BBN) | Ship Sept. | | | 6 |
| MIT - Multiply & Divide 10 | Ship Sept. | | | 10 |
| MIT - Sequence Break | Ship Sept. | | | 15 |
| ITT - Mag. Tape Unit | Billed 6/1 | 13 | | |
| ITT - ADX #4 (2nd half) | Billed 7/24 | 234 | | |
| ITT - ADX #6 | Billed 8/22 | 143 | 144 | |
| ITT - ADX #2 (extra memory) | Ship Sept. | | 13 | 14 |
| ITT - ADX #2 (extra tapes) | Ship Sept. | | 20 | 20 |
| ITT - ADX #2 (extra tapes) | Ship Sept. | | 20 | 20 |
| ITT - ADX #7 | Ship Sept. | | 143 | 144 |
| ITT - ADX #6 (duplex gear) | Ship Oct. | | | 6 |
| ITT - ADX #7 (duplex gear) | Ship Oct. | | | 6 |
| ITT - ADX #3 | Ship Oct. | | | 196 |
| Total Forecast of Computer Receipts: | | $999 | $418 | $708 |

DEC Short Term Cash Forecast

Schedule 2

Systems Receipts

($000's omitted)

| Customer | | September | October | November |
|---|---|---|---|---|
| Navy - Virginia Beach | Billings of 7/3 | $ 34 | $ | $ |
| RCA International | Billed 7/12 | | 91 | |
| Navy - Virginia Beach | Billed 7/24 | | 22 | |
| Ampex | Billed 7/27 | 11 | | |
| Navy - Virginia Beach | Billed 8/14 | | 22 | |
| Hughes | Billed 8/24 | | 13 | |
| EMI | Ship Sept. | | | 21 |
| Sylvania | Ship Sept. | | | 22 |
| Navy - Dam Neck | Ship Sept. | | | 23 |
| GE - rental | Bill in Sept. | | | 2 |
| Total Forecast of Systems Receipts: | | $45 | $148 | $68 |

DEC Short Term Cash Forecast

Schedule 3

## Module Receipts

| | | September | October | November |
|---|---|---|---|---|
| Module & Misc. Receivables at 8/31/62 = | $607 | $260 | $290 | $ 57 |
| Estimated September Billing | 250 | - | 200 | 50 |
| Estimated October Billing | 250 | - | - | 200 |
| Total Forecast of Module Receipts: | | $260 | $490 | $307 |

DEC Short Term Cash Forecast
Comparison of August '62 Performance
Actual vs. Forecast

Schedule 4

($000's omitted)

| | Actual | Forecast | Variance (gain)/loss |
|---|---|---|---|
| Beginning Cash Balance | $519 | $519 | |
| Add Receipts | | | |
| LRL (2nd half) | - | 187 | |
| MIT (1st half) | 200 | - | |
| ADX #4 | 206 | - | |
| Sanwa Bank | 35 | - | |
| Other | 416 | 250 | |
| Total receipts: | 857 | 437 | $(420) |
| Deduct Disbursements | 690 | 882 | (192) |
| Ending Cash Balance: | $686 | $74 | $(612) |

The LRL second half payment (less retention of $10) was received 9/5. The MIT, ADX, and Sanwa Bank transactions represent acceleration of payment brought about by direct customer contact (had been forecast as September receipts).

There is no effective way to analyze the gain of $192 in disbursements.

# INTEROFFICE MEMORANDUM

DATE September 7, 1962

SUBJECT Tape Drive Reel

TO Kenneth H. Olsen

FROM Henry Crouse

The Kirk Molding Co., Inc., 140 Brook Street, Clinton, Telephone No. EMpire 5-4565, has been authorized to sell the reel to anyone by Mr. Rodney Blake. The reel has been supplied to the Health Department in Maryland.

The mold is owned by M. I. T.

Mr. James Brunner is sending several sample reels to us for evaluation as well as drawings.

Price Schedule:

| QUANTITY | 2,000 | 1,000 | 500 | 250 |
|---|---|---|---|---|
| PRICE | $184.50/M | $234.50/M | $217.25/lot | $183.63/lot |

It is available in many colors. They begin a run of 2000 pieces in blue and after 100 pieces or so they add a different colored pigment. This technique results in a solid color some muddled colors and some more solid colors. It might be wise to order two different colors only to reduce the ones with poorer appearance.

dec INTEROFFICE MEMORANDUM

DATE September 7, 1962

SUBJECT Quality Inspection

TO Ken Olsen

FROM Bob Hughes

This memo is just to review the results of a quality inspection by Gene Smith, Marshall Space Center, Huntsville, Alabama.

Gene was surprised to see that all the in-process inspectors actually worked for production, but received their instructions from quality control. He pointed out that NASA usually insisted that inspectors work for Q. C.

He indicated that he thought this was a good system as long as we had roving inspection for finished goods sampling and that should we have a NASA inspection, we should stick to our guns on this point.

He also stated that NASA required 100% controlled inspection but that we shouldn't get concerned about this. If a NASA QC team ever gets here to inspect our facility, he said the areas in which they would really concentrate their attention would be in soldering. Apparently they have a new automatic soldering operation in which they bubble their solder as it goes on the boards. He said this works wonderfully, and they would probably want us to have it. They are very interested also in the solder of cable assemblies and the temperature of our solder irons. Other areas that they would go into are wire strippers. They worry about nicked wire. I am going to have Klaus Doering look into the wire stripping problem and standardize on one good type. They will be very interested in receiving inspection, whether all in shop travelers are stamped by the appropriate inspectors, and whether our record keeping is systematic and in general whether we have controls for our quality.

I was under the impression that he would write a reasonably favorable report about us regarding Quality.

cc: Jim Cudmore
Klaus Doering
Bob Beckman

dec **MEMO**

DATE 9/7

TO H. Olsen FROM Bob Larson

Attached is estimate of cost of picnic. I have reviewed it with Dick Mills and it seems to be a fair estimate. We expect 1000 people. You might want to review the quantity of food ordered. We ran out of roast beef early last year so we have increased this order

DAP 984

KO
SO
RMV
MS

September 6, 1962

Estimated Cost of Company Picnic

Bob Lassen Bill Tobin

| | |
|---|---|
| Roast Beef - 200 lbs-900 Servings @ 3 ozs. per serving (20% shrinkage on raw meat) | $180.00 |
| Hamburgers - 300 lbs. - 5 hamburgs per lb.- 1500 servings | 195.00 |
| Hot Dogs - 60 lbs. - 10 per lb. - 600 servings | 33.00 |
| Salad - serve 1, 000 | 50.00 |
| Corn - 100 dozen ears of corn at 40¢ per dozen 1200 servings | 40.00 |
| Bulky Rolls 65 dozen with seeds - 48¢ per dozen - $31.20 65 dozen without seeds - 42¢ per dozen$27.30 | 58.50 |
| Hot Dog Rolls - 50 dozen - 600 rolls | 14.00 |
| Condiments for all sandwiches | 20.40 |
| Pickles and Olives | 15.00 |
| Potato Chips - 2,000 bags - 2,000 servings | 45.00 |
| Watermelon - $1.75 each - 25 watermelons - 40 cuts per melon (1,000 servings) | 43.75 |
| Sheet Pan Fudge Cake - 13 cakes - $4.00 per cake - 910 servings - 70 cuts per cake | 52.00 |
| Ice Cream - 33 gallons 20 gallons plain vanilla 13 gallons three flavor $2.20 per gallon, $6.00 packing charge | 78.60 |
| Milk & Coffee- 500 milk @ 7¢ per serving 1500 coffee @ 4¢ per serving | 95.00 |
| Soda - 100 cases - 2400 bottles @ $1.10 per case | 110.00 |
| Bagged Ice for Soda | 15.00 |

| | |
|---|---|
| Paper Plates, cups and napkins, plastic knives, forks and spoons - straws,etc. | $50.00 |
| Detergents | 10.00 |
| Linens | 20.00 |
| Blueberry Pies for Pie Eating Contest - 25 pies @ 8 cuts per pie - 80¢ per pie - 200 cuts | 20.00 |
| Pop Corn Vendor - $5.00 per hour - 4 hours guaranteed - plus cost of merchandise | 25.00 |
| Labor Cost | 250.00 |
| Bill Tobin | 250.00 |
| | $1670.25 |

Dick How does this look?



| | |
|---|---|
| Hay rides | 50 00 |
| Clown | 75 00 |
| Camp Ararat | 140 00 approx |
| Prizes | 120 00 approx |
| Equipment | 20 00 approx. |
| Police | 75 00 approx |
| ~~$2,080.25~~ | Total |
| $2,150 00 | Total |

Memo To: Supervisors From: Personnel Office

Subject: Identification Badges Date: September 7, 1962

In conjunction with the initiation of a security guard program, the following outline will acquaint you with our identification badge procedure:

## Badges

Permanent - Blue: Issued by the Personnel Office to all permanent full and part time employees.

Temporary - Beige: Issued by the Personnel Office to all temporary employees and to new employees prior to their receiving their permanent badge.

Red Badge - Issued by the security officers at the entrances to Buildings 5 and 12 to employees who forget or lose their badge.

Contract Worker - Green - Issued by the receptionists in Buildings 5 and 12 on a daily basis to each contract worker.

Visitor - (Typed Cards) Issued by the receptionists in Buildings 5 and 12 on a daily basis to each visitor.

## Procedure

1. The Pinkerton Security Officers will be responsible for ensuring that all people who enter or leave the plant are wearing or are issued the appropriate identification badge.

2. Badges will be visible at all times.

3. People who either forget or lose their badge will be issued a red badge by the Pinkerton Security Officers at the entrances to Buildings 5 and 12. The officer will ask them to complete an Employee Identification Slip before they are permitted to enter the building. The Red Badge will be returned to the same security station when the employee leaves at the end of his work day. If an employee has lost his badge he may obtain a Temporary Badge from the Personnel Office upon turning in the Red Badge which was issued to him by the Security Officer.

4. People who enter and remain in the Purchasing and Personnel areas in Building 5 will not be required to wear a badge. People who proceed from the Purchasing and Personnel areas in to the plant however, will be issued the appropriate badge by the receptionist in Building 5.

5. Each visitor and contract worker will be issued their badge

on a daily in-out basis by the receptionists in buildings 5 and 12. The receptionists will call the responsible supervisor for authorization to issue Visitor or Contract Worker badges. If you plan to have a visitor or contract worker in your area for several consecutive days, special arrangements for the daily issuance of their badge can be made by completing a Contract Worker and Visitor Admittance Card (supplied by the Personnel Office) and leaving it with the receptionists. This card will allow the receptionist to issue Visitor and Contract Worker badges without calling the supervisor for the period of time indicated on the card. Visitors and contract workers should not enter or leave the plant without a responsible escort, subject to the supervisor's discretion with respect to visitors and contractors with whom we are familiar.

6. The Pinkerton Security Officers will be given a list of all people who are permanently authorized to enter the plant after 5:00 P.M. Supervisors will be responsible for providing the officers with a daily list of his people who are authorized to enter the plant after 5:00 P.M. for that evening only. This is extremely important as failure to provide such a list will result in embarassing confusion.

In the event a supervisor neglects to notify the security officers that a particular employee will report to work that evening, the security officer will ask the employee to complete an Employee Identification slip which will be given to the employee's supervisor the following morning.

**********

dec INTEROFFICE MEMORANDUM

DATE September 6, 1962

SUBJECT PGEC PUBLICITY SCHEDULING FOR 1962-1963

TO K. H. Olsen FROM J. L. Atwood

Based on last year's experience, I think the following schedule should keep the PGEC publicity effort under control:

Membership Mailing

x = Meeting date

x-14 = Mailing date

x-21 = Notice and envelopes started

x-28 = Mailing list up-dated

REFLECTOR Publicity

Submit 15th of second month preceding meeting

Applying this schedule to the October 10th meeting, which I understand is the only definite date as yet, we would:

| | |
|---|---|
| Mail | Sept. 26 |
| Start notice and envelopes | Sept. 19 |
| Up-date mailing list | Sept. 12 |
| Submit publicity | Aug. 15 |

dec INTEROFFICE MEMORANDUM

DATE Sept. 6, 1962

SUBJECT

TO Ken Olsen

FROM Jack Smith

I was asked by E. Harwood to give him an estimated cost of the Mag. Tape Unit Type 50. I thought you might be interested in how my estimate came out.

dec INTEROFFICE MEMORANDUM

DATE September 6, 1962

SUBJECT Magnetic Tape Unit Type 50
(Estimated Manufacturing Cost)

TO Ed Harwood
Roland Boisvert

FROM Jack Smith

Material Costs:

| | | |
|---|---|---|
| 1. | Cabinet (with all hardware) | $ 356.87 |
| 2. | Rotron fans | 40.00 |
| 4. | 8" Blank panels | 6.40 |
| 1. | Isolation panel | 4.67 |
| 1. | Bottom blank panel | 2.40 |
| 1. | 8' 50 conductor cable | 19.00 |
| 1. | Indicator panel | 13.02 |
| 1. | Zip switch (Z2P1) | 11.85 |
| 2. | Zip switch (Z2P2) | 10.90 |
| 1. | Zip switch (Z2P3) | 5.65 |
| 1. | Thumb wheel switch | 3.80 |
| 11. | Lamps | 8.36 |
| 1. | Simplex sub-assembly | 40.00 |
| 1. | Potter tape handler | 6,426.60 |
| | | $6,949.52 |

Power Supplies and Modules:

| | | |
|---|---|---|
| 1. | 728 | $ 90.00 |
| 1. | 811 P. C. | 125.00 |
| 23 | Modules | 687.29 |
| | | $ 902.29 |
| | Total Material Costs | $7,841.81 |

(continued)

| | |
|---|---|
| Labor and Overhead | $ 434.50 |
| Total Manufacturing Cost (less checkout) | $8,276.31 |

dec INTEROFFICE MEMORANDUM

DATE September 5, 1962

SUBJECT Itek Computer Installation

TO Ken Olsen FROM Bob Beckman

As you requested, I have looked into the situation at Itek. Their main complaints at this time concern unreliable computer operation over the last few weeks, lack of maintenance programs and other maintenance information, and incorrect drawings and cable schedules.

In regard to computer reliability, I want to re-emphasize the fact that since August 1 Itek has been maintaining the computer on their own. They claim that they have actually been doing most of their own maintenance work since January, but the fact remains that up until August 1 we were averaging at least one call per week at Itek. Since the first of August we've had one or two phone calls asking for advice on trouble shooting and one frantic call at five-thirty in the evening, which was cancelled fifteen minutes later because they managed to get hold of their own technician. On August 24, two of my people went over to replace their old style memory power supply with a new 735 power supply. This is a change that we initiated and did at no charge. After changing the power supplies and readjusting memory currents, the machine did not operate properly. My people stayed until about ten o'clock that night getting back on the air, and the trouble was in no way connected with the power supply change they had made. In fact, one of the Itek people mentioned that they had had this same trouble off and on for some time. To me it's rather significant that they were not complaining about "unreliable operation" until three weeks after they informed us that they would maintain the machine themselves.

The next complaint about not having materials from DEC has been a cronic complaint from Itek. No matter how many sets of prints and sets of program tapes and write-ups you send these people they're continually screaming for more and saying that they haven't got anything. I told Norm Taylor that I myself had prepared a set of tapes for John Bala when he came to the course, and that I knew of other tapes and write-ups that had been sent to Earl Pughe and other people in the company. Earl Pughe and John Bala said they had never received these items and yet less than twenty minutes later I found the very set of tapes that I had prepared for John Bala in

a file drawer in Earl Pughe's office. By the time we got through looking around we found at least two complete sets of every maintenance tape and write-up that has ever been available. I've attached a copy of a letter that I ran across in our files that bears on this particular subject. I'm beginning to think that I should ask for a signed receipt for every piece of paper I give Earl Pughe.

One of Earl's big complaints is that our prints are inaccurate, and I must admit that he's right. However, the situation is not as bad as he makes it out to be, and in some cases, it's really his own fault. For instance, while Jack and I were there the other day we started looking for something in the punch control logic. Earl turned to a set of prints on a table in the computer room, obviously his trouble shooting working prints. He turned to the print that covers the punch logic and it was immediately obvious that the print did not match what was physically present in the machine. He threw up his hands and said something about "how can you take care of a machine if you don't even have prints for it". (It seems that his standard trouble shooting practice on the machine is to work until he finds something that doesn't match the print, then he throws up his hands and walks out.) I pointed out that the print he had was for the Tally punch logic and asked him if he didn't have another newer one around. He sent John Bala out and John came back in a moment with a file folder with seven or eight copies of the punch logic prints. One of these in the file folder was a copy of the new logic as it exists in his machine and with a date of April, 1962 compared to the November,1960 date on the print he was using as a working copy.

This is not to say that we're entirely blameless in this particular area. For one thing, the two prints of the punch logic had exactly the same print number even though they were not identical logic. I have since checked with Roger Melanson and this has been corrected. I am going through the whole list of Itek prints and, if I can get some cooperation instead of just belly-aching from Itek I think we can get the print situation straightened out to our mutual benefit.

As far as the immediate situation is concerned, I am doing everything I can to get them squared away. Even though they had all of the routines and write-ups, I collected another set of those useful for maintenance purposes and personally delivered them to Norm Taylor, along with a copy of the maintenance manual. I also made arrangements

for Jack Shields and John Bala to get together when John returns from vacation next week. Jack will go over all of the maintenance programs and help John set up margin check procedures and records. Most of this is covered in the PDP-1 Maintenance Manual, but since Itek's machine is physically different than the newer machines they'll have to do some translation of logic locations in order to match the margin check set-up in the book to the Itek computer.

In spite of the way they treat their machine I think it's actually in fairly good shape right now. I don't think it will stay that way long though, with the kind of maintenance it's getting. John Bala is a good kid, but he needs a lot more experience. Earl Pughe seems to be in charge of maintaining the machine, and I have no confidence in him at all. I know very little about his technical background and qualifications, but from what I saw of him the other day he doesn't strike me as having the patience and common sense required for this kind of work. He always seems to be more interested in finding a reason why he can't fix the computer than in actually fixing it. It is interesting to note that the prints that are so inaccurate that he can't work on the machine are exactly the same prints that our own people use when they go over there. And after that bit about the tapes and write-ups I wouldn't exactly want to call him a liar, but I get the impression that he has only the barest noding aquaintance with the truth.

Again I want to say that we're not completely blameless here. Many of the things that Norm Taylor thinks we should have are things that I agree with completely. Some of them are being corrected and others need to be worked on. The new maintenance manual will answer many of the problems. The matter of poor write-ups for maintenance routines is gradually being corrected with our new Maindec series, and with a little time and help from Itek we should be able to correct the existing discrepancies in the documentation of their computer. I will continue to do everything I can to help them keep operating, but I'd feel a little easier in my own mind if they were letting us maintain it so I would really know what was being done to the machine.

Customer

May 3, 1962

Mr. Earle W. Pughe
Information Technology Laboratories
10 Maguire Road
Lexington, Massachusetts

Dear Mr. Pughe:

Enclosed are copies of test tapes that our technicians use.

There is no write-up for the PPA Test, so I am including instructions for its use in case you are unfamiliar with the program. With these tapes plus the ones you received Wednesday, May 2, you should have the complete set of maintenance programs.

I am looking forward to the addition of your test programs to our library. I am sure they will be of great benefit to us.

If you have questions concerning these programs or any others in the library, I would be most happy to hear from you.

Sincerely,

(Mrs.) Beverly A. Clohset
Computer Sales Programmer

BAC/jr
Enclosures

PPA Test

A list of random numbers is included in the program. After loading the program and pressing "start" these numbers are punched on tape. Upon completion of the punching cycle the new tape is read in by pressing "continue". The bits on the punched tape are compared against the bits in memory with a typeout occurring if there are discrepancies. An example of the typeout format would be:

```
p 1 - 1   (picked up bit 1 once)
p 2 - 3   (picked up bit 2 three times)
d 1 - 1   (dropped bit 1 once)
d 3 - 4   (dropped bit 3 four times)
```

R. [redacted] Hughes
9/4/62

Subject: Product Defect Control

Module defects arrive in Quality Control from three different sources. (1) The customer service group; (2) The in-house computer or systems checkout group; (3) From the customers by way of the Sales Department.

Defective modules will be tagged with pertinent information and when the unit is repaired, a description of the repairs is made on the reverse side of the defective module tag. (See attachment 1) The repair procedure for defective modules is to test them at 25° C and 55° C to make out test data sheets for the module at these two temperatures.

In-house checkout and field service will always put the defective module tags on the modules. Usually we shall attempt through the field sales office to have the customer tag the defective modules, but we won't insist on it, and we will take back untagged modules for repair. When they arrive at DEC, the burden to put the tags on them will fall on the Sales Department.

All modules must be tagged with the pertinent information that is shown on the tag (or as much as possible).

At the time the repairs are made by the Quality Control Department, a customer defect report (see attachment 2) will be filled out. This report covers the trouble reported, the results of the investigation of the trouble, and the conclusions which we have come to as a result of this trouble. This report is filled out in duplicate. The original with the test data sheets are filed in

Quality Control Customers Defect Report File. The copy along with copies of the test data sheets are sent to the customers.

Defects other than modules will be sent to Quality Control in two ways. (1) is the field service report, a copy of which will be sent to Quality Control. The Quality Control engineers will review field service reports on a weekly basis to determine if anything is happening which we should be doing something about.

(2) All Sales offices will be sent Quality Control Inspection Forms (Attached). This form will also be available throughout the company and is a method of field and in-house feedback which may be used to describe any type of complaint. This report is to be answered immediately regarding the action taken, and will be approved by either Jim Cudmore, Klaus Doering or Bob Hughes.

These forms will be reviewed at the weekly Quality Control meeting, Monday, at 3 o'clock.

## DEFECTIVE MODULE

USER _____ EN. NO. _____ PDP NO. _____

TYPE _____ SOCKET _____ SER.NO. _____

REMOVED BY _____ DATE _____

DESCRIBE FAULT _____

SEE OTHER SIDE

REPAIRED BY _____ DATE _____

DESCRIBE REPAIRS _____

DISPOSITION _____

# CUSTOMER DEFECT REPORT

DATE _____

CUSTOMER NAME _____ CUSTOMER P.O. _____ OR EN _____

TYPE OF UNIT _____ NO. _____ SERIAL NO _____

REJECT REASON:

BY:

Q. C. INSPECTOR _____ DATE _____

RESULTS OF INSPECTION (DETAILS):

CONCLUSIONS:

APPROVED: DATE:

DISPOSITION: DATE:

CC:

# QUALITY CONTROL INSPECTION REPORT

DATE:

ITEM _____ TYPE# _____ NO. _____ OUT OF _____

WHERE USED: (SYSTEMS, COMPUTER, FINISHED GOODS, MODULE)

DEFECT NOTED:

FIRST NOTED BY:

ACTION TAKEN:

BY: DATE:

dec INTEROFFICE MEMORANDUM

DATE September 4, 1962

SUBJECT Testing Of All In-Out Equipment

TO Kenneth H. Olsen
Maynard Sandler

FROM Jack Smith

Effective Friday, August 31, 1962, responsibility of the testing of all in-out equipment was transferred to one central authority, the Production Department. This includes Magnetic Tape, Reader, Punch, Typewriter and Memory System Checkout. To date two steps have been taken which should improve the efficiency of the various operations.

1. At the present time the various groups are decentralized, being located in separate areas from each other. We feel a more controllable and efficient operation would be gained by a more centralized control. An area has been assigned and within the next couple of weeks all in-out testing will be moved into this area. The assigned area is an extension of the present Magnetic Tape Checkout area. In all future communications the group will be referred to as the In-Out Test Group.

2. I was a little concerned to find that we have only one trained man per in-out checkout area. That is only one man trained and qualified to checkout Memory Systems. Another to checkout Magnetic Tape 50 Units, etc. This is a very dangerous situation, in that the absence or termination of an individual could greatly effect the efficiency of the checkout of certain in-out equipment.

To eliminate this situation each man will be assigned a basic responsibility for a certain piece of in-out equipment. When he has free time he will be trained in the test procedure of other in-out equipment. In time we will have a well rounded in-out test personnel capable of checking out more than one type of equipment. Each man will have a basic responsibility and the capability of performing a secondary responsibility.

COMPANY CONFIDENTIAL

dec INTEROFFICE MEMORANDUM

DATE September 4, 1962

SUBJECT Fiscal '63 Cash Strains

TO Kenneth Olsen ✓

FROM George O'Dea
Dick Mills

Our memo of August 30 spelled out a target of Net Sales for Fiscal '63 of $10,800. It is our understanding that this will be presented to the Board of Directors and will become the company's official Budget of Business.

For our internal information we have taken this Budget and run it through the formality of a Balance Sheet, Statement of Profit and Loss, and Statement of Cash Flow primarily for purposes of anticipating cash strain. The conclusions drawn therefrom are:

a) We'll bull through September on sheer grit.
b) Things will ease substantially in October and November.
c) We fall nearly $700 short in December.
d) For the balance of Fiscal '63 we oscillate between $200 and $700 short of our mark.

Since these conclusions are predicted on a host of assumptions it behooves us to consider each in its turn in order that we appreciate the validity thereof. The assumptions are:

1. We will bill $10,800 for Fiscal '63.
2. The percentage of cost to net sales will increase by 3 points to provide for obsolescence, price, and usage variance. No credit has been given for volume increase.
3. No provision will be needed for price re-negotiation or pension plan.
4. Inventories at the close of any given month will consist of
   Next 6 months cost of Computer Sales
   Next 4 months cost of Module Sales
   Next 2 months cost of System Sales
   To the extent that Fiscal '64 volume affects Fiscal '63 purchases, we have assumed an approximate sales level of $14,000 for Fiscal '64.
5. Receivables at the close of any given month will consist of
   Current and half of prior months Module Sales
   Current and prior months System Sales
   Current, prior, and half of preceding months Computer Sales
   This formula was modified slightly for the receivables balances at the close of July and August owing to the substantial collection efforts exerted during the past few weeks.
6. Capital expenditures were estimated at $400 plus $48 (net) for improvements.
7. Operating expenses were estimated at $3,075 (vs. fiscal '62 actual of $1,871.)

As you see, every effort was made to be conservative.

Attached Exhibit A, Balance Sheet, traces the consequences of applying the above assumptions to our books. We have shown the effects on cash created by retiring all short term borrowings ($300 in November, $500 in December, and $300 in June.) The negative cash balances for the last 6 months of the year indicate the extent to which we cross the line after meeting all existing obligations.

As to a course of action for DEC to follow, it is our recommendation that we sweat out the September 15 crisis and as soon as our formal September closing is completed, approach the National Shawmut for a Revolving Credit Type Term Loan.

The primary reason for the delay in approaching the bank is to permit a credibility factor to arise in these figures. (We can't see how they could come out worse than shown here-but it will be more comforting to have 3 months actual experience under our belt when we call on the Shawmut.)

As to the 3 months experience, we plan to include in our internal distribution of the financial statements a detailed analysis of the actual experience in contrast to that forecasted-tracing particularly the seven basic assumptions spelled out earlier. If, as we secretly hope, the real experience proves more favorable than the assumed, our position will be that much strengthened.

One last advance warning in regards to following actual performance vs. forecast. Any individual months performance can be grossly misleading (for this reason we propose to continue the short term cash forecast begun last month.) As the year proceeds however, the cumulative data becomes highly significant and permits the analysis of variance effort to detect departure in trends from the basic assumptions.

The July closing due this week, will start us toward our mark.

# # #

CC: Harlan Anderson

Attachment: 1

## Computer Billings - Fiscal '63

| | ADX | PDP-4 | PDP-1 | Total |
|---|---|---|---|---|
| July, Aug. | $720 | $ - | $960 | $1,680 |
| Sept. | - | 60 | 200 | 260 |
| Oct. | 320 | 60 | 200 | 580 |
| Nov. | 400 | 60 | 200 | 660 |
| Dec. | 300 | 60 | 200 | 560 |
| Jan. | 300 | 60 | 200 | 560 |
| Feb. | 300 | 60 | 200 | 560 |
| Mar. | 300 | 60 | 200 | 560 |
| April | 300 | 60 | 200 | 560 |
| May | - | 60 | 200 | 260 |
| June | 300 | 60 | 200 | 560 |
| | $3,240 | $600 | $2,960 | $6,800 |

Digital Equipment Corporation — Schedule 2

Fiscal 1963 Forecast

Statement of Cost of Goods Sold (+ approximation) / future inventory Balances

| | Total | Cost of Sales * Modules @ 39% of Sales | Systems @ 46% of Sales | Computers 54% |
|---|---|---|---|---|
| July | 1011 | 156 | 55 | 800 |
| Aug | 319 | 156 | 55 | 108 |
| Sep | 271 | 85 | 46 | 140 |
| Oct | 439 | 85 | 41 | 313 |
| Nov | 479 | 86 | 37 | 356 |
| Dec | 420 | 86 | 32 | 302 |
| Jan | 420 | 86 | 32 | 302 |
| Feb | 420 | 86 | 32 | 302 |
| Mar | 421 | 86 | 32 | 303 |
| April | 421 | 86 | 32 | 303 |
| May | 259 | 86 | 33 | 140 |
| June | 422 | 86 | 33 | 303 |
| Total | 5302 | 1170 | 460 | 3672 |

July ending inventory Balance:
- Module c/s (156+85+85+86) 412
- System c/s, Aug, Sep, ½ Oct (55+46+21) 122
- Computer c/s 6 Mos: (108+140+313+356+302+302) 1521
- 2055 ✓

Aug ending inventory Balance
- Module c/s (85+85+86+86) 342
- System c/s Sep Oct ½ Nov (46+41+19) 106
- Computer c/s 6 Mos (140+313+356+302+302+302) 1715
- 2163 ✓

Sep ending inventory Balance
- Module c/s (85+86+86+86) 343
- System c/s Oct, Nov + ½ Dec (41+37+16) 94
- Comp. c/s (313+356+302+302+302+303) 1878
- 2315

Oct ending inventory Balance
- Module c/s (4 @ 86) 344
- Systems (37+32+16) 85
- Comp (356+302+302+302+303+303) 1868
- 2297 ✓

Nov ending inventory Balance
- Module c/s (4 @ 86) 344
- Systems (32+32+16) 80
- Comp (302+302+302+303+303+140) 1652
- 2076 ✓

Dec ending inventory Balance
- Module c/s (4 @ 86) 344
- Systems (2 @ 32+16) 80
- Comp (302+302+303+303+140+303) 1653
- 2077 ✓

Jan ending inventory Balance
- Module c/s (4 @ 86) 344
- Systems (2 @ 32+17) 81
- Comp (302+303+303+140+303+310) 1661
- 2086

Feb ending inventory Balance
- Module c/s (4 @ 86) 344
- Systems (2 @ 32+17 81
- Comp (303+303+140+303+310+320) 1679
- 2104

Mar ending inventory Balance
- Module c/s (3 @ 86+190) 348
- Sys (32+33+17) 82
- Comp (303+140+303+310+320+330 1706
- 2136

April ending inventory Balance
- Module c/s (2 @ 86+90+95) 357
- Sys (33+33+20) 86
- Comp (140+303+310+320+330+340) 1747
- 2190

May ending inventory Balance
- Module c/s (86+90+95+100) 371
- Sys (33+40+25) 98
- Comp (303+310+320+330+340+350) 1953
- 2422

June ending inventory Balance
- Module c/s (90+95+100+105) 390
- Sys (40+50+30) 120
- Comp (310+320+330+340+350+360) 2010
- 2520

* Predicated on '62 Actual Cost rates + 3% for obsolescence, Price, + Usage Variance.
The rates in columns 3, 4, & 5 of this schedule × Sales Values in Columns 8, 9, & 10 of Sched 1 = Cost of Sales.

8/30/62

Digital Equipment Corporation
Fiscal 1963 Forecast

Schedule 3

Estimate of Accts. Receivable & Cash Receipts

Less Ending Balance - Accts. Receivable*

| Date | Beginning Balance Accounts Receivable | Add Net Sales Per Schedule 1 | Total | Cash Receipts From Customers |
|---|---|---|---|---|
| July '62 | 952 | 2000 | 2010 | 942 |
| August | 2010 | 720 | 2230 | 500 |
| September | 2230 | 580 | 1840 | 970 |
| October | 1840 | 890 | 1360 | 1370 |
| November | 1360 | 960 | 1870 | 450 |
| December | 1870 | 850 | 1990 | 730 |
| January | 1990 | 850 | 1920 | 920 |
| February | 1920 | 850 | 1870 | 900 |
| March | 1870 | 850 | 1870 | 850 |
| April | 1870 | 850 | 1870 | 850 |
| May | 1870 | 550 | 1570 | 850 |
| June | 1570 | 850 | 1570 | 850 |
| | 952 | 10800 | 1570 | 10182 |

*Receivables balance predicted on collecting after:

Module Billings: current + 1/2 prior month
System Billings: current + previous month
Computer Billings: current , previous, + 1/2 prior month

Digital Equipment Corporation
Fiscal 1963 Forecast
Balance Sheet (Abbreviated)

Exhibit A

(#000's omitted)

| | 6/30/'62 audit | 7/31/'62 | 8/31/'62 | 9/30/'62 | 10/30/'62 | 11/30/'62 | 12/31/'62 | 1/31/'63 | 2/28/'63 | 3/31/'63 | 4/30/'63 | 5/31/'63 | 6/30/'63 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash | 342 | 519 | 230 | 177 | 664 | 334 | (665) | (466) | (447) | (306) | (271) | (177) | (637) |
| Rec (see Sched 3) | 952 | 2010 | 2230 | 1840 | 1360 | 1870 | 1990 | 1920 | 1870 | 1870 | 1870 | 1570 | 1570 |
| Inv (see Sched 2) | 2527 | 2055 | 2163 | 2315 | 2297 | 2076 | 2077 | 2086 | 2104 | 2136 | 2190 | 2422 | 2520 |
| Inv Value | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 |
| PPdy | 25 | 20 | 20 | 30 | 30 | 30 | 40 | 30 | 30 | 40 | 40 | 40 | 50 |
| Cur. Assets | 3849 | 4607 | 4646 | 4365 | 4354 | 4313 | 3445 | 3573 | 3780 | 3743 | 3832 | 3863 | 3517 |
| Accts Pay | 391 | 437 | 400 | 500 (?) | 300 | 300 | 300 | 300 | 300 | 310 | 320 | 330 | 350 |
| Notes | 1116 | 1116 | 1116 | 1116 | 1116 | 816 | 316 | 316 | 316 | 316 | 316 | 316 | 16 |
| With + Accruals | 233 | 235 | 190 | 200 | 220 | 220 | 240 | 240 | 280 | 310 | 300 | 320 | 300 |
| Reserve for Tx | 858 | 1264 | 1345 | 955 | 1063 | 1173 | 838 | 933 | 1028 | 932 | 998 | 1016 | 919 |
| Cur Liab | 2598 | 3052 | 3051 | 2771 | 2699 | 2509 | 1694 | 1789 | 1924 | 1868 | 1934 | 1982 | 1585 |
| Net Working Cap | 1251 | 1555 | 1595 | 1594 | 1655 | 1704 | 1751 | 1784 | 1856 | 1875 | 1898 | 1881 | 1927 |
| Gross Fixed Assets | 321 | 351 | 381 | 411 | 441 | 476 | 511 | 546 | 581 | 616 | 651 | 686 | 721 |
| Less Reserves | -60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 |
| Net F.A. | 261 | 286 | 311 | 336 | 361 | 391 | 421 | 451 | 481 | 511 | 541 | 571 | 601 |
| Leased Eq | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 | 79 |
| Less Reserve | -48 | 50 | 52 | 55 | 57 | 59 | 62 | 64 | 66 | 69 | 71 | 73 | 76 |
| net Leased Eq. | 31 | 29 | 27 | 24 | 22 | 20 | 17 | 15 | 13 | 10 | 8 | 6 | 3 |
| Leasehold Impr. | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 68 | 72 | 76 | 80 | 84 |
| Assets over Cur. Lia | 1579 | 1910 | 1977 | 2002 | 2090 | 2171 | 2249 | 2314 | 2418 | 2468 | 2523 | 2538 | 2615 |
| Long Term Debt | 87 | 87 | 87 | 87 | 87 | 78 | 78 | 66 | 66 | 66 | 66 | 66 | 66 |
| Net Worth | 1492 | 1823 | 1890 | 1915 | 2003 | 2093 | 2171 | 2248 | 2352 | 2402 | 2457 | 2472 | 2549 |
| Shareholders Equity | | | | | | | | | | | | | |
| Common Stock & Pum. | 116 | 116 | 116 | 116 | 116 | 116 | 116 | 116 | 116 | 116 | 116 | 116 | 116 |
| Ret'd Earn (less contingency) | 1376 | 1707 | 1774 | 1799 | 1887 | 1977 | 2055 | 2132 | 2209 | 2286 | 2341 | 2356 | 2433 |
| | 1492 | 1823 | 1890 | 1915 | 2003 | 2093 | 2171 | 2248 | 2352 | 2402 | 2457 | 2472 | 2549 |

Digital Equipment Corporation
Fiscal 1963 Forecast

Exhibit B

Statement of Profit & Loss

| Date | Net Sales per Schedule 1 | Cost of Sales per Schedule 2 | Gross Profit | Operating Expenses* | Operating Profit | Other Expense | Pre-tax Net | Provision for State, Fed Tax | Net |
|---|---|---|---|---|---|---|---|---|---|
| July | 2000 | 1011 | 989 | 250 | 739 | 2 | 737 | 406 | 331 |
| August | 720 | 319 | 401 | 250 | 151 | 3 | 148 | 81 | 67 |
| September | 580 | 271 | 309 | 250 | 59 | 4 | 55 | 30 | 25 |
| October | 890 | 439 | 451 | 250 | 201 | 5 | 196 | 108 | 88 |
| November | 960 | 479 | 481 | 275 | 206 | 6 | 200 | 110 | 90 |
| December | 850 | 420 | 430 | 250 | 180 | 7 | 173 | 95 | 78 |
| January | 850 | 420 | 430 | 250 | 180 | 8 | 172 | 95 | 77 |
| February | 850 | 420 | 430 | 250 | 180 | 8 | 172 | 95 | 77 |
| March | 850 | 421 | 429 | 250 | 179 | 8 | 171 | 94 | 77 |
| April | 850 | 421 | 429 | 300 | 129 | 8 | 121 | 66 | 55 |
| May | 550 | 259 | 291 | 250 | 41 | 8 | 33 | 18 | 15 |
| June | 850 | 422 | 428 | 250 | 178 | 8 | 170 | 93 | 77 |
| | 10800 | 5302 | 5498 | 3075 | 2423 | 75 | 2348 | 1291 | 1057 |

*Operating expenses:

| | |
|---|---|
| Selling | $960 |
| Tech. Pub. (incl. 25+50 for cat.) | 375 |
| Admin. | 840 |
| Engineering | 900 |
| | $3075 |

Digital Equipment Corporation — Exhibit C

Fiscal '63 Forecast

Cash Flow + Statement of Cost of Goods Sold ($000's omitted)

| | Cash Flow: Beginning Cash | add customer Receipts (schd 3) | deduct disbursements: for taxes | repay loans | other | Ending * Cash | Statement of Cost of Goods Sold: Beginning Inventory | Add In-put (Mtl, Labor, O'hd) | Less ending Inventory | Cost of Goods Sold ← per Exhibit B |
|---|---|---|---|---|---|---|---|---|---|---|
| July | #342 | #942 | # - | # - | #765 | #519 | #2527 | #539 | #2055 | #1011 |
| Aug | 519 | 500 | - | - | 789 | 230 | 2055 | 427 | 2163 | 319 |
| Sep | 230 | 970 | 420 | - | 603 | 177 | 2163 | 423 | 2315 | 271 |
| Oct | 177 | 1370 | - | - | 883 | 664 | 2315 | 421 | 2297 | 439 |
| Nov | 664 | 450 | - | 300 | 480 | 334 | 2297 | 258 | 2076 | 479 |
| Dec | 334 | 730 | 430 | 500 | 799 | (665) | 2076 | 421 | 2077 | 420 |
| Jan | (665) | 920 | - | - | 721 | (466) | 2077 | 429 | 2086 | 420 |
| Feb | (466) | 900 | - | - | 661 | (227) | 2086 | 438 | 2104 | 420 |
| Mar | (227) | 850 | 190 | - | 739 | (306) | 2104 | 453 | 2136 | 421 |
| April | (306) | 850 | - | - | 815 | (271) | 2136 | 475 | 2190 | 421 |
| May | (271) | 850 | - | - | 751 | (172) | 2190 | 491 | 2422 | 259 |
| June | (172) | 850 | 190 | 300 | 820 | (632) | 2422 | 520 | 2520 | 422 |
| total | #342 | #10182 | #1230 | #1100 | #8826 | #(632) | #2527 | #5295 | #2520 | #5302 |

* before arranging new financing (revolving credit loan?)

9/3/'62