ELECTRONIC DATA PROCESSING CONSULTING SERVICES

charles w. adams associates inc.

142 THE GREAT ROAD · BEDFORD · MASSACHUSETTS · CRestview 4-8050

March 28, 1962

Mr. Gordon Bell
Digital Equipment Corporation
Main Street
Maynard, Massachusetts

Dear Gordon:

For the past week I have been trying to determine the most practical approach to the software problem of the PDP-4 computer.

I believe we are in agreement that an assembly program similar to the TX-0 Macro variety is most desirable. I am somewhat dubious whether the macro instruction features can be made available for the minimum machine configuration of 1,024 words with no secondary storage. However, I do not believe that is too important since it would be unlikely that there would be a great need for macro instructions in such a small machine configuration.

What is most important is the need to develop a utility system of routines which complement one another in providing a systematic means for the programmer to produce a workable, efficient and well-documented program in as short a calendar period as possible.

One of the major pitfalls in the development of various utility routines is that some author-programmers often try to be cleverer than others by attempting to minimize storage or maximize functions. The loser is the user, who finds himself in a situation analogous to deciding between a luxury liner and a raft for crossing a lake. The former won't fit and the latter is too primative.

The PDP-4 will probably be used more as a single-purpose than as a general-purpose computer. For that reason the majority of PDP-4's will have a limited number of users. The multitude of fancy features in some of the more sophisticated compilers will be of little interest to the computer owner who is concerned only with a few major programs. Console debugging will probably be the rule rather than the exception.

Based on these assumptions, I believe there are two major criteria that we should use in designing the PDP-4 utility systems. First the symbolic programming language should be efficient and yet easily learned, and, second, it should be convenient to continue the use of the symbolic programming language throughout the testing stage, including console debugging.

First of all, I recommend that:

1. The basic off-line program-data preparation unit be a paper-tape punch/reader/keyboard/printer teletype Type 28 ASR.

2. Its letters and symbols be the standard set most widely used.

3. The codes for the letters and symbols be standard as well.

My reasons are that:

1. If the programming language is to be continued throughout the testing stage, including console debugging, it will be most convenient to have compatability in symbols and codes between the off-line preparation unit and the console teletype unit.

2. If there is compatability between the off-line and on-line teletypes, the off-line unit can serve as a standby for the on-line unit; thus simplifying the maintenance problem.

3. If a customer chooses to have his console teletype unit contain a paper-tape punch (ASR instead of KSR), he can use it as an off-line unit as well when the console unit is not needed to communicate with the computer.

4. If the symbols and codes are standard, it will be easy to obtain repair replacements; and should the unit or computer be connected to a community line, it will be compatible with most other stations.

The following programs are suggested as the principal routines of the PDP-4 utility systems:

1. An assembly program which will produce a punched paper tape that will contain a composite binary and symbolic description of the assembled program.

2. A composite tape corrector program which will:

   a. accept symbolic corrections directly from the console teletype or via a previously prepared paper tape,

   b. read the existing composite tape and incorporate the corrections into the composite listing and produce a new composite tape.

3. A symbolic "What has changed" listing program which will:

   a. read the current composite tape and compare the binary value for each real binary word on the composite tape with its counterpart in memory.

   b. if the two words disagree, print (or punch for off-line listing) the symbolic expression for the individual word along with the absolute octal difference between the original and present value, the octal location, and the octal value of the word.

   c. as a secondary feature, provide a symbolic and obsolete listing of the program, either on the console teletype or punched for off-line listing. While it is theoretically true that the absolute description of the program is not needed, it is obvious that the absolute information will be valuable especially in the minimum machine configuration.

   d. accept absolute or symbolic address ranges so that only those areas of interest will be processed by the program.

4. A console examination - modification program, which will actually consist of two versions. The first will use a small amount of core storage and allow obsolete but mnemonic examinations and modifications request. However, for each modification made in obsolete, it will also be possible to express at the teletype the modification in symbolic form. The symbolic expressions of the modifications will be punched out as they are made. The subsequent symbolic modification tape will ultimately be used by the composite correction program to provide a new composite tape. This procedure would undoubtedly be necessary with the minimum machine configuration.

The second version will receive the requests from the console teletype in symbolic form. Although instructions will not be possible, symbolic replacements and effective deletions will be possible because the current composite tape (in the form of a loop) will be available for reference via the paper-tape reader. It will still be possible to produce a symbolic modifications tape containing the true changes that will be incorporated into the current composite tape. It should be noted that this version and the composite correction program would be modified and become one program in a machine whose configuration had sufficient core or secondary storage.

5. A memory dump program which will produce an obsolete but mnemonic teletyped printout or an off-line punch-out of a selected area. Again, this will be most useful in the minimum machine configuration. In view of the fact that the "What has changed" program will provide a symbolic and absolute listing of any selected area, it is not necessary to have a separate symbolic dump program.

6. A memory loader routine which will read a composite tape and use only the real binary information in order to load the program into memory. There will be a sum check on the real binary words. (The composite tape will also contain a sum check for all items on the tape which will be used by some of the other utility programs.)

7. A new source-tape generator. It is my hope that only the current composite tape need be retained for a given program. The original source tape will be useless after the original composite tape has been

corrected a few times. However, there will be occasions when sufficiently large or major changes in the program will require a new assembly run. In that event, a symbolic source-tape based on the program. Sufficient blank tape will be placed between either individually selected lines or every line to permit splicing.

8. A binary punchout program. This will be available for data records and for thoroughly tested programs that are now ready for actual operation. This binary tape will be identical to the real binary information on a composite tape. As a result, the memory loader program will be able to read both kinds of tape.

To summarize, the recommended utility routines are:

1. Assembly Program
2. Composite Tape Corrector
3. "What Has Changed" Lister
4. Console Examination - Modification (Simple)
   Console Examination - Modification (Limited Symbolic)
5. Memory Dump (Simple)
6. Memory Loader
7. Source-Tape Generator
8. Binary Punchout

I have worked out the tentative details of the programming language of the assembly program and the description of what would be contained in a composite tape. It now remains for you and me to meet and discuss whether such a system is attractive to you. If so, we can work out the specific details of what is needed after which, I will submit for Adams Associates, a fixed-price proposal to perform the work.

Sincerely,

Jack

John T. Gilmore, Jr.
Vice President

JTG:bp

dec INTEROFFICE MEMORANDUM

COMPANY CONFIDENTIAL

DATE April 2, 1962

SUBJECT New Starting Rate and Application of Walsh-Healy Public Contracts Act

TO Ken Olsen
H. Anderson
S. Olsen
M. Sandler
B. Lassen

FROM R.F. Mills

Quick Summary:

1. I believe we are not subject to the new Walsh-Healy Wage Order for Office Computing and Accounting Machines Industry #50-202.26 of $1.55 per hour for all of our employees.

2. A new starting rate of $1.50 per hour appears to be necessary but we recommend that we go to $1.55 per hour in order to have protection for the possible hiring of a computer technician at the minimum starting rate.

3. We recommend a review of all hourly employees making out time cards with new rates to be effective April 9th. This review is to be completed by April 5th.

Recommendations:

1. Increase our starting rate to $1.55, to become effective April 9th, 1962.
2. Review all hourly paid employees who now make out time cards and who would have been reviewed July 1, 1962. This review to be conducted on three basis as follows:

   1) Adjustment to new starting rate.
   2) Classification adjustments with in group limits.
   3) Merit adjustment.

3. The next review to be left open as conditions warrant or one year from now.
4. No general 20¢ per hour increase but on a selective basis.
5. That we post the Walsh-Healy notice on the bulletin board.
6. That with the change in rate we prepare a straight-forward message for employees explaining that we now have a new starting rate of $1.55 per hour.
7. That we establish minimum and maximum rates by job classification but that we do not publish them.

Introduction: There are two problems involved here, 1) The effect of the new Walsh-Healy Wage Order for the Office, Computer and Accounting Machines Industry - 2) The establishing of a new minimum hiring rate.

Walsh-Healy Public Contracts Act:

The Problem: If we are subject to the New Office, Computing and Accounting Machines Industry Wage Order - Title 41-Public Contracts, Chap.50, Part 50-202.26 of $1.55 per hour to effective March 12, 1962 to cover all of our employees, we will be forced to review all employees working directly on any part (component) which will end up in our computers. If we are not subject to this particular order for all of our employees, which I believe we are not, then Chapter 50-Part 50-202.24, Electronic Component Parts Industry, applies for our modules and our electronic component parts production which is a minimum wage of $1.23 per hr., for which we are covered by a margin or 12¢ per hour with our present starting rate of $1.35.

Investigation:

Contacts:

Jack Barnard - After reading the Wage Order, his conclusion was that we were subject to the $1.55 per hr. minimum.

Mary Doherty - Very little knowledge of the application of the order. CRC, Bedford

Dept. of Labor, Washington, D.C. - Mr. Epstein - He confirmed our conclusion under Wage Orders 50-202.26 and 50-202.24, that we are able to segregate our business by work areas as they would apply to the various Wage Orders.

Published Material:

I read the complete Public Contracts Act and Wage Orders 50-202.24 - Electronic Component Parts Industry, which covers our modules in a very specific manner and sub-assemblies as well and 50-202.26, Office, Computing and Accounting Machines Industry, which covers our scientific electronic computers.

Applicable Provisions of Minimum Wage Orders:

1. 50-202.24 - Electronic Component Parts Industry: The Electronic Component Parts Industry was defined as " that Industry which manufactures or furnishes functional parts for inclusion in electronic end products, Systems or equipment such as ------Electronic Computers------Test Equipment------and Power Supplies". Included in this definition are those parts of any electronic end product, previously defined, which affect current characteristics within its circuit such as complex components, packaged components, modules including computer logic modules and devices such as flip-flops, gates, triggers, emitter-followers and magnetic shift registers and other similar component combinations manufactured as a single unit-------": The minimum wage under this order is $1.23 per hr.

2. 50-202.26, Office, Computing and Accounting Machines Industry: The Office, Computing and Accounting Machines Industry was defined as " that industry which manufactures or funishes computing machines and machines of a type designed for office or business use-----such as----- electronic computing and associated information processing equipment, except airborne". After reading the tentative minimum wage order, the tone was such as to include scientific electronic computers and I put this question directly to Mr. Epstein at the Dept. of Labor in Washington, and he confirmed that scientific electronic computers are indeed included in this definition. The minimum wage for this group is $1.55per.hr.

What does this mean?

If we were to so choose, local conditions not withstanding, we can continue with our starting rate of $1.35 per hr. and still be within the definition under the Walsh-Healy Public Contracts Act as our minimum rates are in excess of wage order minimums in both areas, ie: modules, sub-assemblies and computers.

New Minimum Hiring Rate of $1.55:

Introduction: We believe that due to local conditions meaning Raytheons starting rate of $1.53 per hour, Spectrans of $1.50 for assembly workers, and Dennisions of $1.40 to $1.50 for ribbon winders and packers and the fact that in the last wage survey, H.H. Scott and DEC had the lowest starting rate in the area, coupled with the fact that we have not been getting the required number of assembly workers, we believe that we should have a new starting rate of $1.55 per hour.

What is the Problem? Since it appears necessary to have a new starting rate, just what kind of a starting rate should we have? It is highly probable that a $1.50 starting rate would cover our situation very well and would stir up more applicants for DEC, however, in order to avoid the possiblity of a computer technician being hired at the minimum who would be working on a computer, which would come under the Walsh-Healy Wage Order - of $1.55 per hour, we believe a rate of $1.55 per hour is justified.

General Comments: If the review of all hourly employees who make out time cards is approved the implementation procedure for the three adjustments is being covered in a separate memo by Bob Lassen.

INTEROFFICE MEMORANDUM

TO: Ben Gurley
Ken Olsen
Harlan Anderson
Stan Olsen
Dick Best
Bob Hughes

DATE: April 2, 1962

FROM: Ed Harwood

Sometime between 5:00 on Friday and 8:30 Saturday, 4 sockets in the Beckman machine were broken and no note to the effect left by the person or persons who caused this accident. To replace these plugs will require approximately 1 1/2 days of wiring.

INTEROFFICE MEMORANDUM

DATE April 2, 1962

SUBJECT Future ITT Orders

TO Nick Mazzarese

FROM H. E. Anderson

During the meeting held in New York with di Scipio of ITT, the following comments were made on the letter I had sent them about new orders.

First, they would like to know if the cancellation charges in the fixed type order could increase non-uniformly. You will remember that the cancellation charge varied uniformly from $25,000 before 6 months, to half of the purchase price at the delivery time. They agreed to the $25,000 at the beginning, and they also agreed to the half of the purchase price at the end. They would like to know if we could keep the $25,000 in effect for the 6th, 5th and 4th month prior to delivery, and then increase uniformly to half the purchase price. We did not give them a specific answer, but my feeling is we should be willing to do this.

Second, they would like to change the deposit arrangement so that they would not have to deposit $25,000 for all machines, particularly in a very large order spread over a long period of time. Instead, they would like to deposit $25,000 for each of the first 6 machines when the order is placed, and then add on $25,000 per month for each of the other machines included in the order. This seems entirely acceptable, and I would suggest that it is satisfactory.

Third, we need to supply them the discount percentages for the fixed order.

Would you take the necessary steps to be sure that this gets integrated into the document, and that this whole matter gets settled?

# # #

File

March 30, 1962

Proposed Annual Hourly Merit Review - 1962

K. Olsen
H. Anderson
S. Olsen

Personnel Committee

We recommend a new starting rate of $1.55 per hour effective April 9, 1962. Our recent area wage survey indicates that this is in line with local starting rates.

We also recommend that the Annual Hourly Merit Review be conducted immediately rather than July 1. This will include all hourly employees except those not required to fill out time cards.

We are recommending a selective increase rather than 20¢ across the board. The three basic adjustments to be considered are: the new starting rate, the employee's job and wage rate structure and his individual merit rating.

All increases will be effective April 9, 1962.

The next review will be based upon existing wage conditions. If there is no substantial change within a year, the next recommended review will be April 9, 1963.

cc: R. Mills
M. Sandler

dec INTEROFFICE MEMORANDUM

H. S. G.

DATE March 30, 1962

SUBJECT

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

FROM Jack Smith

We are presently contracting a large part of our Power Supply and Mounting Panel wiring. Listed below are orders we now have placed outside.

50 - 1901 delivery, 4/13/62
These people will be able to deliver to us 25 Mounting Panels per week.

50 - 728 delivery, 4/16/62
These people will be capable of delivering to us 50 Power Supplies per week.

50 - 722 delivery, 4/20/62
These people will be capable of delivering to us any combination of 50 panels per week, 1901 - 728 Power Supplies, etc.

dec INTEROFFICE MEMORANDUM

DATE March 30, 1962

SUBJECT

TO Ken Olsen
Harlan Anderson
Stan Olsen
Ben Gurley
Gordon Bell
John Koudela
Nick Mazzarese
Jack Atwood

FROM George Rice

A conference is planned by the above persons on Monday, April 2, in Stan's office. The general discussion will pertain to the PDP-4. The immediate interest will be the sales brochure to be distributed at the up-coming W.J.C.C.

AT 2:PM

INTEROFFICE MEMORANDUM

DATE March 30th, 1962

SUBJECT

TO Harlan Anderson
Dick Best
Russ Doane
Ben Gurley
Stan Olsen

FROM Kenneth H. Olsen

I would like you to attend a meeting in my office on Wednesday, April 4th at 9:00 a.m. to discuss the design and plans for the 30 megacycle line of modules.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

Fil

DATE March 29, 1962

SUBJECT Dover, New Hampshire

TO Ken Olsen
✓ Harlan Anderson

FROM R. Mills

Since our visit to Dover, N.H. on January 27, 1962, we have had several direct inquiries from them through the New Hampshire representative, Mr. Allen Chase as to the status of our thinking as regards their area. Unless you have some objection, I would plan to write a letter to Mr. Stewart M. Shanes who is the Mayor of Dover explaining to him that we have decided at the present time to contain our operations to the present location and any consideration of their city which we found filled the bill to a great extent for us, would be deferred for some time, possibly a year or two.

File

INTEROFFICE MEMORANDUM

DATE March 28, 1962

SUBJECT DECUS Newsletter

TO Stan Olsen/Harlan Anderson FROM Elsa Newman

All installation members have been contacted either by telephone or in writing with reference to the purpose of the Newsletter. Copies of the written letters are in the DECUS file or attached hereto. Response is very good in most cases.

Acting on John Koudela's request, I mentioned the fact that a Board Meeting might be advisable with reference to the announcement of the next DECUS meeting. Arrangements have been made for the Board to meet at 12 noon on Wednesday, April 4, at DEC. The Newsletter will carry a summary, or at least a news item, on the Board conclusions. Larry Buckland of Itek, Ed Fredkin, John Koudela and the president (pro tem?), Mr. Charlton M. Walter, are the Board members, according to the by-laws. It was Mr. Walter who expressed the desire to have the meeting very soon.

Newsletter:

Beverly Clohset has forwarded two routines which will be in the Newsletter under a tentative heading, "PDP Library."

I think the format is jelling. We will have:

1. Feature article, possibly a contribution from MIT on the use of the PDP in a new jet or war game. I spoke with Dan Edwards, one of the people involved in the program. He said he would try to get a write-up.

2. Beverly's write-up on the programs.

3. Column which will take care of training programs.

4. Bob Beckman's maintenance programs.

5. Steve Lambert's programming programs.

6. Possibly something from John Koudela, also.

I am also editing an article on DEC High Speed Printer Used with PDP-1.

Future Plans:

I think the first issue is ready for the galley proof stage. I am in need of Eleanor's, or someone's, help who can operate an executive typewriter. That type seems to be the most flexible for making a final copy for reproduction. I think the copies can be reproduced on our new duplicating machine. I have an example of what it will do, and I am quite satisfied. I offer these suggestions for your approval.

You will receive the final draft before it is prepared for reproduction on the executive typewriter.

# # #

INTEROFFICE MEMORANDUM DATE: March 28, 1962

SUBJECT: The PDP-J for Massachusetts General Hospital, Dr. Ervin

TO: Ken Olsen
Ben Gurley
Harlan Anderson
Stan Olsen

FROM: Gordon Bell

I have just talked with Dr. Ervin at MGH about our computer gift. I have previously talked with Steve Lorch at MGH and he gave the PDP-4 specifications to Ervin. Ervin's initial comments were:

1. He felt the PDP-4 was a "lovely little machine" which would handle all sorts of jobs and could be pushed around the laboratory and integrated with experiments. He personally felt that he could keep it busy full time.

2. For a number of possible applications, people wanted to do statistical analysis, crystalography processing, fourier analysis and general tabulating. The nearly common language for these people in Fortran. The methods they currently use for the solution of the problems is to get 7090 time. They feel that a computer such as PDP-1 could almost fill the need the 7090 is currently serving, provided a Fortran or "as advertized DECAL" was available.

We talked about the NIH and he said that their philosophy was:

1. Six large computing installations such a 7090's would be scattered throughout the country for large production runs.

2. A large number of very small machines would be scattered in individual laboratories.

He felt that the machine that is currently serving this function is the CDC-160. There are presently about 6 160's in fairly key spots throughout the country including Airborne Instruments Laboratory, (for NIH) and the Albert Einstein Institute in New York. In both cases, DEC tried to persuade them to use a PDP-1 and I believe we probably didn't sell hard enough or the price was against us. Of course, they might be better off with a PDP-1 provided the programs were available.

He told me about the Linc computer, but wasn't too enthusiastic. He felt that the word size and 1K memory were limiting. He also feels it will be useful, but was dubious that individual laboratories would buy the parts and assemble it by hand, in fact, he said he didn't know of anyone who was willing to undertake the assembly of a kit.

He was enthusiastic about the PDP-4 because of its apparently low price (CDC-160 range), its command structure, flexibility, word length and general capabilities. He felt for it to be useful, we must settle software details and then we can get into medical work the 160 is currently doing.

He feels that PDP-4 must have IO equipment such as PDP-1. He also feels that the PDP-1 could serve the need for the larger backup machine of the larger laboratories. Here speed is more important (fast multiply especially).

Ervin is going to be writing a letter very shortly retelling his thoughts about PDP-1/PDP-4 which may verify the above.

Let's get some programming policies for PDP-1, and let's change the programming policies for PDP-4.

dec INTEROFFICE MEMORANDUM

Fil

DATE March 27th, 1962

SUBJECT Plant Security Officer

TO Loren Prentice

FROM Kenneth H. Olsen

We need to draft someone to be Plant Security Officer. This person should be quite senior in the organization and capable to work out a consistent and logical system of locks and security. I think that you are the obvious person for this job.

You have the shops and carpenters under you and you also have engineers you can delegate most of the work to, but, I would like you to take the general responsibility for it and to work out a consistent plan for locking the plant and an orderly system of keys.

I believe that we are going to rent the top floor of Building 5 which will help our security significantly. We will then put a partition on the landing between the third and fourth floors so that we block this obvious weakness in our security. We can then also use the whole common area and loading dock area in the very front of Building 5 and have only a lock on the very front door. Maynard Industries would like us to take over this floor and are willing to give us a very good break and some very good concessions.

One of the first things we should do is set up a system of keys. Perhaps the very first thing we should do is make the front door open with any key. I think we should have a very small number of types of keys. There should be one master key, one key to the main doors, one key to the secondary doors, one key to the computer room which we will build on the Building 4 auditorium, one key for the box in shops, one key for the locks in the printing department and one key for the locks in production department.

We will, very soon, have badges issued at which time we will insist that everyone wear a badge at all times. We will then insist that all contractors have badges.

Kenneth H. Olsen

cc: Stan Olsen
Harlan Anderson

dec INTEROFFICE MEMORANDUM

7x

DATE March 27, 1962

SUBJECT

TO K. Olsen D. Mills
H. Anderson
M. Sandler
S. Olsen
B. Gurley
G. Bell

FROM Jack Smith

It has been necessary these last few months to add on many wiring vendors to keep up with our increase in sales of Special Systems and Computers. In doing this, we have established a larger outside capability. We have asked a few of these vendors to increase their faculties to meet with our future work load.

We are fast approaching the point where these vendors will have produced all wiring sub-assemblies needed for Computers through ADX-7. To date this is the last Computer order we have. Our present schedules call for this point to be reached in three weeks. We must at this point channel these capabilities into the product lines which will further the best interests of the company. It must be decided what type of Computers we shall build, whether standard 20,000 series or ITT 10,000 series, in what order these machines are to be built, and at what rate. A program for the construction of standard options, such as Magnetic Tape should be started while we have these capabilities. The type of rate of construction of each option must be determined and orders placed with our outside vendors. Decisions must be made as to the number of PDP-4s we will be expected to produce before our first machine has been through its initial Checkout.

Below is an outline of our present outside wiring capabilities:

NAME	PRESENT WIRING PANELS BEING PRODUCED/WEEK
Engineering Model Labs	23
Pastorizo	15
Elasco	16
McCloud & Hannipol	5
Industrial Wire and Cable	6
TOTAL	65

As you can readily see these outside capabilities coupled with our own capabilities leave us with quite a large productivity of wiring panels. Now is the time to decide on what products we will allocate these capabilities.

INTEROFFICE MEMORANDUM

FROM: JIM BURLEY

TO: Hal Anderson

DATE: March 22, 1962

Recent competitive information received by this office is as follows

1. 3Cs TCM Report M-1 on "Transistorized Core Memory Systems", their S-PAC Series TCM

This is a 23 page general descriptive brochure which includes a block diagram of their basic system and 8 photographs.

2. Ramo-Wooldridge - "AN/UYK-1 (TRW-130) Computer Description M250-1U16".

This is a 24 page brochure describing their "Stored Logic" Multiple Purpose Computer in rather complete terms. Price $83,500.

There is also a 9 page brochure entitled "Standard Peripheral Equipment Group" for the AN/UYK-1 (TRW-130) Computer System.

We will be happy to furnish photo copies to anyone interested in these brochures.

dec MEMO

DATE March 22, 1962

TO Jack Brown

FROM Jack Smith

During my conversation with you this past Monday, I quoted the delivery of a Magnetic Tape Control 52 this Friday, March 23, 1962, and an additional unit this next Monday, March 26, 1962. The first unit will be delivered to Check-Out this evening, one day early. The additional unit will be delivered Monday as planned.

cc: K. Olsen
H. Anderson
B. Gurley

dec INTEROFFICE MEMORANDUM

DATE March 22, 1962

SUBJECT Progress Report

TO H. Anderson

FROM L. Rittner

The following is a summation of my activities to date:

1. I have interviewed the following personnel: J. Fadiman, D. Best, J. Myers, E. Simeone, M. Sandler, S. Olsen, N. Mazzarese, B. Gurley, G. Bell, D. Mills, H. Crouse, B. Dill, R. Melanson, L. Prentice, J. Smith.

2. Not only did we discuss pricing, but I utilized the opportunity to orient myself into the company, its products, etc. I have found everyone to be most helpful and informative. I'm acquiring a good background of the company's functioning and the reasons for its price policies. I see the viewpoints and operations of the different product lines.

3. I have accumulated a good deal of valuable information and am condensing it into a concise report which outlines our present procedures in pricing.

4. In an effort to iron out inconsistencies, drafts of this report are presently going out to the principal parties for their additions and modifications.

5. As soon as the drafts are returned, probably some time next week (unless the IRE Show interferes), the present procedures in pricing will be available. At that point, I would appreciate your reviewing this report so that we may go on to the next phase of the program.

6. I see a pattern developing for possible improvement in our pricing for the future, and will unfold these thoughts in their logical sequence.

Len Rittner

COMPANY CONFIDENTIAL

March 21, 1962

POLICY FOR REMUNERATION OF PRODUCTION ASSEMBLY WORKERS

The starting rates for female production assembly workers is 1.35 per hour. All workers for Production are hired at this rate, regardless of prior background or skills.

Our present policy is to indicate to applicants and new employees a three-months probationary period, at the end of which time a review of the worker's progress in skills and attitudes is made. Those girls who have proved good are then granted a .10 per hour increase; those girls who have shown good potential, but whose performance or attendance have been not up to standard are not granted an increase at this time, but are spoken to about their shortcomings. After another month of trial, they are accepted and given an increase. Incidentally, no girl has ever failed to respond to a talk.

There have been two or three girls whom we have discharged prior to the three-months period, but this has always been because of extremely poor attitiude or unexplained absences.

The standard time of merit review is June of the year. The program for point-rating is as before. A girl achieves points on the basis of her productivity, quality, attendance, attitude, etc. and the raise will be zero, 5, 10, or 15 cents per hour, according to the point score.

Quantity of production is reported by tabulating after they have processed the Daily Job Lists turned in by our people. Each girl's performance is measured against the known standard or average time for each operation on each unit.

Quality of production is measured by the Final Inspection Lot Trouble Sheet, which lists misplaced components and mechanical defects for each lot for each girl.

Attendance is measured by an actual tabulation from Personnel records taken from the Weekly Time Card for each girl.

Other point factors, such as attitude, ability to learn, etc., are evaluated by judgement of the girls' supervisors.

I have suggested to the Personnel Committee that we change our three-months policy to a six-week probationary period. I believe that the earlier reward for diligence and aptitude is more important than an increase in our starting rate.

I further believe that we must grant an increase to any girl at any time who has mastered her assigned jobs and tasks to the degree that we have moved her on to more advanced work. For example, the skills are Assembly Training (Drilling, Transformer Winding, Diode Bending, etc.), on to Component Assembly, on to Attaching Plugs, on to Checking Backs, on to Transistors, on to Final Inspection, on to Systems Wiring, on to Group Leader. We have recently moved new girls through one or two stages within the three month probationary period and we have advanced some girls to Transistors within six months; and now I propose that we give these girls increases every time they move to a new advanced skill, of course, after a three to four week trial period.

After the probationary period our increases have not been awarded in a timely enough manner. Skill and achievement must be rewared as well as length of service. One of my supervisors has made the point rather well: Let's not be concerned about the people not yet here, but first take care of those people who are here.

Maynard Sandler

dec INTEROFFICE MEMORANDUM

File

DATE March 20th, 1962

SUBJECT

TO Ben Gurley
Harlan Anderson
Stan Olsen
Ed Fredkin - Informational International

FROM Kenneth H. Olsen

I have become quite concerned about our proposed plan to place our prototype PDP in Ed Fredkin's plant. Some of the potential customers that we have talked with have shown some concern at being too close to Ed because they consider him potential competition. If this is a common attitude it could be quite serious to us. I am also afraid that if Ed carries out all the services he promised, it might be too serious a drain on his own operation. Ed might also be limited in the resources to make the installation look good.

I propose that we consider putting the PDP in our present auditorium on the fourth floor of Building 4. This area is very nicely prepared with a tile floor and a well illuminated area. This is so large that we could set the computer up very nicely and have area for people to run special experiments and room for a large classroom. This could work out very well for Ed Fredkin because we could take the lock off our present lobbie door in Building 4 and put it on the door in purchasing so we could give Ed Fredkin direct access to this room. We could run a partition along the far wall so that the Machine Shop would have access to their wash room. We could then allow Ed Fredkin, or our customers, to come in freely on their own and use this facility. If necessary, we might make a small co-educational wash room in the present storage room.

Kenneth H. Olsen

dec MEMO

DATE 3/19/62

TO H. Anderson FROM Ted Johnson

Several minor details were overlooked in the shipment of the Beckman Computer.

1. The typewriter cord was dirty.
2. The typewriter ribbon in the typewriter was in very bad shape.
3. One of the door stop rods was missing on the back door.
4. There was no supply of fanfold paper tape at hand. Since requested a supply of paper tape and typewriter paper for the office.
5. Beckman was concerned because of the absence of a serial or model number on the PDP-1. Should there be a label somewhere on the machine?

Send a copy to

Ed Harwood

Ben Burley

Bob Beckman

Bob Hughes.

H. E. Q.

dec INTEROFFICE MEMORANDUM

DATE March 19, 1962

SUBJECT

TO Harlan Anderson

FROM Dave Denniston

I called Tony Scara, the man who has been using our modules at E.A.I. in Princeton to see if I could find out something about a demonstration of some new digital device(s) at their location this week, as you suggested.

Apparently, from what he said, E.A.I. is sponsoring a course on Hybrid techniques for their customers. This lasts for the entire week and will also include several guest speakers. The group will be introduced to an E.A.I. machine which includes a digital section, constructed with our modules. Only a prototype of this machine exists, according to Tony, and is so new that it will not really be announced for a while.

dec INTEROFFICE MEMORANDUM

DATE March 16, 1962

SUBJECT

TO Module Distribution List

FROM Stanley Olsen

This is a preliminary copy of the price list which will appear in our new catalogue. Stars indicate new prices which will be effective as of April 1. Except for the Types 4139 and 4141, the new prices will be lower. All orders received after April 1 will be shipped at the new prices. Orders received before April 1, but shipped later will be billed at the lowest price.

Stanley C Olsen

DEC MODULES FOR SALE

Model #	Description	Price
51	Negative Current Driver up to 1 amp (Vacuum Tube)	$212
52	Negative Current Driver up to 1 amp (Solid State)	760
61	Positive Current Driver up to 1 amp (Vacuum Tube)	212
62	Positive Current Driver up to 1 amp (Solid State)	760
71	Current Voltage Calibrator, 0-1 amp across 1 ohm resistor or 0-1 v	500
75	Bias Panel for use with 52 and 62 Current Drivers	82
103	6 Inverters	113
110	2 Six-input Negative Diode NOR	60*
201	Flip-Flop, Buffered, Set, Reset, Complement, Carry, 2 Inverters	130
302	Delay (One Shot)	147
402	Variable Clock	85*
406	Crystal Clock (500 kc to 5 Mc)	140
410	Pulse Generator (Schmitt)	61*
501	3 Level Standardizers,	140
602	2 Pulse Amplifiers, 2 Inverters	100
650	Tube Pulser, 10 v Out (0-1 Mc)	105
667	4 Negative Level Amplifiers, 0 to -15 v Out	88*
668	3 Positive Level Amplifiers, 0 to +4 v Out	140
710	Power Supply, 10 v, 0.5 amp; 19 inch	125
722	Power Supply, +10 v, 1 amp; -3 v, 1.2 amp; -15 v, 6.5 amp; 19 inch	305
728	Power Supply, +10 v, 1 amp; -15 v, 8 amp; 17 inch	220
730	Dual Variable Power Supply, 0-20 v, 2.5 amp each; 19 inch	280
734	Variable Power Supply, 0-20 v, 2.5 amp, 17 inch	215

* New prices effective April 1, 1962

DEC MODULES FOR SALE

Model #	Description	Price
743	Dual Power Supply, 15 v 8.5 amp each; 19 inch	$290
749	Power Supply for Current Drivers 51 and 61, 19 inch	281
750	DC Power Cable for 901	3
765	Bench Power Supply for Testing DEC Modules all Voltages Variable	400
766	Power Supply for Current Drivers 52 and 62, 19 inch	510
772	Dual Power Supply, 36 v, 5 amp each; 17 inch	260
801	Relay, Single Pole, Double Throw	89
901	19" Mounting Panel for 9 Laboratory Modules	100
901C	49½" Mounting Panel for 10 Classroom Modules	150
911	10 Patch Cords, 2, 4, 8, 16, 32 or 64" long	9
912	100 Taper-pin Patch Cords, 2, 4, 8, 16, 32 or 64" long	18
921	Laboratory Module Test Power Cable	10
922	System Module Test Power Cable	25
950	Assembled Blank Laboratory Module, No Copper Clad	9
951	Unassembled Blank Laboratory Module, Copper Clad Board	9
1000	12 Clamped Load Resistors, 1,500 ohms each	28
1001	18 Clamped Load Resistors, 3,000 ohms each	32
1002	18 Clamped Load Resistors, 10,000 ohms each	30
1103	6 Inverters	108
1104	4 Inverters	89
1105	5 Inverters	98
1110	2 Six-input Negative Diode NOR	68*
1111	2 Six-input Positive Diode NOR	68*
1113	6 Two-input Positive Diode NOR	123
1115	2 Three-input and 2 Four-input Positive Diode NOR	100
1117	3 Five-input Positive Diode NOR	87
1130	3-bit Parity Circuit	180

DEC MODULES FOR SALE

Model #	Description	Price
1150	Binary-to-Octal Decoder, Selected Output at -3 v, Others at gnd	$150
1151	Binary-to-Octal Decoder, Selected Output at gnd, Others at -3 v	150
1201	Flip-Flop, Buffered, Set, Reset, Complement, Carry, 2 Inverters	133
1204	2 Flip-Flops, Buffered, Set, Reset, Complement, 2 Inverters, No Carry	173
1209	2 Flip-Flops, Buffered, Set, Reset, 2 Inverters	168
1213	4 Flip-Flops, Shift or Read-in Gates	154
1304	Delay (One Shot)	130
1310	Tapped Delay Line up to 1 microsec	91
1311	2 Tapped Delay Lines up to 0.2 microsec	78
1404	Variable Clock	89*
1406	Crystal Clock (500 kc to 5 Mc)	160
1410	Pulse Generator (Schmitt)	60*
1501	3 Level Standardizers,	150
1502	6 Level Standardizers,	115
1540	Sense Amplifier for Core Memories	141
1546	Sense Amplifier for Core Memories	150
1547	DC Difference Amplifier, 0 to -10 v In, 10 mv Difference Saturates Output	180
1550	X10 AC Difference Amplifier, 20 Mc Bandwidth	400
1552	Sense Amplifier for Core Memories	105
1554	Dual Output X10 AC Difference Amplifier	400
1556	DC Slice Amplifier, 0 to -1 v In, 5 mv Difference Saturates Output	150
1561	2 Six-bit or 1 Twelve-bit Deposited Carbon, Digital-to-Analog Converter Network	105*
1562	-10 v Reference Supply	140

DEC MODULES FOR SALE

Model #	Description	Price
1563	2 Eight-bit Wire Wound, Digital-to-Analog Converter Network	$180
1564	14-bit Wire Wound, Digital-to-Analog Converter Network	180
1566	BCD 3 Digits + Sign, Wire Wound, Digital-to-Analog Converter Network	200
1568	12-bit Metal Film, Digital-to-Analog Converter Network	180
1606	Pulse Amplifier with Dual Outputs, 2 Inverters, Five-input Negative Diode NOR	108
1607	3 Pulse Amplifiers, 3 Inverters	130
1608	2 Pulse Amplifiers with Dual Outputs, 2 Inverters	120
1616	Pulse Amplifier, a 1606 with 5 v, 0.5 microsec Out	108
1667	6 Negative Level Amplifiers, 0 to -15 v Out	115*
1669	9 Indicator Drivers from DEC Levels	39*
1671	BCD Decoder and Light Driver	96
1672	Level Converter, DEC-709/709-DEC, 2 Pair	120
1675	9 Indicator Drivers with No Input Resistors	39*
1677	4 Single-ended Bridges for Driving DAC's 1561, 1563, 1564, 1566 and 1568	140
1678	3 Bus Drivers with Input Gates, -3.5 v Out into 100 ohms	120
1681	3 Power Inverters for Driving Large Loads or Co-axial Cable	80
1682	3 Bus Drivers, +6v into 75 ohms, 2-input Inverter Gate on each Driver	150
1683	Half Binary-to-Octal Decoder, +60 v Out	107
1684	4 Bus Drivers with Single Ended Bridges, -3 v Out	125
1685	4 Bus Drivers, -3 v Out, 1 microsec ramp	128
1687	3 Level Amplifiers, +6.5 v to -6.5 v Variable, 10 ma Out	118

DEC MODULES FOR SALE

Model #	Description	Price
1689	DEC-to-IBM 7090 Converter, 4 Circuits, +8 v into 93 ohms	$ 77
1703	9 Switch Filters, Converts Switch Closures to DEC Levels	30
1901	19" Mounting Panel for 25 System Modules	150
1903	19" Mounting Panel for 20 System Modules	125
1904	30" Mounting Panel for 43 System Modules	200
1905	24" Mounting Panel for 33 System Modules	175
1906	19" Patch Cord Mounting Panel for 20 System Modules	260
1907	Cover Plate for 1901 and 1903	9
1909	19" Taper-pin Mounting Panel for 25 System Modules	220
1910	19" Taper-pin Mounting Panel for 20 System Modules	185
1913	19" Mounting Panel for Type 52-62 Current Drivers	45
1914	19" Mounting Panel for 25 System Modules, Marginal Checking Switches, Chromicoat	150
1915	24" Taper-pin Mounting Panel for 33 System Modules	250
1916	17" Mounting Panel for 22 System Modules Marginal Checking Switches, Chromicoat	140
1917	24" Mounting Panel for 33 System Modules, Marginal Checking Switches, Chromicoat	175
1918	19" Wire-Wrap Mounting Panel for 25 System Modules	220
1919	Power Cable from 722 Power Supply to Spad Lugs	3
1923	19" Wire-Wrap Mounting Panel for 20 System Modules	185
1950	Assembled Blank System Module, Board not Copper Clad	6.50
1951	Unassembled Blank System Module, Board Copper Clad	6.50
1954	System Module Extender	20
1955	Assembled Punched-hole System Module "Vector" Board	7
1960	System Module Puller	2
3101	6 Inverters	47
3101C	6 Inverters, Classroom Module	62

DEC MODULES FOR SALE

Model #	Description	Price
3102	6 Inverters (MIL Symbology)	$ 49
3102C	6 Inverters (MIL Symbology) Classroom Module	64
3110	2 Six-input Negative Diode NOR	43
3110C	2 Six-input Negative Diode NOR, Classroom Module	58
3112	2 Five-input OR-NOR (MIL Symbology)	55
3112C	2 Five-input OR-NOR (MIL Symbology) Classroom Module	70
3114	2 Five-input AND-NAND (MIL Symbology)	55
3114C	2 Five-input AND-NAND (MIL Symbology) Classroom Module	70
3201	Flip-Flop, Buffered, Set, Reset, Complement, Carry, 2 Inverters	63
3201C	Flip-Flop, Buffered, Set, Reset, Complement, Carry, 2 Inverters, Classroom Module	78
3203	Flip-Flop, Buffered, General Purpose (MIL Symbology)	72
3203C	Flip-Flop, Buffered, General Purpose (MIL Symbology) Classroom Module	87
3301	Delay (One Shot)	74
3301C	Delay (One Shot) Classroom Module	89
3302	Delay (One Shot) (MIL Symbology)	76
3302C	Delay (One Shot) (MIL Symbology) Classroom Module	91
3401	Variable Clock	67
3401C	Variable Clock, Classroom Module	82
3407	Crystal Clock (5 kc to 500 kc)	160
3410	Pulse Generator (Schmitt)	57
3410C	Pulse Generator (Schmitt) Classroom Module	72
3602	2 Pulse Amplifiers, 2 Inverters	65
3602C	2 Pulse Amplifiers, 2 Inverters, Classroom Module	80
4102	9 Inverters	61
4105	5 Inverters	44
4106	6 Inverters	49

DEC MODULES FOR SALE

Model #	Description	Price
4110	2 Six-input Negative Diode NOR	$ 43
4111	2 Six-input Positive Diode NOR	43
4112	6 Two-input Negative Diode NOR	68
4113	6 Two-input Positive Diode NOR	68
4114	2 Three-input and 2 Four-input Negative Diode NOR	54
4115	2 Three-input and 2 Four-input Positive Diode NOR	54
4117	3 Five-input Positive Diode NOR	47
4125	4 Pulse Inverters each driven by 2 Negative Capacitor-Diode Gates	54
4126	6 Pulse Inverters each driving a Positive Capacitor-Diode Gate	68
4127	6 Pulse Inverters each driven by a Negative Capacitor-Diode Gate	68
4128	2 Pulse Inverters each driving 4 Positive Capacitor-Diode Gates	40
4129	2 Pulse Inverters each driven by 4 Negative Capacitor-Diode Gates	40
4139	8 Two-input Positive AND Gates OR'ed into an Inverter	55*
4141	a4139 with Logic Interconnections made by Wiring between Lugs on Board	57*
4150	Binary-to-Octal Decoder, selected Output at -3 v, Others at gnd	90
4151	Binary-to-Octal Decoder, selected Output at gnd, Others at -3 v	90
4152	Binary-to Octal Decoder, selected Output at -15 v, Others at gnd	90
4153	Binary-to-Octal Decoder, selected Output at gnd, Others at -15 v	90
4201	Flip-Flop, Buffered, Set, Reset, Complement, Carry, 2 Inverters	69
4202	2 Flip-Flops, Buffered, Shift Right, Shift Left, Complementing, Read-in	84

DEC MODULES FOR SALE

Model #	Description	Price
4209	2 Flip-Flops, Buffered, Set, Reset, Complement, 2 Inverters, No Carry	$ 79
4213	4 Flip-Flops, Shift or Read-in Gates	96
4214	4 Flip-Flops, Set, Reset, No Gates	96
4215	4 Flip-Flops, BCD or Binary Counting, General Purpose	90
4216	4 Flip-Flops, Shift and Read-in Gates	100
4218	4 Flip-Flops, Jam Transfer	96
4301	Delay (One Shot)	80
4303	Integrating One Shot	91
4401	Variable Clock	72
4407	Crystal Clock (5 kc to 500 kc)	160
4410	Pulse Generator (Schmitt)	41*
4504	IBM 7090-to-DEC Converter, 6 Circuits, +5 v to +1.5 v In; -3 v and gnd, Out	74
4603	3 Pulse Amplifiers, 3 Inverters	89
4604	3 Pulse Amplifiers, Standardizes to 0.4 or 1.0 microsec pulse	92
4610	Pulse Amplifier, 30 v into 100 ohms	150
4667	6 Negative Level Amplifiers, up to -15 v Out	53*
4676	Intensity Amplifier for Scope Display	74*
4677	4 Single-ended Bridges for Driving DAC's 1561, 1563, 1564, 1566 and 1568	62*
4677A	4677 with Lower Output Resistance	100
4680	3 Solenoid Drivers, -35 v, 0.5 amp Out	60
4681	3 Solenoid Drivers, -70 v, 0.5 amp Out	75
4682	3 Solenoid Drivers, +28 v, 0.1 amp Out	180
4685	8 Negative Level Amplifiers, -30 v Out	58
4686	5 Positive Level Amplifiers, up to +20 v Out	70

DEC MODULES FOR SALE

Model #	Description	Price
4688	Intensity Amplifier for Scope Display, Programmable Amplitude	$ 65
4689	9 Indicator Drivers from DEC Levels, 100 ma Out	62
5101	6 Inverters	138
5202	Flip-Flop, Buffered, Set, Reset, Complement, Carry, 2 Inverters	160
5310	Tapped Delay Line up to 0.25 microsec with Pulse Amplifier	170
5401	Variable Clock	173
5403	Crystal Clock (5 Mc to 10 Mc)	160
5602	2 Pulse Amplifiers, 2 Inverters	125
6105	5 Inverters	125
6106	6 Inverters	138
6202	Flip-Flop, Buffered, Set, Reset, Complement, Carry, 2 Inverters	160
6208	2 Flip-Flops, Buffered, Set, Reset, Complement, 2 Inverters, No Carry	230
6310	Tapped Delay Line up to 0.25 microsec	114
6311	2 Tapped Delay Lines up to 0.05 microsec	97
6401	Variable Clock	173
6403	Crystal Clock (5 Mc to 10 Mc)	160
6603	3 Pulse Amplifiers, 3 Inverters	164
1926	Blank Panel $5\frac{1}{4}$" x 19"	5
1925	Blank Panel $3\frac{1}{2}$" x 19"	3.50
1961	Taper-pin Crimper Tool	27.80
1962	Taper-pin Inserter Tool	15.80
1963	Taper-pin Extractor Tool	6.60

* New price effective April 1, 1962

716.

INTEROFFICE MEMORANDUM

DATE 3-16-62

SUBJECT Organization of Computer Applications Analysis and Programming (CAAP) at DEC

FROM John Koudela

TO K. Olsen
H. Anderson
S. Olsen
B. Gurley
D. Mills
G. Bell
B. Beckman
J. Atwood

The Computer Applications Analysis and Programming (CAAP) function for DEC Computers can, quite naturally, begin and develop on many fronts. Computer Sales require problem analysis, proposal preparation, demonstrations, and program library explanations. Computer training requires that programming classes be conducted and special, individualized attention be given to help solve specific programming problems. Computer design often requires high-level programming considerations to maximize the usefulness of the finally designed equipment. Computer checkout and maintenance requires computer programming indoctrination, and must be supplied with test and diagnostic programs. Advertising, accounting, and computer production require programming knowledge and ability to solve many of their own applications using DEC Computers. Even more important are the CAAP responsibilities to the customer: the organization, development, maintenance and distribution of a general purpose program library and the secretarial and promotional functions required to develop and maintain a highly active user's group.

CAAP is important for many reasons. Above all, however, is that, 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 a highly capable CAAP group.

To assure steady and sound growth of the CAAP function at DEC, it is proposed that well-defined goals and responsibilities be outlined and put into effect now to prevent the development of inefficiencies in the future.

The primary goal should be to centralize all CAAP functions under the managerial responsibility of the Sales Department.

This can and should be done because programming contains many elements which together form a common denominator that can best be manipulated and expanded by general purpose programmers.

It is necessary for proper coordination and definitive responsibility assignment of the overall CAAP function. The proper organizational location is the Sales Department because CAAP's most important function is to support the computer sales effort. If, in addition, the requirement be stipulated that the "general purpose programmers" be sales oriented, all of the various programming interests mentioned above will be satisfied. For example, test and diagnostic routines are important in both the initial sales effort and those necessary to "keep the customer sold". This, of course, is in addition to our own checkout and maintenance operations. Demonstrable applications from our own advertising, accounting, and computer production departments serve to expand our computer market. Programming associated with equipment design would be at the source of market feedback and could function as an important link between computer sales and computer design regarding present and future equipment requirements. CAAP, so organized, should be directly supervised by a competent, experienced, sales oriented programmer who, in turn, is directed by the Sales Manager.

The specific organization and corresponding responsibilities of the CAAP group can be quite naturally delimited from all of the above considerations as follows:

1. CAAP Manager. This person would be responsible for integrating and coordinating all CAAP operations. His major aim should be sales support. If available, it is suggested that Mr. Roland Silver be considered for this position.

2. Programmer-Analyst for Design, Checkout, and Maintenance. This person would be responsible for the development of test and diagnostic routines; analysis of programming and operating requirements of present and future computer products; and sales and design liaison. If available, it is suggested that Mr. Harrison R. Morse be considered for this position.

3. Programmer-Analyst for Sales Proposals and Applications. This person would be responsible for the development of demonstration routines; that portion of technical sales proposals requiring problem analysis, program running time estimates and sample programming; and the development of programs for DEC's own applications. If available, it is suggested that Mr. J. Martin Graetz be considered for this position.

4. Programmer-Analyst for Education and Program Library. This person would be responsible for developing and conducting programming courses for prospects, customers, and DEC personnel and for organizing, building, maintaining and distributing the master program library. If available, it is suggested that Mrs. Beverly A. Clohset be considered for this position.

5. DECUS Coordinator. This person would be responsible for promoting the development of a highly active user's group; coordinating user's activities as they effect DEC; and the preparation and publication of the DECUS Newsletter. If available, it is suggested that Mrs. Elsa L. Newman be considered for this position.

6. Clerk-Typist. This person would be responsible for all of the general clerical and typing requirements of the CAAP group and in particular would prepare Flexowriter tapes and operate off-line tape duplication-verification equipment.

All members of the group would be engaged in the general development of the master program library, including the development of automatic programming routines, and in the preparation of various programming materials.

The basic materials to be produced and distributed by the CAAP group, on a continuing basis, should be:

1. Program Writeups
2. Program Tapes
3. Program Listings
4. Technical Memos
5. DECUS Newsletters

Currently available examples of "Technical Memos" are:

1. Permanent Memorandum, M-1138, Type 15 Memory Switching for the PDP-1.

2. Permanent Memorandum, M-1139, Specifications for Model FIO-DEC Flexowriter.

3. Permanent Memorandum, M-1140, Programmed Magnetic Tape Control Unit for the PDP-1 (Type 51).

As a rule, information concerning the use of DEC Computers is disseminated through Programming Manuals, Systems Manuals, Maintenance Manuals and advertising literature. Very often, however, it is necessary to pass on some of the information to the users of DEC Computers before revisions to manuals are complete or before any other provisions for publication are made. Therefore, the issuance of a series of Technical Memos would provide for a rapid means of communication of pertinent technical information to DECUS members and all concerned. Needless to say, such memos would also serve as valuable sales tools.

The DECUS Newsletter, on the other hand, would represent a digest of DEC and DECUS computer activities and present a kind of "periodic progress report" to all users. Of particular importance is the progress associated with the development of programs to be contributed to the user's program library. In general, the Newsletter would be the main instrument for promoting a highly active user's group.

Many interests exist concerning the types and formats of program writeups, tapes and listings and how and when they are to be distributed. Several of these interests may be listed as follows:

1. The desire of DEC to minimize the volume of programming materials to be reproduced and distributed.

2. The need for customers to obtain a "basic library" soon after their order has been placed (e.g., often programming must begin long before computer installation and program tapes as well as writeups must be supplied because computer time may be obtained at another PDP-1 installation other than our own).

3. DEC checkout and maintenance personnel require machine language formatted tapes of test and diagnostic routines as opposed to the symbolic formatted tapes normally distributed and required by customers.

To satisfy all of these interests in the best possible manner, including many conveniences and intangible benefits, the following distribution plan appears to be the only one that is feasible:

1. Each checkout and maintenance technician will be provided with his own, personal set of test and diagnostic routines. These will be continually updated by the CAAP group. Tapes will be in machine language format for ready, convenient use. Personnel possessing such a set of tapes and writeups are individually responsible for maintaining them much in the same manner as they are for their individual tool kit.

2. Customers have been designated by the DECUS By-Laws to be DECUS Installation Members having one, named person to act as their representative (i.e., DECUS Delegate). At the time an order is placed for a computer and the Construction Requisition is prepared, the DECUS Delegate is to be sent one, complete copy of the "Basic Programming Library", (such a "library" has been at least partially defined). Insofar as possible, each routine in this library will have two corresponding tapes: a DECAL Symbolic tape and a DECAL Loader tape. This will enable the user to verify assembly-compiler procedures for the symbolic tape against the already verified loader tape. Each DECUS Delegate will receive complete updating service regarding the Basic Library only. The DECUS By-Laws also provide for "interested parties" to become Individual Members. Since such members do not have DEC Computers, but can provide useful services to DECUS, they should be entitled to receive only the program writeups for the Basic Library.

Note that rather than passing the Basic Library tapes through the hands of the checkout personnel and delivering them, in turn, with the computer, the case of mutilated and lost tapes cannot possibly occur. Furthermore, checkout personnel are generally not interested in symbolic formatted tapes and the routines used to reduce them to machine language tapes.

The preparation and distribution of program listings should be highly minimized. All test and diagnostic routines should have listings, but in general, customers can easily produce their own listings from the symbolic tapes provided to them from the Master Program Library.

INTEROFFICE MEMORANDUM

SUBJECT: Installation of The Beckman Machine DATE: March 16, 1962

TO: Ben Gurley
Ken Olsen
Stan Olsen
Harlan Anderson
Dick Best
Al Blumenthal
Maynard Sandler
Nick Mazzurese
Loren Prentice

FROM: Ed Harwood

Ken Larsen called to tell me about the installation of the Beckman #1 machine in California. The computer arrived there on Tuesday, March 13, and after unpacking the computer and installing the reader, typewriter and punch, Ken Larsen just pressed the start switch and the checkerboard was running. He was surprised to see the machine run so well and the Beckman people were more surprised. I told him to act more nonchalant the next time.

He has been checking the computer the rest of the week and has noticed no other electronic troubles. The only trouble he did notice was a bent corner on the end panel due to the strapping being to tight. He said we should make sure that we talk to the shipping people and see that they don't strap so tight that the sheet metal bends up.

The Beckman people will begin the formal acceptance test on Monday, March 19. He will notify us as soon as the test is complete.

dec INTEROFFICE MEMORANDUM

DATE March 15, 1962

SUBJECT

TO Ken Olsen
Harlan Anderson ✓
Dick Best
Ben Gurley

FROM Stan Olsen

Monday afternoon at 2:00 Chuck Corderman is coming over to give us a talk about all the problems that they have encountered when making a computer with our modules. He estimates this will last about two hours.

This information should be of tremendous value to us so I committed all of us to attend.

# # # # #

INTEROFFICE MEMORANDUM

DATE March 13th, 1962

SUBJECT

TO Dick Mills

FROM Kenneth H. Olsen

Mrs. Dorothy Mason of Maynard called to tell us that she had some property that we might be interested in. It is a 90 acre farm which is mostly in Maynard but is also slightly in Stow. It now has a landing strip on it and therefore it is quite level. I told her that when you returned from Chicago you would telephone her to find our more of the details of this. The land is now zoned for residential use but she has heard that it could be changed if there was a reasonable industry that was interested.

Her telephone number if TWinoaks 7-8058 and because she works she is not home until after 5:30 p.m. During the day she may be reached at Emerson 9-9630, Extension 234.

Kenneth H. Olsen

cc: Stan Olsen
Harlan Anderson

dec INTEROFFICE MEMORANDUM

DATE March 10, 1962

SUBJECT PDP-1 MAINTENANCE MANUAL TYPING

TO Ben Gurley
Bob Beckman

FROM Jack Atwood

CC Ken Olsen
Harlan Anderson
Stan Olsen

My comments to Cyburtek with respect to the typing of the PDP-1 Maintenance Manual were in substance:

1. That we are extremely anxious to get the manual produced in final form at the earliest possible date.

2. That reproduction typing would be the key factor in the production process.

3. That, in addition to the two IBM Executives in the Advertising Department, we had six similar machines which had been bought specifically to enable us to handle major reproduction typing jobs of this kind quickly by splitting the work among eight capable and experienced typists.

4. That if Cyburtek felt their reproduction typing facilities would be too limited to handle the job as quickly as we might be asking for it, we would be happy to discuss with them the possibility of doing the work here and making a suitable adjustment in the contract price of the manual.

These comments did not concern the typing of the balance of the preliminary draft. They concerned only the reproduction typing of the final version, and they were only comments - not a commitment, implied or otherwise, for the Advertising Department to take on the entire project. Our normal ratio of reproduction typing to competent typists and/or IBM Executives would make it impossible for us to complete such a project within a reasonable period of time.

The only way the company can make this type of commitment is to have it understood and agreed to that the six secretaries who have been provided with IBM Executives for this purpose - Aynne Manning, Eleanor Parker, Lucy White, Ruth Alving, Becky Lizotte, and Barbara Bergeron - will each type and proofread a suitable portion of the total text.

When discussing services to be rendered by other departments, it is always good management practice to touch base during the course of the discussion with the managers of those departments. This is particularly recommended when the services in question are described or specified by an outside agency.

In a rapidly growing organization such as ours, work loads and priorities are apt to undergo rapid and drastic changes. Consequently, even firm commitments for internal services must be considered at least as subject to review as the equipment proposals which we, as a company, make to our customers and prospects.

dec INTEROFFICE MEMORANDUM

DATE March 9, 1962

SUBJECT Technical Writing for PDP-1 Options and PDP-4 Manual

TO Ken Olsen
cc: Harlan Anderson ✓
Stan Olsen
Ben Gurley
Gordon Bell

FROM Bob Beckman

As a result of discussions with Cy Burton of Cyburtek the following arrangements have been made:

1. After completion of a current commitment Cyburtek will give DEC's requirements first priority over all other customers. In return, DEC agrees to supply periodic estimates of the work required.

2. With the exception of Bill English, all Cyburtek writers are available at this time to devote full time to DEC's requirements. This impressive sounding statement boils down to Don Michalek, who is presently working on the maintenance chapter of the PDP-1 Manual; Phil Rulon, a former employee who has rejoined the firm; and Cy Burton himself.

3. Bill English, on a part time basis, will supervise the work of Michalek and Rulon. English will be available to devote full time to DEC's work in mid or late April.

This rather nebulous sounding arrangement has the following advantages:

1. Cyburtek has shown itself capable of doing an above average job of technical writing.

2. Most Cyburtek personnel are already well checked out on DEC equipment, methods, and terminology.

3. This arrangement gives us most of the advantages of an in-house technical writing department, while at the same time avoiding most of the disadvantages.

4. The arrangement is verbal and subject to change at any time.

The following disadvantages should be noted:

1. The arrangement is verbal and I'll have to devote some time to making sure they stick to it.

2. Cyburtek's greatest asset (as far as we are concerned) is Bill English, and Bill will not be available to devote full time to our projects until mid or late April. However, once Bill is free he can pitch right in without requiring a training period. I seriously doubt that any other writer that might be available could start today and be as effective as Bill English by the end of April.

At the present time the priority for technical writing on computers appears to be as follows:

1. Completion of basic PDP-1 Maintenance Manual

2. Mag Tape Options

3. PDP-4 Maintenance Manual

4. Other PDP-1 Options

In view of the above and unless directed otherwise I will channel Cyburtek's activities in the following manner:

1. Don Michalek will continue to work on the maintenance chapter of the PDP-1 Manual. Memoranda requesting the information and/or interview time required will be forwarded to the personnel concerned.

2. Phil Rulon, under Bill English's part time supervision, will start work immediately on the Mag Tape Options.

3. Don Michalek, as soon as he completes his work on the maintenance chapter, will start on the other options.

4. As soon as his other commitment is complete, Bill English will start work on the Mag Tape Options and the PDP-4 manual. The intention here is that English's primary efforts will be on PDP-4, with part time supervision of Rulon and Michalek in their work with the Mag Tape and other options.

5. As soon as PDP-4 drawings and other information are available, Bill English will take suffcient time from his present job to prepare a detailed outline for the PDP-4 manual. At that time he will be able to give us a firm completion date. The present estimate, which I feel is not too overly optimistic, is that we can have the PDP-4 manual in preliminary form by mid June.

Firm completion dates on the Mag Tape and other options will be established as soon as the outlines for these items are completed.

It is suggested that interim PDP-4 information in a form similar to the F15, but slanted more toward maintenance, be produced in-house to cover the period from June 1st to June 15th, and to act as back-up in case the June 15th date slips.

dec INTEROFFICE MEMORANDUM

DATE March 9, 1962

SUBJECT PDP-1 Maintenance Manual

TO Ken Olsen
cc: Harlan Anderson ✓
Stan Olsen
Jack Atwood

FROM Ben Gurley and Bob Beckman

NOTE: Decision requested by March 12, 1962

Attached is a copy of information supplied by Cy Burton of Cyburtek. The second and third pages constitute a proposal for additional material to be included in the PDP-1 Maintenance Manual. This additional material would involve a charge of $3200 in addition to the original charge of $12,320.

It is recommended that this additional charge be authorized.

The original agreement with Cyburtek on the writing of this manual provided for adjustment of the estimated price on the basis of the page count of the final version. Any reduction in number of pages would be credited to us by Cyburtek. Any increase in the page count required our approval.

Even though most of the work represented by this change proposal has already been accomplished, Mr. Burton made it plain that if we objected to the increased cost he would withdraw the proposal. We would still have the benefit of most, it not all, of the work involved.

Cyburtek's performance in the writing of this manual has been more than satisfactory. Their work in editing and correcting certain of our drawings has been extremely valuable and the general quality of their work is quite high. It is felt that the additional charge is quite reasonable and that it should be approved.

By copy of this memo Jack Atwood is requested to confirm, in writing, the implied commitment of his department to typing the remaining portions of the preliminary draft.

CYBURTEK CORPORATION
March 6, 1962

CURRENT STATUS

PDP-1 MAINTENANCE MANUAL

Chapter	Estimated Pages	Actual Pages	Added Text
Front Matter	15	15*	--
1 - Introduction	3	3	--
2 - General Description	16	24	8
3 - System Function	40	72	32
4 - Installation	8	9	1
5 - Operating Procedures	31	40	9
6 - Control	45	62	17
7 - Arithmetic Unit	33	48	15
8 - Memory	25	25	--
9 - Input-Output	30	30*	--
10 - Computer Operations	16	16*	--
11 - Circuit Analysis	60	70*	10
12 - Maintenance	63	63#	--
	385	477	92

* To be delivered to DEC prior to March 31, 1962

DEC data not yet available.

Drawings Prepared by Cyburtek

Editing and correction of 28 PDP-1 logic drawings.	--
Chapter 2 - Layout Drawings	2
Chapter 3 - 4 Drawings Revised	1
Chapter 7 - Flow Charts	2
Chapter 10 - Flow Charts	7
Chapter 12 - Large Layout Drawing.	6
	18

CYBURTEK CORPORATION
March 6, 1962

PROPOSAL FOR ADDITIONAL MATERIAL TO BE INCLUDED IN DEC MAINTENANCE MANUAL FOR PDP-1

	Pages
Added text for basic manual (details on following page)	92
Drawings prepared by Cyburtek	18
Text for: (1) Type 15 Memory Extension Control (including necessary changes to other portions of manual affected by installation of Type 15 Control); (2) Multiply Algorithm; and (3) Divide Algorithm.	20
Editing and correction of 28 PDP-1 logic drawings.	no charge
	130
Less typing rebate*	30
	100
Proposed change: 100 pages @ $32	$3,200.

* Mr. Jack Atwood has suggested that his department would prefer to do the final typing for two reasons: (1) he would prefer using the DEC Mid-Century Executive typeface, and (2) he expects to have surplus typing time available. Cyburtek will still take full responsibility for editing the preliminary draft and incorporating the changes requested by DEC.

Added Text for Basic PDP-1 Manual

Total additional text = 92 pages. Written because:

(1) Topics not included in original Cyburtek proposal, but subsequently suggested by DEC or Cyburtek; e.g. logic related to optional in-out equipment, added programming and operating information, terminology, power control and marginal check equipment, addition algorithm, and circuit analysis for nine power schematics and ten other circuits not included in the original outline.

(2) Data furnished by DEC subsequently to September 18, 1961; e.g. standard sequence break system, revisions due to memory control type 15, etc.

dec INTEROFFICE MEMORANDUM

DATE March 2, 1962

SUBJECT Delivery Status of Major Components

TO Ken Olsen
Harlan Anderson
Stan Olsen
Dick Best
Ben Gurley
Bob Savell
Jon Fadiman
Dick Whipple
Ed Harwood
Nick Mazzarese
Derick Chin
Bob Hughes
Jack Brown
Jack Smith
Maynard Sandler
Steve Lambert
Al Blumenthal
Gordon Bell

FROM Henry Crouse

The following is the delivery status as of this date March 2, 1962.

Vendor	Description	Delivery Schedule
Ampex Computer Products	4096 x 19 Memory Stack	1 unit - 3/26/62 1 unit - 4/2/62 1 unit - 4/9/62 1 unit - 4/16/62 1 unit - 4/23/62 1 unit - 4/30/62
Anelex Corporation	High Speed Printer	1 unit received balance of 4 not scheduled
Digitronics Corporation	Readers	3 units - 2/20/62 2 units - 2/28/62 1 unit - 3/5/62 3 units - 3/15/62 2 units - 3/30/62* 2 units - 4/5/62 2 units - 4/15/62* 2 units - 4/15/62 1 unit - 4/30/62* 1 unit - 4/30/62

*5 units to be painted blue

Vendor	Description	Delivery Schedule
Fabri-Tek, Inc.	16 x 32 x 16 Memory Stack	4 units - 5/1/62
Ferroxcube Corporation	4096 x 19 Memory Stack	5 units - February 6 units - March 3 units - April
Friden, Inc.	Friden Flexowriter	1 unit - 5/16/62
Packard-Bell Corporation	Multiverter M2-12B-B	1 unit - 3/31/62
	Multiplex EM3	1 unit - 3/31/62
	SH3 Sample-Hold Amplifier	1 unit - 3/31/62
Potter Instrument Company	Magnetic Tape Handlers	1 unit - 5/15/62* 2 units - 5/22/62* 2 units - 5/29/62* 2 units - 6/5/62* 1 unit - 6/12/62 1 unit - 6/12/62* 2 units - 6/19/62* 2 units - 6/26/62* 2 units - 7/3/62* 2 units - 7/10/62 2 units - 7/17/62* 1 unit - 7/24/62*
Soroban Engineering	Computeriter, 16" carriage	4 units - 4/30/62 2 units - 5/15/62 2 units - 5/30/62 balance of 2 units to be scheduled
	Computeriter 12" carriage	4 units - 4/15/62 balance of 6 units to be scheduled
Teletype Corporation	BRPE-11 Punch	4 units - 2/28/62 2 units - 3/5/62 3 units - 3/15/62 3 units - 3/30/62 6 units - 5/5/62 7 units - 5/15/62 8 units - 5/30/62
Vermont Research Corp.	Magnetic Drum	1 unit - 4/9/62

*17 of 20 units to be painted blue

dec INTEROFFICE MEMORANDUM

DATE March 1st, 1962

SUBJECT

TO Harlan Anderson

FROM Kenneth H. Olsen

Frank Ervin called on Thursday, March 1st to ask the status of our proposal in giving them a computer. I told him what ideas the Board of Directors had and that we hadn't really gotten to think too much about the problem yet, but, suggested that we get together to see if we could clarify some of our thinking. He is all for this and would like us to get together with some of their people. I told him that I would call him on Monday, March 5th to let him know if you and I can stop in to see him one of the three days we will be going into town. In addition, I suggested that he have his people come out here because this will take more than one session and we would like to have them get to know us better.

He asked if the man we were looking for would be a programmer type. I said he would be more of an engineer who would develop a competence in the whole general field rather than specifically a programmer. Maybe we should look over the Harvard Business School applicants and pick out an engineer there who might be interested. Perhaps one of those who wrote the report on medical electronics might be a good possibility.

Kenneth H. Olsen

cc: Ben Gurley
Gordon Bell

dec INTEROFFICE MEMORANDUM

COMPANY CONFIDENTIAL

DATE March 8, 1962

SUBJECT Future ITT Orders

TO Mr. K. Olsen
Mr. H. Anderson
Mr. S. Olsen
ITT File

FROM N. Mazzarese

The subject of future ITT orders was discussed at a meeting attended by R. Hughes and R. Lane of ITT and H. Anderson and N. Mazzarese of DEC.

It was generally agreed that the basic problem is how to handle orders for more than 12 computers; specifically, the easy cancellation plan presently in use is not workable for larger orders.

Our main interest is to have some assurance that ITT would not cancel out on us; i.e., if we were to build up capability to produce three or four machines/month for them, we could lose a considerable capital investment in production expansion.

To this end, we made the following proposals:

1. Firm orders for all computers above 12.

2. Longer lead time, 12 to 18 months, on individual computers to allow us to prepare for a high manufacturing rate.

3. ITT should build up an inventory of computers without options. Options could be added upon sale to customer.

4. We would produce up to a maximum of four computers a month.

5. One ordering approach might be the sliding window -- a standing order for 12 firm machines with one year's lead time on each machine. This could be ended at any time by not ordering the computers for a given month. Each month, new machines would be ordered, and machines ordered 12 months ago would be delivered. If machines were missed, a heavier cancellation than presently used would be paid.

COMPANY CONFIDENTIAL

ITT's main considerations were:

1. Six month maximum lead time on an order.

2. The need for a vendor who can supply up to four machines/month. They agreed it would be necessary to build up to a maximum of four/month on a gradual basis.

Essentially, what they want is a concrete proposal on what our capability is. Perhaps we should be careful in this area. With ITT's tremendous manufacturing capability, they would like us to say we can only handle X/month. They will then propose that we license them to build all over X/month, where X is any number we choose.

A proposal which meets both of our requirements is as follows:

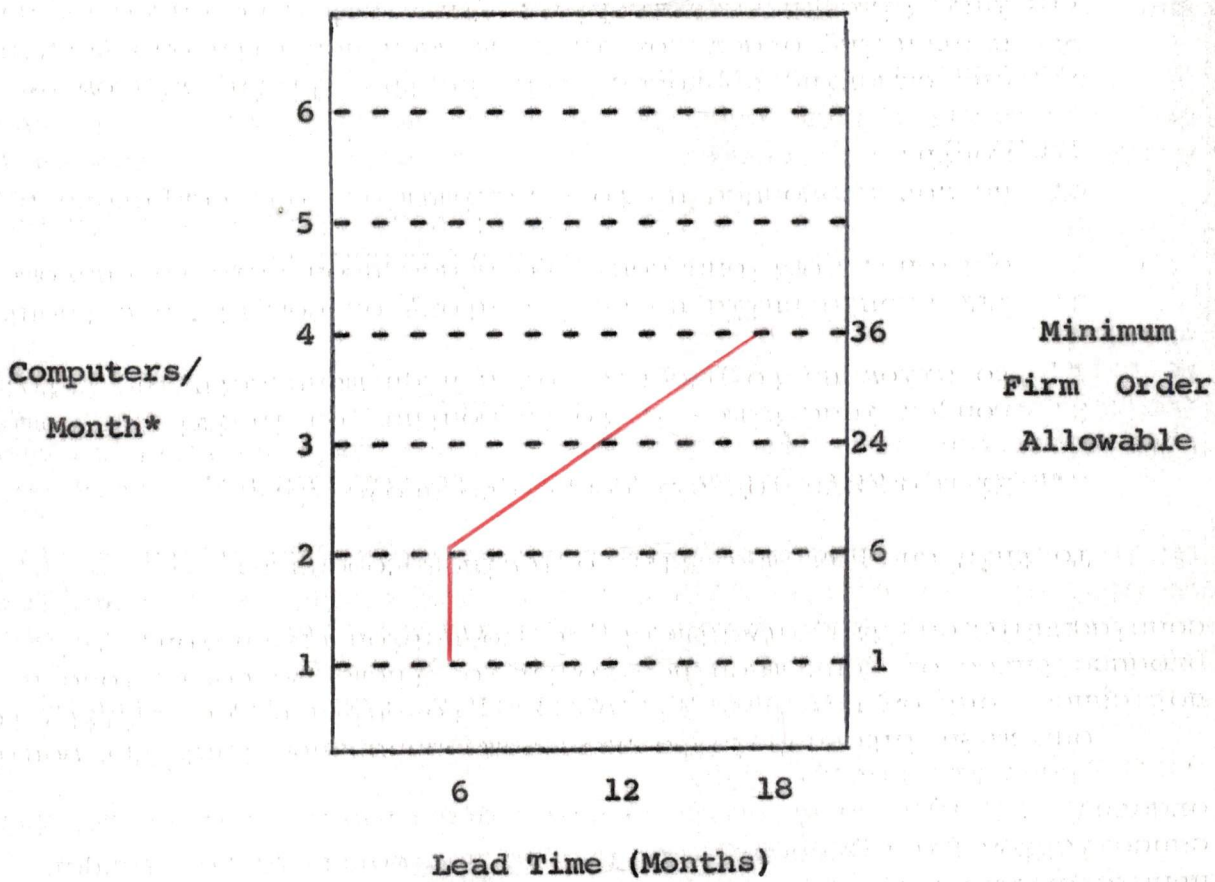
We accept an order for an additional 12 computers under our present arrangement. Any computers ordered above this amount should be firm. On six months' notice, we will deliver two computers/month for a minimum of six months. On one year's notice, we will deliver three computers/month for a minimum of one year. On 18 months' notice, we will deliver four/month for one year.

For firm orders of this nature, a cash deposit should be made upon placement of order. This would equal the cancellation charge for the computer ordered. In general this cancellation charge will be high, but could be arbitrated if the computer was sold to another customer.

A revised discount policy should be considered.

First, any of ITT's options on which we are not now giving a discount should be reviewed. This has already been done on the Sequence Break System with the decision being to give a discount.

Secondly, firm orders could have an additional discount over and above the 10% now offered. This should be geared to the quantity ordered and based upon cost accounting history for the ADX series.



*Includes both firm and non-firm orders

INTEROFFICE MEMORANDUM

DATE March 8th, 1962

SUBJECT

TO Harlan Anderson
Jack Atwood
Bob Beckman
Gordon Bell
Dick Best
Jack Brown
Jon Fadiman
Ben Gurley
Dick Mills
Stan Olsen
Maynard Sandler
Bob Savell

FROM Kenneth H. Olsen

The next Professor Forrester meeting will be held on March 13th, 4:00 to 6:00 p.m. in my office.

Kindly mark your calendar accordingly.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE March 7, 1962

SUBJECT

TO Ken Olsen
✓Harlan Anderson
Dick Mills

FROM Bob Dill

We were visited by W. Wellen, Jr. of the Dept. of Labor and Industries and I quided the inspector on a trip through the plant. I believe his general reaction was favorable, but he did mention the following items:

1. Emergency doors should be unlocked during working hours.

2. Emergency doors should not have door stops attached.

3. The emergency exit at the end of building #12 facing Main Street on both the second and third floors were inadequate. The windows were locked and the window sash broken.

4. Mentioned that a public safety inspector would be out to check the fire escape.

dec INTEROFFICE MEMORANDUM

DATE March 6, 1962

SUBJECT

TO Gordon Bell

FROM Steve Lambert

c.c.: Harlan Anderson ✓
Ben Gurley

On Friday March 2, I went to see Charlton Walter about the two CRC machines.

1. We discussed the mounting of the precision display for a polaroid camera. It was assumed that a 5" ring bezel will be mounted on to the display to accept the camera clamp.

2. At this meeting, Charlton was promised the other high speed channel as described in the first quarterly report. In the report, it states that both machines can accept the automatic tape control, thus two high speed channels must be incorporated for these machines.

3. CRC was under the assumption that they could hook all three memories in series to get total of 12K core. The point was clarified that they can only have 8K as described in the quarterly reports.

4. We discussed the cable loading for all in-out devices. A total of 18 cables will be required for all of the devices. The break down is:

4 cables to the mag tape 52 control, approx. 20 feet
1 cable to the 51 control, approx. 20 feet,
1 - 20 foot cable to be jumpered between tape transport 1 and tape transport 4
1 memory jumper cable approx. 7 feet
1 info-exchange cable about 12 feet
1 - 5 inch Incision display cable, 45 feet
1 - 16" scope display cable, 20 feet
2 memory module cables about 12 feet
2 cables for the A to D, 12 feet
4 other short cables are required to jumper between tape approx. 7 feet

5. Power requirements were discussed and they described the outlets available.

2 for the basic machine, 30 amps each
1 memory module, plug 20 amps.
1 tape control unit, plug 20 amps.
1 per tape transport unit, 20 amps.
1 display, 20 amps.
1 A-D converter, 20 amps.

6. We discussed various in-out instructions and how they worked. They mentioned that they would desire a better documentation on the type 52 control and its functions.

# # # #

bbb

H.E.C.

dec INTEROFFICE MEMORANDUM

DATE March 3, 1962

SUBJECT MANUFACTURING INVENTORIES

TO K.H.O.
H.E.A.

FROM M. Sandler

Inventories are a dynamic input which must be analyzed and interpreted both as a condition of and a determinant of our company policy and activity.

We have for some time been on a steep growth slope and must at this time take a long, hard look at the status and trend of our various inventories. Are our inventories adequate for what we plan to do? Are they in excess of need? Can we determine what our inventories should be?

At present we maintain three basic inventories:

1. Raw Material
2. Work-In-Process
3. Finished Goods

Raw Material Inventory includes all material, equipment, and components used directly in our products. We do have assigned Part Numbers and maintain control records of receipts and issues of raw material. In order to find answers to the above questions, we are presently engaged in classifying and coding our various raw material into meaningful categories, (Resistors, Capacitors, Transistors, Special Computers and/or Systems components and equipment, etc.) so that we may intelligibly examine the structure of our inventory.

Work-In-Process Inventory at present is broken down into Module WIP (Open Jobs and Manufactured Parts in stock), Systems WIP (EN Job Numbers), and Computers W IP (EN Job Numbers). We are presently working on parts and subassembly lists and codes which will prove meaningful in answering inventory questions.

Finished Goods Inventory is made up of modules instock at manufacturing cost. There normally will not be any Computer or Systems finished stock.

Until this work is done, however, we should examine our present inventories with our present knowledge.

We have set an immediate goal of 10,000 modules per month. We look for 8,000 - 10,000 units on the shelf for shipment, 10,000 - 12,000 units in process, and probably should have 8-12 weeks raw material available in light of extending pro-

curement lead times (6-12 weeks presently).

Assumptions for Modules production are:
Average Manufacturing Cost per unit = $30.
Average Material Cost is 60% Manufacturing Cost = $18.
WIP Value is 50% at any given moment.

Special Systems are being produced at the rate of 4-5 monthly, and we here assume one Memory Tester, two Core Testers, and one Special System to be produced per month:
Average selling price for Memory Testers is $55,000., manufacturing cost $22,000.
Average selling price for Core Testers is $24,000., manufacturing cost $12,000.
Average selling price for Special Systems is $22,000., manufacturing cost $11,000.

Special Materials for Systems comprise approximately 10% of Manufacturing Cost (presently included in Raw Material Inventory).

Thus, total Manufacturing Cost Special Systems is

M.T.	$22,000.	Material $2200.
C.T.	$24,000.	Material $2400.
S.S.	$11,000.	Material $1100.
	$57,000.	$5700.

Computer production aims to produce at 2-3 per month--- (computers plus options is equivalent of 4-5).

We assume $125,000. selling price, $50,000. manufacturing cost, and special material equipment 35% of manufacturing cost.

The attached table summarizes the above calculations.

Inventories are fluid. In our situation of increasing demand, inventory values flow from purchase orders to receipts into Raw Material to issues of material to Work-In-Process to completion of WIP to Finished Goods. Our total inventory should be as summarized. Within that total the various inventories will fluctuate according to how effectively we balance the entire operation of our procurement and production endeavors.

INVENTORY STRUCTURE
-ESTIMATED-

	LOW	HIGH	REMARKS
RAW MATERIAL			
Modules	$360,000.	$540,000.	8-12 weeks @ 18/unit
Systems	11,400.	14,000.	8-12 weeks
Computers *(1)	140,000.	210,000.	8-12 weeks 35% mfg. cost
	511,400.	764,000.	
WORK-IN-PROCESS			
Modules	150,000.	180,000.	10-12,000 units 50% mfg. cost
Systems *(2)	28,500.	35,000.	50% mfg. cost
Computers *(2)	100,000.	125,000.	50% mfg. cost
	278,500.	340,000.	
FINISHED GOODS			
Modules	240,000.	300,000.	8-10,000 units on shelf at mfg. cost
totals	$1,029,900.	$1,404,000.	

*(1) January Inventory was $149,000.
*(2) Includes Modules

High
Modules - 18 selling days FG
11 " " WIP
30 000 units RM

dec INTEROFFICE MEMORANDUM

File

DATE March 1st, 1962

SUBJECT

TO Harlan Anderson

FROM Kenneth H. Olsen

Several people from Concord Control will come to visit us on Friday, March 2nd at 9:00 a.m. If you are here we would like to have you meet with us, otherwise, I will take care of it myself.

Kenneth H. Olsen

Personnel Meeting
Changed to 11 am

dec INTEROFFICE MEMORANDUM

DATE 2/28/62

SUBJECT General Report

TO H. Anderson, Stan Olsen FROM Ted Johnson

1. I stopped in today to visit with Doug Shimaro of 3C, West Coast operations. I have attached a copy of the recent literature on the DDP-19. This literature was just released today. They have approximately 8,000 sq. feet of space and total employees in the Western area number around 60. So far, they have only sold the machine to Houston. There are no machines on the floor now and I doubt that they will be showing a computer at the WJCC. They have packaged their H-Pacs very nicely. I saw no literature or signs of their new 5 meg. logic. They are doing a lot of business in Japan, much of this being the sale of their patchboard educational computer for use as a DDA. I expected a more impressive facility and really questioned where all of the people are associated with this office. I presume there are a number at their systems facilities at Goldstone and White Sands. I understood that they are planning to put a salesman into the San Francisco area. They recently hired three new salesmen and lost one old-timer and are interested in hiring additional help. Apparently their stock issue is to go on the market toward the end of March at approximately $15 a share. Shimaro had a D&B report on our company on his desk and my general impression is that they are quite stunned by the financial as well as product success of the company. I also got the impression that their systems work was often a real headache.

2. There was recently a bidder's conference at JPL for a Digital Recording System which will be installed at Goldstone. We were not called into the conference because it was the understanding of this department that we would not be interested in undertaking full systems responsibility. The following people were represented:

1. Astrodata
2. Beckman
3. Radiation, Inc.
4. Philco, Palo Alto
5. Data Technology, Inc.
6. Scientific Data Systems
7. 3C
8. Ramo Wooldridge

The first 5 do not, as far as I know, have computers which will meet the requirements of the system although there is a possible special purpose approach to the problem. The requesting group at JPL does not have a very clear idea of what they hope to do and I have

established contact with them for making them more knowledgeable about PDP-1 and how a GP machine might handle their requirements. Note that SDS, the break-off company from Packard Bell Computer, is planning to bid their computer into the system.

3. A decision on the wind tunnel computer for JPL should be made within the next few weeks. I received a call from CSC today requesting price information on our computer for this system. The system with our computer and options, (4 tapes, tape control 52, 2 on-line output typewriters extra, and oscilliscope) would be approximately $260,000. Their budget calls for total lease outlay of $7,000 per month. Our competition on this system is the Rem Rand 1218, which Hoover indicated is shaping up quite favorably. There is some question, however, as to whether they might shift the present PDP-1 over to this application.

4. Ben Gurley took down detailed notes on the requirements for the SFOF system at JPL. Steve Lambert also discussed this in detail with Tom Miller. It would appear that they are committed to the IBM approach for this system.

5. With respect to our meeting with Bob Ryle of Mesa Scientific, these people are interested in the possibilities of a reduced price on a PDP-1 on an installment purchase or rental in exchange for services they could provide in writing programs for automatic checkout systems and possibly a test oriented compiler or Fortran. There is no urgency from their point of view and I will continue to maintain contact with them and appreciate your comments.

6. Stan and I both felt that the San Francisco area is open to a more active sales effort on our part. It would appear to be signs of increased activity in that area. We have recently made some good contacts at Lockheed, Sunnyvale for the computer and there are possible markets in Philco, Stanford Univ., Stanford Rsch., Univ. of Calif., Berkeley, and smaller organizations in that area. Ken and I will plan to investigate the needs and potential of this area this week and I will make my recommendations as to what we could do to improve our visits in the Northern California area.

7. Ben Gurley and Ken were to have talked with Prof. Bernard Widrow of Stanford Univ. Prof. Widrow was a Lincoln Lab. associate of Ken Olsen. He is head of the department of Stanford which uses computers for adaptive systems research and is currently starting a company to make systems in this area. A letter to him from Ken Olsen would be appreciated by this office.

8. From our point of view, the delivery problem is the outstanding problem of the day. I again urge a rapid solution for the maintaing of an adequate minimum inventory level for mounting panels and accessories.

9. I hope to receive a copy of the sales breakdown from Stan shortly.

10. In order to insure closer connection and follow-up on our computer customers, I would urge documentation of all service calls and telephone discussions with users of our computers. We will attempt to provide concise but informative reports on the current status of machines in the area. These reports should be very brief but I think are very necessary if we are to maintain continuous service to the computer customer.

11. If possible, I would like to receive a complete listing of all the programs and routines we have available and whenever possible information as to the amount of memory these programs occupy. I currently have a list of programs on which there are writeups and I would like to have this up-dated and augmented with programs and writeups which are not yet available.

12. JPL's discussion with Ben Gurley again pointed out how uninformed we often are as to the status of equipment developments back in Maynard. We should be able to extract most of this information, I suppose, from the BiWeeklies. But I think that the Sales Department should assume responsibility for supplying concise reports to the branch offices with the primary intention of supplying information which is available and useful in talking to prospective customers. We are at a point where this communication problem requires that somebody in the plant take on the responsibility of stimulating the branch offices with applications suggestions and adequate sales information on equipment and systems which we are doing for various customers. A more direct approach is required than the occasional memo, BiWeekly, or Newsletter. Such information could also include suggestions on how to look for new application areas and acquire technical information on various application areas.

13. I expressed some reservations about the new catalog which will be coming out. I feel that this will be a highly useful sales tool and will certainly be an impressive display of our module line. The primary problem in selling modules, however, is still to convince the customer of the advantages of the modules and to provide clear information as to the rules of our line so that they can make a good judgement on the advisability of our line for their particular problems with as little confusion as possible. The logic booklet is still not clearing up some simple questions as to the use of pulses and levels and how to inter-connect basic packages such as the inverters, particularly when their usage is confused by the different types of modules now available. Therefore, I think there is great danger in the Sears Roebuck approach to literature if we lose sight of the fact that the primary problem of the literature should be to bring out these basic points and that we could be doing a better job in this area.

14. Please send a new colored picture of the computer to replace the one we have of the old model in the office.

Ted

dec INTEROFFICE MEMORANDUM

DATE February 28, 1962

SUBJECT Report on trip to Far East, February 10 through February 25, 1962.

TO Stan Olsen

FROM Jonathan Fadiman

c.c.: Ken Olsen
Harlan Anderson
Dick Mills

The five days of February 13 through February 17 were spent installing the Memory Tester 1516D in Hong Kong. The address of the Company there is Ferrotec, Ltd., 650 Castle Peak Road, Kowloon, Hong Kong, telephone 806963. The managing director there is Mr. Kenneth D. Wallis. The system arrived on time with no damage and was installed with no serious problems. The machine is considered acceptable by Mr. Wallis. There are a few minor things that we have to take care of and send them, mostly some revised drawings.

I spent February 18 through February 22 in Tokyo, Japan. During the four business days that I was there I visited 8 companies and three trading companies, and the prospects look excellent for the sale of our memory test equipment. My interpreter was Mr. John T. Yamakawa of Nagashima Assoc.

On Monday morning February 19, I visited the Totsuka Plant of Hitachi, Ltd. The people I spoke with were Mr. M. Hirai and Mr. H. Mandai and Mr. I. Oikawa. They have ordered one Memory Tester 1516 and one Automatic Core Tester 2113 with a CH58 Handler. The order is being placed through their associated trading company, Nessei Sangyo, and then through RCA International. Everything has been approved except that there is some delay in getting the money approved from the Japanese ministry of trade. However, these orders are definite.

Monday afternoon, I visited the Nippon Electric Co. known as NEC, at Kawaski. Also there, were some people from Tohoku Metals, which is associated with NEC. The people I visited were Mr. Takasaki, Manager of the Engineering Department, and Mr. Nakamura, Chief of the Chemical Section. They definitely want and need both an Automatic Core Tester and a Plane Tester. However, they will not have the budget approved until summer time, when they will be placing orders with us. They would probably prefer to deal directly with us because of the greater ease of engineering discussions. They will definitely send an Engineer here to learn about the machines.

On Tuesday morning, February 20, I visited the Ofuna Plant of Mitshubishi. This is probably the largest engineering concern in Japan. They are extremely anxious to order both an Automatic Core Tester an an Automatic Plane Tester and probably are our most immediate prospect next to Hitachi. They would prefer to deal independently with us. They would like me to check on the availability of some improved probes for the Ramsey Handler. The people I saw there were Mr. M. Minakami and Mr. H. Ide.

On Tuesday,afternoon I visited the Fuji Electric Co., Ltd. The people I spoke with there were Mr. Seikin Kobayshi, Mr. M. Sakaurai, Mr. E. Shiratori, and Mr. M. Torii. Also present at the meeting was a representative from Nissho. Fuji definitely wishes to work through Nissho as a trading company. They are going to need one Core Tester and one Plane Tester in about 3 months. Their preference is definitely for DEC. Mr. Kobayshi says that he is the one that introduced DEC to other Japanese companies. Evidently all the companies work very closely together and he was a little upset that I hadn't contacted him first thing upon arriving in Japan and thanked him for his part in helping us. I preceded to thank him as best I could on the spot.

On Wednesday morning, February 21, I had a meeting with the Tokyo Electronics Co., Ltd. known as TDK. We had the meeting in my room at the Imperial Hotel. Present were Mr. Jun Kadono and Mr. Yu Hata. They at present have one Reese Core Tester and one Reese Plane Tester, and they are very unhappy with both of these. They expect their business to expand considerably very shortly; indeed their business is already expanding and they are perhaps the foremost producer of cores. Therefore, they are definitely going to need more equipment and they definitely wish DEC equipment. These prospects should materialize some time during the summer. They definitely wish to work through a trading company, either Rikei or Nissho. The feeling is that Nissho is the better company.

On Wednesday afternoon I visited the Oki Research Laboratory at Shinagawa. I talked there with Mr. Atsushi Fujii. They have already ordered one Reese Core Tester but the ministry of trade has not yet approved the amount of money. However, I expect that they will. They previously ordered a Reese Plane Tester but then cancelled the order because they decided the price was too high and they didn't like the specifications of the Plane Tester. They may need new equipment in the future and would tend to buy ours. However, they are certainly less interested than some of the other companies with whom I have spoken. They wish to work through a trading company, and personally think Nissho is better than Rikei.

On Thursday morning, February 22, I visited the Central Research Laboratories of Hitachi, Ltd. I spoke there with Mr. K. Marata, Mr. S. Kurokawa, Mr. H. Mashima and Mr. Y. Onishi. They are most interested in an Automatic Plane Tester and also somewhat in an Automatic Memory Core Tester. Their general feeling however is that they would like one if possible with better than a 0.1 microsecond rise time, in other words, a better machine than we can at present deliver. They are doing advanced research in very fast cores and also a good deal in thin film work. They may however, decide to buy our existing equipment as I told them that though we are working on improved machines, it would be quite a while before we can deliver such equipment. They definitely wish to deal through a trading company, both for importing purposes and also for after-service. However, they will send an Engineer to our plant.

On Thursday afternoon, February 22, I visited the Sunamachi factory of the Tokyo Shibaura Electric Co., known as Toshiba. I visited Mr. Hiroshi Aoyama and Mr. M. Tezuka. They are interested only in our Automatic Core Tester, since they manufacture cores but do not string planes. The other factory of Toshiba has just purchased a Reese Core Tester and a Reese Plane Tester. The Sunamachi factory wishes to see how the Reese Core Tester works out before ordering ours. They are already making efforts to buy an Automatic Core Tester and are putting the money in the budget. Their general feeling is that they would prefer to buy our equipment. However, in order to justify this, they must first see how the Reese equipment works out. I went there with a representative of the Rikei Co. Toshiba definitely wishes to deal through a trading company and the people who first approached them was Rikei.

In general, all of these companies are interested in our equipment and we ought to sell about 8 to 10 machines with a total volume of business of $400,000. to $500,000. within the next 18 months. All companies will definitely send an Engineer to this country to learn about our machine at the time of checkout. Each of these companies have been given one copy of our complete catalog and one copy of the 1516 manual and one copy of the 2102 manual. They were informed that the manual should be kept as "Company Confidential" and were for their own use only. Prices were quoted directly as follows:

Memory Tester 1516 basic price - $54,400.
$500. 50 cycle power
$700. display scope
$1,500. installation trip
Total - $57,100.

This price is for the 1516 with plug-in-units for 64 x 64 x 64 only. I mentioned that to buy the system without the word address portion would cost $8,200. less, and to buy the 1514 would cost $2,000. less.

Prices quoted on the Automatic Core Tester 2113 was as follows:

Basic machine $21,000.
Plus $500. for 50 cycle power
Total $21,000. not including installation trip. If a separate installation trip is required, the total price would be $23,000.

Core Handler prices were quoted at $6,500. for the CH58, $7,900. for the CH60, and $9,600. for the CH70. The last price was in error; it should be $9,800. and I will send a letter to the firms giving them this information. Delivery times were quoted as 10 to 12 weeks on an Automatic Core Tester and 14 to 16 weeks on an Automatic Plane Tester.

On Monday evening, February 19, I visited with the Rikei Trading Co. I met Mr. Isamu Hosoi and Mr. Shohei Shiraiwa. They are a small company, very actively trying to get our business.

On Tuesday evening, I met with the Nissho Co. Ltd. I talked with Mr. Minoru Yokochi and Mr. Yoshiro Yokota and Mr. M. Takekawa. Nissho is quite a large trading company, also very actively seeking our business. They have a branch office in New York which might be useful to us. They definitely have some engineers available for service. Of all of the trading companies, they seem like the best for our purposes if we were to choose a trading company.

On Wednesday evening, February 21, I met with Shoshin Shoji Kaisha, Ltd. and talked with Mr. Harry Harigae and Mr. S. Fujino, the President. This is a much more sophisticated trading company, quite large, composed of people used to be part of Mitsubishi. They also seem to be quite good and they also seem like a very good trading company, rather less aggressive in seeking our business.

My general feeling is that we are going to have to work through a trading company with many of the companies in Japan. A few of the reasons were stated in a letter from Shoshin Shoji of which I have sent a photo copy to Stan Olsen. Possibly however, it is not necessary for us to choose a certain company and work only through that one. However, we should definitely quote prices directly to the factories and also provide service mostly ourselves, and insist that an Engineer from the factory come to DEC in order to learn about the machines. Engineering discussions should still be held directly between DEC and the Engineers at the Japanese company buying the equipment. We must never make the mistakes that Reese has made in leaving after-service to a rather poor trading company.

# # # #

bbb

dec INTEROFFICE MEMORANDUM

DATE February 28, 1962

SUBJECT CRC Meeting Minutes

TO Steve Lambert
Harlan Anderson
Ben Gurley
Bob Beckman

FROM Gordon Bell

Friday, February 23, we had our regular meeting. The next meeting is scheduled for Friday, March 2, at 9:00 at CRC.

The physical characteristics of the machines in regard to layout of their room was discussed. The following questions need to be answered at next meeting:

1. Whether we can "loan" or "rent" a FIO-DEC Flexowriter for them when they get their machine.

2. Whether we are to give them a second high speed channel so that machines will be entirely symmetrical. Whether the type 51 can be plugged into second machine. According to the second quarterly progress report, every piece of equipment is pluggable with respect to both machines.

We need to:

1. Supply them with second copy of DECUS materials "one machine, one vote".

2. Order all free standing tape units.

3. Order free standing memory so that it may plug into either machine.

We discussed analog equipment, and status of their programming.

dec INTEROFFICE MEMORANDUM

File

DATE February 28th, 1962

SUBJECT

TO Ben Gurley
Harlan Anderson

FROM Kenneth H. Olsen

I received a telephone call on Tuesday, February 27th from Jim McDonnock of Concord Control. About a year ago they were bought out by Vertex Corp. in Tulsa, Oklahoma, who lately have been bought out by Dorset Electronics in Norman, Oklahoma. Vertex has been building aircraft simulators of a very simple type and now are interested in sophisticated digital types. Digital is the latest word in the Air Force and it is the only kind they are interested in.

Vertex turned down a bid on the C135 last month, but, next month there is going to be bids open on the C141 and later in the year two more airplanes. They weren't very much interested in this and because Concord Control is closer to the source of aerodynamics information, computer information and programming Concord Control will probably take the responsibility. They are interested in a team member to take part in this activity and I told him we would be very interested in talking with them, although I told him that we were limited in our time right now.

Kenneth H. Olsen

dec INTEROFFICE MEMORANDUM

DATE February 26th, 1962

SUBJECT

TO Harlan Anderson
Dick Mills

FROM Kenneth H. Olsen

I received a telephone call from General Doriot on Friday afternoon, February 23rd. He may have been hinting that we get the note out to him that he asked for about the statistics on DEC. However what we discussed was a suggestion for my talk at the AR&D stockholders meeting.

He said that the Dun & Bradstreet report on DEC list our sales volume for 1959 at 1.5 million, for 1960 1.0 million and for 1961 2.0 million. He suggested at this stockholders meeting that I could announce, for the first time in history, what the actual sales volume of DEC was for these years. He could have suggested that I tell them what the profit was saying that they could figure it out anyway. He said that we should not predict what the sales would be for 1962, although by that time we should be able to tell fairly close.

I asked him to send a copy of the Dun & Bradstreet report to us so that we can analyze it and then send in a correction to them. I would like to hear your reaction to my giving this very dramatic announcement at the meeting.

Kenneth H. Olsen

dec INTEROFFICE MEMORANDUM

DATE February 22, 1962

SUBJECT Ed Fredkin's Computer

TO Ben Gurley
Ken Olsen
Harlan Anderson
Dick Best

FROM Gordon Bell

I have just talked with Ed last night in regard to his ideas on a large computer. The principle is beyond reproach, in that a large machine is the sum of a series of small machines or parts. I think everyone who has ever thought about a machine at some point believes this. Ed wants $'s for this idea, but I feel it needs a bit of development in order to produce a machine from our 30 mc, logic and glass delay lines.

I propose that we hire Ed to present seminars on the organization of this machine. Interested parties are invited, but the above parties should be <u>required</u> to attend.

yes H.E.G.

dec INTEROFFICE MEMORANDUM

File

DATE February 22, 1962

SUBJECT Class on Sequence Break System

TO H. Anderson
G. Bell
A. Blumenthal
J. Brown
B. Gurley
E. Harwood
S. Lambert
N. Mazzarese
R. Reed

FROM Nick Mazzarese

Gordon Bell will be conducting a class for D.E.C. Personnel on the special sequence break system used in ADX machines.

TIME: Tuesday, February 27, 1962, 9:00 A.M.

PLACE: Engineering Area

DURATION: Approximately three hours

dec INTEROFFICE MEMORANDUM

DATE February 21, 1962

SUBJECT BBN Modifications

TO Harlan Anderson

FROM Ed Harwood

Due to unexpected difficulties in the installation of the high speed multiply/divide and the additional memory at BBN plus Paul Gadaire being out sick, the schedule has slipped approximately 2 weeks.

Due to this delay, I do not think we will be able to install the new Teletype Punch at Itek until sometime around the 1st of April. The installation of the punch should shut the computer down at Itek approximately 4 days. This time includes our checkout of the new punch and its logic.

Ed

Please be sure that BBN and Itek know this.

Andy

dec INTEROFFICE MEMORANDUM

MIT File

DATE February 21, 1962

SUBJECT MIT Liason

TO B. Gurley
H. Anderson
K. Olsen

FROM Gordon Bell

MIT is proceeding with some fairly major plans for time sharing and these include:

1. A drum connected with TX-0/PDP-1.

2. Multiple consoles on each machine.

3. A sequence break system which is significantly different than Type 20. A break cycle 0 would be added which gets the sequence break address from one of 16 registers, and then dismisses almost indirectly through these 16 registers.

4. A disc file system.

I think a policy should be formulated to benefit DEC-MIT, similar to Ferranti-University of Manchester.

None of the above items, as they exactly stand, would serve as prototypes for DEC products. The ideas are fairly sound, but vast, and with help in the idea filtering, detailed engineering design, drafting, and fabrication, they might succeed, provided their programming staff will stick with the job to get the executive routine written. I have suggested they work with a prototype model shop of some type.

The arrangement:

1. MIT would design hardware.

2. MIT would consult with DEC on design.

3. DEC would draft, (both Block Schematics and wire listings) and fabricate the designs.

4. DEC would make internal PDP-1 modifications.

5. MIT would test the design. DEC might pretest some designs (in case of consoles).

Eventual problem areas include:

1. Modifications to central processor for larger system. Handling of their specific documents.

2. Plans may make a number of programs incompatible with present PDP-1's (for example they want a command to save all program flags, special iots, sbs, etc.).

3. Projects are open ended in nature.

4. Great discontinuities of project manager at MIT.

5. MIT take over of DEC through job shop nature.

6. The pricing would have to be almost cpff due to open end projects.

7. (We have already quoted $500 as price to prepare wiring diagram, and wire their designs from Block Schematics.

DRUM SYSTEM STATUS

A present problem is the MIT drum system. They want their integrated system for 2 machine control, priority, independent timing, etc. The delivery date is in May, and since their change of design has been relatively late in coming, delivery may be a problem. The read-write and selection portions of the drum are being constructed. I have the first available engineer assisting in the drum projects. MIT's project manager will come to DEC twice each week and talk to drafting room in regard to the MIT design, and get engineering consultation. There is about 2 man weeks of drafting, and 4 mounting panels. MIT would make modifications to PDP-1 from plans drawn by DEC. MIT would do the system testing, and pay DEC when the system is delivered to MIT. The price would be the present drum system plus additional hardware. The delivery date would be a function of MIT design dates.

File

dec INTEROFFICE MEMORANDUM

DATE February 20, 1962

SUBJECT Multiply for MIT Machine/MIT Machine Use

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

FROM Gordon Bell

Jack Dennis has asked us to check on the veracity of an old rumor that DEC plans to "loan" MIT a high speed multiply-divide option.

Professor Caldwell of the Nuclear Group is starting to use the MIT machine prior to the ordering of his machine. I've gotten some calls from him since I knew him at the TX-0, and refered him to BBN for some programming. Our Sales Department should contact him to help him process his order for a PDP-1.

File

February 20, 1962

INTEROFFICE MEMO TO: H. Anderson
S. Olsen
R. Mills
R. Beckman
G. Bell
A. Blumenthal
B. Gurley
A. Hall
E. Harwood
R. Savell

FROM: Nick Mazzarese

SUBJECT: Computer Acceptance Test

The attached form is proposed for use at the acceptance test for Beckman #1 on February 26 and 27 at D.E.C., Maynard. Any suggestions as to changes in format or content must be made by February 22, 1962.

It is further proposed that all future computers undergo a similar acceptance test irregardless of whether or not our customer will monitor it.

As proposed, each computer would use the basic PDP-1 acceptance test form, with additional sign-off sheets to be provided for each of the options.

Your comments are invited on this proposal.

COMPUTER ACCEPTANCE TEST

Customer _____

E. N. _____

Date _____

Location _____

The outline included with this cover letter details the format of the PDP-1 computer and option acceptance test. The signatures of an authorized customer representative and the cognizant DEC engineer indicate that preliminary pre-shipment acceptance has taken place.

This acceptance is comprised of three phases:

Phase I is a complete mechanical inspection to insure that DEC workmanship standards have been adhered to.

Phase II and Phase III are electrical checks on computer operation and basically are defined by a series of test programs which thoroughly evaluate the computer's performance.

It is understood that a satisfactory test shall be considered as:

a. Error free program time $>$15.2 hours where error free programming time is defined as unattended computer operation according to the enclosed outline without manual intervention unless specified in the program.

b. Down time $<$1.8 hours where down time is defined as time from detection of error until test is resumed.

COMPUTER ACCEPTANCE TEST

Basic PDP-1

Customer _____

E.N. _____

Date _____

Location _____

TEST	Time Hours	OPERATE TIME		DOWN TIME		MALFUNCTION	REMARKS	APPROVAL
		Start	Stop	Start	Stop			
I. PHASE ONE a. Mechanical Inspection								
II. PHASE TWO TOTAL	8.5							
a. Warmup	0.5							
b. Test Total	8.0							
1. Colossal Typewriter	1.5							

COMPUTER ACCEPTANCE TEST

Basic PDP-1

TEST	Time Hours	OPERATE TIME Start	OPERATE TIME Stop	DOWN TIME Start	DOWN TIME Stop	MALFUNCTION	REMARKS	APPROVAL
2. Console Test	0.5							
3, Complementing Checkerboard Program M-1068	1.0							
4. Punch Test Program, DEC TP-1 Operating Instructions M-1100	0.5							
5. Checkerboard Program for 1024 & 4096 Wd. Memories M-1120	1.0							
6. Memory Address. Program M-1121	1.0							
7. Read Binary Test M-1123	1.0							

COMPUTER ACCEPTANCE TEST

Basic PDP-1

TEST	Time Hours	OPERATE TIME Start	OPERATE TIME Stop	DOWN TIME Start	DOWN TIME Stop	MALFUNCTION	REMARKS	APPROVAL
8. Instruction Test Program M-1130	1.0							
9. Over Temperature Test	0.5							
III. PHASE THREE TOTAL	8.5							
a. Warmup	0.5							
b. Test Total	8.0							
1. Analyzer M-1103	0.5							
2. PRIM (Punch Read-In Mode Tape) M-1105	0.5							
3. FRAP	2.0							
4. DECAL	2.0							
5. MARGI	1.0							

COMPUTER ACCEPTANCE TEST

Basic PDP-1

TEST	Time Hours	OPERATE TIME Start	OPERATE TIME Stop	DOWN TIME Start	DOWN TIME Stop	MALFUNCTION	REMARKS	APPROVAL
6. Temperature Test	1.0							

Preliminary Acceptance of Basic PDP-1

Approved by _____
DEC Installation Engineer

Approved by _____
Authorized Customer Representative

C O M P U T E R A C C E P T A N C E T E S T

Option 10 Multiply Divide

Customer _____

E. N. _____

Date _____

Location _____

TEST	OPERATE TIME		DOWN TIME		MALFUNCTION	REMARKS	APPROVAL
	Start	Stop	Start	Stop			
1. Multiply Divide Test							
2. Mechanical Inspection							

Preliminary Acceptance of Option 10

Approved by _____
DEC Installation Engineer

Approved by _____
Authorized Customer Representative

dec INTEROFFICE MEMORANDUM

File

DATE February 20th, 1962

SUBJECT Hewles, Holz and Willard

TO Harlan Anderson
Ben Gurley
Stan Olsen
Maynard Sandler
Gordon Bell

FROM Kenneth H. Olsen

On Friday morning, February 16th, I was visited by the partnership of Hewes, Holz and Willard. They are a team of people from the Registrar's office at M.I.T. who have joined together on a part time basis, to do computer consulting. They have been, supposedly, quite successful in automating the work of the Registrar at M.I.T. and now they have formed a consulting partnership to sell their services to other people. They are doing this consulting on a part time basis and with the blessing of M.I.T.

Some of their work at M.I.T. was financed by the E.F.L. (Educational Facility) which was started by the Ford Foundation. Optimizing class organization is apparently a problem which is a natural for computers. Most schools of course feel that they haven't had the money to do this even though the results of optimizing may mean significant savings.

One of their consulting jobs was with Carlton University in Ottawa, Canada. This school has 7,000 students. It was largely a feasibility study and I don't think they have come to any conclusions so far.

Mr. Robert E. Hewes is the Registrar at M.I.T. and Mr. Robert Holz is the Assistant Registrar. Richard Willard is also part of the staff. Their partnership address is P. O. Box 112, Cambridge 39, Massachusetts.

I have no idea how competent these people are, but the problem they are working on is very much like the mailing list and customer list problem which the Sales Department has to develop and like the inventory problem which Maynard Sandler has. I suggested that they try to sell their services to Stan and Maynard.

Kenneth H. Olsen

dec INTEROFFICE MEMORANDUM

File

~~Copy in MIT folder~~

DATE February 19, 1962

SUBJECT Minneapolis Honeywell Intent to Purchase PDP-1

TO H. Anderson
S. Olsen
B. Gurley
A. Hall
J. Koudela

FROM P. Bonner

On February 16, 1962 DEC received notification from Minneapolis Honeywell of their intent to purchase a PDP-1.

This will be honored for a period of 30 days or until March 17, 1962. Thus, a position in our computer delivery schedule (i.e. July 31, 1962) will also be held open for a period of 30 days.

All personnel will be immediately advised of all succeeding developments.

Reminder File for 3/15/62

dec INTEROFFICE MEMORANDUM

DATE February 19, 1962

SUBJECT

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

FROM Jack Smith

I feel that I now have the capabilities to handle more of the Computer wiring. This week I will be getting together with Ed Harwood and Bob Reed to try to work something out. If all schedule and wiring diagrams are available, I will attempt to complete Beck #2, which is due out of Production on 3/9/62.

dec INTEROFFICE MEMORANDUM

File

DATE February 19, 1962

SUBJECT Progress of Basic Computers And Associated Equipment to Final Wiring

TO

FROM Jack Smith

K. Olsen
H. Anderson
M. Sandler
B. Gurley

Type	Schedule Date	Date of Actual Delivery
Basic Computer Beck #1	2/2/62	2/2/62
Basic Computer CRC #1	2/9/62	2/9/62
Basic Computer CRC #2	2/19/62	2/19/62
Basic Computer SRL	2/19/62	2/20/62
Mag Tape 50 Rem-Rand	2/9/62	2/9/62
Mag Tape 50 CRC	2/16/62	2/19/62
Mag Tape 50 CRC	2/19/62	2/20/62
Mag Tape 51 DEC	2/9/62	2/9/62
Mag Tape 51 SRL	2/19/62	2/19/62
Mag Tape 52 ADX-0	1/26/62	1/26/62
Mag Tape 52 Rem-Rand	2/9/62	2/9/62
CRT-30 SRL	2/16/62	2/16/62

February 16, 1962

Martin Whitmer

K. Olsen
H. Anderson

Bob Lassen

The following are some observations made by Mr. Thomas J. Troup (Cryovac Division, W.R. Grace Company), concerning Martin Whitmer.

Whitmer worked for Troup for approximately one year in the area of Financial Analysis. This work apparently involved researching the financial operations of various departments and reporting his findings to top management. It included such areas as Investments, Profit and Loss, Forecasts, and Sales. Troup felt that Whitmer was mentally equipped to do this job but indicated that his prime interests were in Sales-Marketing.

Troup thinks Whitmer is an intelligent person and a good thinker. He feels that Whitmer would be somewhat of a "calculated risk" since he was never "really put to the test" in top management project work. He does feel however, that Whitmer possesses the mental ability and potential to grow into higher level work.

Troup also indicated that he was well liked and that he handled himself well with his associates. He was especially adept at reporting to and dealing with his superiors.

DATE: February 15, 1962

SUBJECT: Ess Gee Proposal - Tape System

TO: Stan Olsen
Ken Olsen
Harlan Anderson
Ben Gurley
John Koudela

FROM: Jack Brown

File

Al Wachtill (914-LY-2-8620) of Ess Gee Electronics explained their tape system needs on the weather bureau job.

They have a modified 7090 called a 7094 which presently has both 729 II and 729 IV transport stations. Under program control, they want to write on either type 729 at either density and then switch the transport on to a PDP which would then read the information, make a few calculations, write back on the tape and then switch it to the 7094.

The tape control we would supply would have to:

1) Check longitudinal parity.
2) Write and read end of file markers.
3) operate without the 7094 power.
4) Drive up to eight drivers.
5) Operate with either speeds or either density.
6) compute while reading or writing.
7) Be delivered by October 1.

It should gather write and scatter read.

It need not:

1) automatically correct for all zeros even mode characters
2) have double rank reading

Considering the fact that we have not yet decided exactly how we should build such a control, when present production pressure will ease, our desire to design a control before we promise delivery, and the Ess Gee credit rating, it was decided not to approach the program on a crash basis.

I told Wachtill therefore that:

1) We are going to have such a control in the future but would not promise it by October 1.
2) We expected it would cost approximately $65,000 (CDC similar unit by the way sells for $82,000).

The October date essentially said no to their proposal and will probably result in their using a different computer. We may or may not have additional follow up with Ess Gee.

dec INTEROFFICE MEMORANDUM

COMPANY CONFIDENTIAL

DATE February 15, 1962

SUBJECT Actual Cost - Universal Controller for AFC

TO Ken Olsen
H. Anderson
R. Mills

FROM E. Simeone

I have made a detailed analysis of the manufacturing cost of the computer and options (Universal Controller) sold to the Air Force Command at Bedford. The purpose of the analysis was two-fold; first, to arrive at an accurate actual cost, and second, to see if all materials were properly charged to the job or if materials used were incorrectly charged to this job. This of course, would affect the accuracy of the cost.

Two EN numbers were assigned to this project. EN 2053 consisted of the computer, an A-D converter and a stimulus synchronizer. EN 2094 covered the CRT model 30A display. A summary of the total cost of these two jobs is as follows:

EN 2053 (Computer, A-D Converter, Stimulus Syn.):

			Total	% of Total Cost
Direct Labor:				
Engineers -	(190 hours)	$ 761.82		
Technicians -	(1545 hours)	3,942.16	$ 4,703.98	8.7
Overhead:			2,906.41	5.4
Direct Materials:			12,483.26	23.0
Manufactured Parts:			10,233.96	18.8
Finished Goods:			23,928.63	44.0
Outside Contractors:			35.00	.1
Totals:			$ 54,291.24	100.0 %

It is our opinion that the maximum estimated cost of the stimulus synchronizer and A-D converter is $2000. and the balance of $52,300. represents the actual cost of the computer.

EN 2094 (CRT - Model 30A):

		Total	% of Total Cost
Direct Labor:			
Engineers	$711.33		
Technicians	924.99	$ 1,636.32	25.0
Overhead:		917.15	14.1
Direct Materials:		2,475.50	37.9
Manufactured Parts:		731.57	11.2
Finished Goods:		672.53	10.3
Outside Contractors:		94.50	1.5
Totals:		$ 6,527.57	100.0 %

In addition to the cost of theses EN jobs, there was labor, materials and overhead totalling $941.72, charged to field service.

Attached is a summary of materials used and a description of labor performed on EN 2053.

A proper analysis of the direct labor presented a problem due to the lack of a job description or operation being reported on all the daily job tickets. I made no attempt to analyze the engineering cost as the job tickets did not show the necessary information. The attached analysis of the technicians labor represents 84 % of the total engineering and technician labor cost.

(See Attachments)

COMPANY CONFIDENTIAL

EN 2053: MATERIALS

DIRECT:		Total	%of Total Cost
Transistors	$ 293.48		
Memory Stack	6,210.00		
Reader	2,300.00		
Teletype Punch	811.43		
Computer Writer	2,210.00		
Swivel Chairs (2)	105.84		
Misc. Parts	552.51	$12,483.26	26.8%
MANUFACTURED PARTS:			
Cabinets	$ 606.32		
Plates & Filler Strips	278.06		
Wiring & Misc. Jobs	9,349.58	$10,233.96	21.9%
FINISHED GOODS:			
Mounting Panels	$ 651.51		
Power Supplies	1,390.67		
Tape Pin-Patch Cords	14.80		
Modules	21,871.65	$23,928.63	51.3%
TOTAL MATERIAL COST:		$46,645.85	100.0%

EN 2053: **TECHNICIANS LABOR**

	Hours	Dollars	%
Wiring & Lacing	244.50	$ 547.62	13.9
Checkout	726.25	2,089.46	53.0
Cable	46.00	94.66	2.4
Paperwork	86.00	250.58	6.4
Misc. & Unclassified	442.50	959.84	24.3
Totals -	1,545.25	$ 3,942.16	100.0 %

dec INTEROFFICE MEMORANDUM

File

DATE February 14, 1962

SUBJECT

TO Stan Olsen

FROM Kenneth H. Olsen

I am very unhappy with our attitudes with respect to answering inquiries within the Sales Department and Engineering Department. I think it is intolerable to offer to send a price quotation and then procrastinate indefinitely. I suspect that if the customer doesn't remind us, there are many answers that we never send out at all.

I would like to have a system set up whereby each request for a quote is entered into a log. This log would also give the dates which we promised to give an answer. The log would be kept by a secretary or clerk who would raise the flag well before the promised date to answer is due.

We then have to give an answer to every inquiry. The answer may be we don't want to bid, or it will be a year before we can give the price, or it might be an exorbitantly high bid, but above all, it is an answer.

The responsibility of the Sales Department is not relieved by simply sending a note to the Engineering Department asking for a price.

Kenneth H. Olsen

CC: Harlan Anderson
Ben Gurley
John Koudela
Bob Beckman
Nick Mazzarese

dec MEMO

DATE February 14, 1962

TO Harlan Anderson FROM Jack Atwood

This isn't nearly as bad as I have made it sound here. A lot of our time is, of necessity, spent on general chores - gathering background information, experimenting with new techniques, performing simple housekeeping chores, and the like.

In addition, the implementation of the cost center system itself took a great deal of time during January.

However, this report provided the vehicle for an effective reminder that we are responsible to our "customers" and that our jobs depend on how well we bear that responsiblity.

dec INTEROFFICE MEMORANDUM

DATE February 13, 1962

SUBJECT ADVERTISING DEPARTMENT OVERHEAD

TO Advertising Crew FROM Jack Atwood

The first run-off of labor charges under the Cost Center system provided one real shocker. To wit:

38.6% of our labor costs for the month of January were charged to miscellaneous numbers.

In other words, nearly half of our month's labor could not be charged back to specific jobs. It simply went into our departmental overhead.

Can you imagine a business where the labor cost on each job that was billed had to be doubled in order to meet the total payroll? Can you imagine how long such a business would continue to attract customers?

Well, that is just what this figure means. It tells us that, in order to pay everyone, we would have to charge nearly twice as much as we should for labor alone on every job. Add to that other costs which run high because we are a new "business" - paying for new equipment, charging off spoilage, defraying the expense of on-the-job training, etc. - and it puts us in a tough competitive position.

And don't forget what we talked about when the new system went into effect. We will soon be in competition - with Samuels Studio, Murphy & Snyder, a dozen or so commercial art services, and literally hundreds of advertising agents and agencies. If the other cost centers in the company don't like the price they have to pay for what we do, they will be perfectly free to look elsewhere. Enough of this type of thing could put us out of business.

So what are we going to do? We're going to start getting some of this miscellaneous labor under control. Obviously it will never disappear entirely. There are certain jobs we do which are strictly overhead operations connected with the general functioning of the department. But we can do better than 38.6%, and we're going to.

One of the first things which showed up in the run-off was that the miscellaneous labor charges for time-clock personnel amounted to only 19.7%, as compared with 42.6% for staff and clerical. That shows us that George, Bob and Warren have already established good habits in accounting for their time. They know what jobs they have been working on, and they charge their time to the jobs. And it shows that the rest of us, in many cases, don't bother to charge the job, either because we forget or because we just don't care.

Another interesting figure was the percentage of total miscellaneous time which could be accounted for by function. Only 21.8% of this time could be traced back to administration

and operations, public relations, sales promotion, technical publications, industrial design, photography, and printing. The rest - a thumping 78.2% - was charged to just plain miscellaneous.

That should be enough to give you the picture. Now here are a few new rules:

1. We are setting up a number of new job numbers which are to be used in place of 0900 whenever possible. These should help get the 78.2% figure back into line.

Public Relations - Miscellaneous	150-1900+
Sales Promotion - Miscellaneous	150-3900+
Technical Publications - Miscellaneous	150-5900+
Industrial Design - Miscellaneous	150-6900+
Photographic - Miscellaneous	151-7900+
Printing - Miscellaneous	151-8900+
February Administrative Duties	150-0903*

These are to be used whenever time cannot be charged to a specific job. They are to be used sparingly, and they are to be used wisely. If something you are doing, for example, has a general bearing on our sales promotion activities but is not chargeable to a specific job, charge it to 3900 not 0900. Use 0900 only as a last resort. A few of us will use 0903 for certain jobs we are asked to do which are definitely outside our normal area of responsibility.

2. Whenever you use a 00 job number, as above, fill in the "Job Description" line on the card. (This line need not be filled in otherwise.) Florence will circle 00 numbers appearing on the time cards, and she and I will check them to see if the numbers used are appropriate.

3. If you are in doubt, leave off the job number. Just write in the job description. That will help us to spot areas where there isn't a clear delineation.

4. If you are working on a job which you believe should have a number but doesn't, leave off the job number and write in the job description. This will help us get new numbers assigned promptly but without keeping you waiting to complete your time card.

5. We are renaming Function 9 (the first digit of the job number). It will now be "Cost Center" instead of "Department." The job number for miscellaneous is still 0900, but it should be 150 or 151 depending on which cost center is actually involved.

6. We are also making several changes in operation numbers, descriptions and designations. We are adding:

18 Personnel (to cover interviewing and orientation)

54 Proofreading

We are expanding these definitions:

32 Finished Art and Mechanicals

50 General Typing and Clerical (to include filing, etc.)

And we are transferring to Cost Center 150:

52 Reproduction Typing

54 Proofreading

That's the message for the day. In all truthfulness, it may be a job-saving one. Of all the departments in the company, we are probably the most vulnerable to outside competition. So we must try the hardest to be able to justify what we do and what we charge for it – if we want to stay in business.

INTEROFFICE MEMORANDUM

DATE February 14th, 1962

SUBJECT

TO Harlan Anderson
Ben Gurley

FROM Kenneth H. Olsen

Mr. Robert Hughes who is on the administrative staff of MIT is coming out to visit us on Friday, February 16th, at 9:30 a.m. He is part of a group of fellows who are trying to sell computing programming services as a separate company. I think their main interest is in developing some attitude as to what price they should sell their services. He is also interested, I would guess, in trying to sell services to us. We, of course, are interested in having all consultants know about our machine.

I will meet with them and talk for a while and if there is reason for you people to get in on it, I will give you a call.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE February 13th, 1962

SUBJECT

TO Harlan Anderson
Dick Mills

FROM Kenneth H. Olsen

We promised to send down to the Board of Directors well before the next meeting a proposal on renting of computers. One of the problems which we promised to look into were what the anti-trust regulations were on selective renting. The Board would more readily go along with renting if we said that we would do it only to those to whom there were special reasons for renting. It may be illegal to offer it to some and not to all.

We perhaps should ask our patent lawyer about this question. If we are tied in with a patent lawyer it would be good to also ask him if we have taken all steps possible to protect the name of our corporation.

Kenneth H. Olsen

dec INTEROFFICE MEMORANDUM

DATE February 13th, 1962

SUBJECT

TO Gordon Bell

FROM Kenneth H. Olsen

When we told our Board of Directors about the cookie factory and the 11 carloads of flour that might get held up each day, they showed quite a bit of concern about the importance of the computer breaking down. When we said we didn't expect it to break down very often they said this was even a worse situation because there will be no one around who will know how to run the manual control. They suggested that we look seriously into duplexing the computer. We, of course, told them we offered this, but, Jay Forrester said it was our obligation to almost force customers into making wise decisions.

Kenneth H. Olsen

cc: Ben Gurley
Harlan Anderson

dec INTEROFFICE MEMORANDUM

File

DATE February 13th, 1962

SUBJECT

TO Stan Olsen
Harlan Anderson
Jack Brown

FROM Kenneth H. Olsen

I received a telephone call at 2 o'clock on Tuesday, February 13th from Mr. Sam Cohen, President of Ess Gee Company, 15 Haven Street, Elmsford, New York - Lyric 2-8620 - area code 914. His technical man, Al Wachtell, also talked with me. They are very much concerned because they have not received a proposal from us on an adapter to use an IBM tape. They have to mail their proposal in tomorrow and the technical decision has to be made later in the month. The computer has to be on the site in October for a shot in November. This is to be used for the Nimbus Satellite and will process information coming by telephone from Alaska to Maryland. They will process the information on a 7090 but they want to take the 729 tape and process it on our computer.

They feel they pretty much sold our computer but they are getting embarrassed because of the delay in getting information from us.

Kenneth H. Olsen

dec INTEROFFICE MEMORANDUM

File

DATE February 12, 1962

SUBJECT ITT Kingdom and Steve Lambert

TO Ben Gurley
Harlan Anderson

FROM Gordon Bell

I would like Steve Lambert to take on the role as designer, and customer liason for ITT. The machine is in fairly good shape and the documentation can be improved. I would like to modify the high speed channels to allow 4 devices, as standard on all machines, Steve could carry this out, and in general, should get into the design of the central machine.

Steve has been requested to get the maintenance routines in a form for DECUS distribution. Permanent Memos, and tapes exist for most all routines.

I would like him to be completely responsible for maintenance routines.

dec INTEROFFICE MEMORANDUM

DATE February 12, 1962

SUBJECT The Computer Division's PDP-4 Policies

TO Ben Gurley
Harlan Anderson
Stan Olsen
Ken Olsen

FROM Gordon Bell

I would like to have a series of short meetings regarding the policy of the PDP-4 Subdivision in the following areas:

1. Relationship to DEC as a Cost Center.

2. Relationship of Sales, Customer liason, and customer installation and tracing.

3. Organization in development and production phases.

   a) Management, planning, marketing, control

   b) Technical directives

      i) Mechanical Engineering
      ii) System Design
      iii) Programming
      iv) Customer Applications
      v) Special Projects
      vi) Documentation

The discussions would yield a set of policy notes for people within or near the group, defining areas of responsibilities.

dec INTEROFFICE MEMORANDUM

DATE February 12, 1962

SUBJECT Present Design Goals for PDP-4

TO Ben Gurley
Harlan Anderson
Stan Olsen
Ken Olsen

FROM Gordon Bell

To this date, the design policies for PDP-4 have been:

1. A slightly bigger than minimum general purpose computer, with flexibility to extend in size. Expandability required in control applications, documented to provide a nicely defined, simple module nest.

2. Reliability to be a maximum.

   a) Standard DEC modules.
   b) Documentation to be complete.
   c) Built in facilities for testing - (Repeat for memory testing).

3. Maximally production oriented machine.

   a) Documentation structure and control.
   b) Register checkout as modules.
   c) Design simplicity for production testing.
   d) Substitution checking.

For the last few months I have been working on a policy for documentation. I feel it is the most important design variable. Documentation seems to provide:

1. Means of retracing design.
2. Means of monitoring design progress.
3. Control for changes in production.
4. Working drawing for production, checkout and maintenance.
5. The communication path with production, from design.
6. Description of machine operation.
7. Parts lists.
8. Customer information.

The amount to which each of the above items fulfill these goals are not independent and present a fine linear (or perhaps non-linear) programming problem. The problem is especially interesting if cost or time is considered.

The design of PDP-4 has been complete for some time, and I would like to discuss the documentation problem in more detail before issuing the rules for writing down the logic for production.

The wiring may be done by a wire list, depending on the success of present experiments with lists.

INTEROFFICE MEMORANDUM

File

DATE February 9, 1962

SUBJECT Trip to Johns Hopkins

TO Stan Olsen

FROM Bob Hughes

cc: Ken Olsen
Harlan Anderson
Dick Best
Ben Gurley

I was somewhat horrified to find that at the installation where Bill Shotts is located, all of our system type plug-in units are mounted in 1906's and had front panels with 1/2" rubber strips which run the length of the mounting panel to keep the plug-in units in their sockets by compression. Bill Shotts stated that if they were not held in with compression they wouldn't run. His particular troubles were that his Laboratory Modules ran for a year with no trouble, then the banana jacks had to be turned in the banana jack sockets in order to keep the units running. He is also having trouble with the fatigue of the phosphor bronze connections in our amphenol sockets. I found one contact which was fatigued and did not grasp the 55 thousandths feeler gauge. I gave Bill the feeler gauge and advised him that when they had problems making contact that they measure all the springs for 55 thousandths with a slightly grasping force and if he found any that wouldn't grasp at 55 thousandths that he insert a scribe on each of the leafs of the socket contact and bend them slightly inwards so that they would grasp the socket. I think we ought to buy Amphenol connectors with beryllium copper contacts right away.

He stated that he had problems with the banana plug connections on the back of the 1906 mounting panel. He also stated that the 4201's which they have would only "progate carry" 8 digits in 1906 mounting panels, but that some people in their Lab find no difficulty in propagating "carry" 14 bits when they use taper pin mounting panels. He blames the contact resistance in the 1906 banana jacks and sockets. We should look into this problem.

We promised Bill Shotts that we would send him the price and literature on the 2309A burst generator.

J. F. Gulick and Joe Harlan modified the 4301 delay on the short end of the range as they wanted short delays. We once made the arbitrary decision that the short end of the delay should be 2.5 micro-seconds. The capacitor which we normally use is 2200 uuf. The capacitor which they used was 470 uuf. I expect this may cause them trouble so we should look into this to make sure the unit has operating margins. They had about 12 bad plug-in units which we agreed to repair.

Mr. H. H. Knapp wants to be put on the mailing list and we should send him literature immediately. His address is: 8621 Georgia Avenue, Silver Springs, Maryland.

Dick King wants to know how he can make an analog to digital converter and mix two inputs together; in other words he wants to be able to take either of two inputs and gate them so that he can make a conversion on either input.

Mr. Schwastic (is that the correct spelling?) is having problems when he uses 4106s to mix pulses into pulse amplifiers. He has discovered that the pulse amplitude into pulse amplifiers deteriorates as a function of time. We suspect this is because of bad 2N412 transistors. He stated these units gave no trouble when used as regular logic inverters. We agreed to give him some 2N1305s.

Mr. Janusz mentioned that 4110's stretch pulses when they are used to "or" pulses, sometimes to as wide as one microsecond. This hasn't given him any trouble and he doesn't have any time bind, but I guess he was surprised. We should ask Dick Best if he has any strong feelings on the 4110 in this regard.

I think you agreed to get secret clearance for Jim Burleigh so that he can visit their Lab frequently.

INTEROFFICE MEMORANDUM

February 9, 1962

DATE

SUBJECT CRC Scheduling Meeting

TO PDP Distribution List

FROM Arthur Hall

It has been decided to use the Beckman #2 computer (now in final assembly and wiring) for the first CRC computer. This computer will be shipped to CRC on Thursday, March 13, 1962.

As soon after 3/13/62 as possible the A-D converter will be delivered.

The final delivery will not be later than 4/2/62.

Configuration for the 3 deliveries is as follows:

1st delivery ** Basic Computer (CRC-1)
Sequence Break #20
H. S. Mult. and Div. #10
Memory Extension Control #15
* Tape Control #51
2 Tape Unit #50
* Information Exchange Register (this may be retrofitted later)

2nd delivery * A-D Converter
* Multiplexer

3rd delivery ** Basic Computer
Sequence Break #20
H.S. Mult. and Div. #10
H.S. Channel #19
Memory Extension Control #15
Memory Module #12
* Tape Control #52
2 Tape Unit #50 (one for use w/A-D Converter)
Color Display and 1 or 3 Light Pens
Precision CRT
* Information Exchange Register

*The exact location of these units still must be decided.
**Both computers will have sockets into which the Tape Control #51, Color Display and Precision Display can be plugged.

Steve Lambert will be Project Manager for the two CRC computers and their associated equipment.

Bob Beckman and Jim Burley will design the A-D converter. Bob Savell is responsible for the two displays.

NOTES:

Of the 3 memory modules now near readiness, the first will be used with ADX-0, the second with CRC-1 and the third with ADX-0. BBN will get the next one available.

The 2 Tape Units #50 and the Tape Control #51 for CRC-1 will be tested on the Prototype computer.

A schedule for the balance of our computer orders is as follows; (Al Blumenthal and Ed Harwood will refine this schedule.)

	Start Final Assembly-Checkout Sequence	Deliver
ADX-0	/	2/19
BECK-1	/	2/16
CRC-1	2/7	3/13
SRL	2/16	3/20
CRC-2	2/19	4/2
LRL	2/26	5/4
BECK-2	3/9	4/18
ADX-4	3/9	4/15
ADX-5	3/30	5/15
ADX-2	4/20	6/15
ADX-3	5/4	7/1
DEC	5/18	
ADX-6		7/15

dec INTEROFFICE MEMORANDUM

DATE February 8th, 1962

SUBJECT

TO Dick Mills
Harlan Anderson

FROM Kenneth H. Olsen

At the monthly Board of Directors meeting on February 6th it was voted to contribute a total of $1,500.00 to Emerson Hospital over a three year period. The payments would then be $500.00 per year. We might consider postponing this until after July 1st.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE February 8th, 1962

SUBJECT Visit from Woods Hole, February 7th, 1962.

TO Harlan Anderson
Stan Olsen
Ben Gurley
Ed Fredkin

FROM Kenneth H. Olsen

Early Wednesday morning, February 7th, Dr. Veronis from Woods Hole Oceanographic Institute and Henry Stommel of Harvard, visited us to talk about a PDP Computer for the Woods Hole Institute. They now have an Autonetic Computer which is giving unsatisfactory service and does not have the features which they desire.

Mr. Stommel is seriously considering giving a contract to Ed Fredkin immediately to show the value of a scope presentation, and to try out Ed Fredkin. However, they may be forced to make a decision on the computer before Fredkin's results are in.

People have been collecting data on the ocean for many years, but, this has been done by many different groups with no consistent way of preparing the data, and now there is no convenient way of presenting it. They have taken data at about 100,000 points throughout the ocean and at each point there is about 1,000 bits of information. They would like to be able to call up graphs or sections of the ocean and present this multitude of data they have. Yesterday Professor McCarthy at M.I.T. demonstrated a PDP with a scope and this caught their imagination. They could then make sections of the ocean or histograms and photograph them and distribute this quite freely and hopefully they could ask for any information and have it presented in any form and get it quite quickly. Eventually this would mean having a disc file however.

The Woods Hole Oceanographic Institute is a non-profit group independent of other organizations but they are on quite friendly terms with M.I.T. and Harvard. Their ties with M.I.T. might become much closer as the Earth Sciences Department develops at M.I.T. M.I.T.'s only contact with water is now the Charles River, which is not quite as challenging as the contact which Woods Hole has.

Only 22 out of the 400 people at Woods Hole are doing classified government work. Of the 400 people about 100 are professional people. They will probably ask us for a discount because they are a non-profit institute. Because they are independent of the government (not quite 100% of their money comes from the government) they can sign contracts which are longer than one year.

They are interested in our color display and I told them that we will let them know when it is finished so we can show it to them.

They feel that they will need one magnetic tape unit and a scope with their computer and they are interested in the possibility of a line printer.

Kenneth H. Olsen

dec INTEROFFICE MEMORANDUM

DATE February 7th, 1962

SUBJECT Monthly Progress Report

TO Dick Mills

FROM Kenneth H. Olsen

I think that we could well spend some time rethinking the organization of all our Progress Reports. It is not at all clear what many of the items mean and why they are where they are. I suggest that first of all, we block diagram the sections of the report so that it would clear to somebody where they fit in.

I suspect that the Statement of Cost of Modules Sold includes items other than modules, but, there is no way to be sure.

In the list of company sponsored engineering jobs it is awfully difficult for us to justify to our Board of Directors how PDP Field Service Charges are part of company sponsored engineering jobs. There are also inconsistencies in the naming of different projects. It is not clear what the difference between PDP Field Service and just Ordinary Field Service is. I expect that current generator and current driver are the same, but, it is not clear.

There should be some way of letting the reader know how much of a project, such as Analog Anelex Development, is company sponsored engineering and how much is being charged off to the customer.

I would like to see someone critically look over this presentation and see if we can't develop one which is more easily understood.

Kenneth H. Olsen

cc: Harlan Anderson
Stan Olsen

dec INTEROFFICE MEMORANDUM

DATE February 6, 1962

SUBJECT Meeting at ITT on January 30, 1962

TO Ken Olsen
Harlan Anderson
Stan Olsen
ITT File

FROM Nick Mazzarese

The meeting was held at 320 Park Avenue, N.Y.C., ITT World Headquarters, and was attended by H. Anderson and N. Mazzarese of DEC and R. Hughes and R. Lane of ITT.

Agenda:

1. Circuit Schematics (Unresolved)
2. Marking of Packages (Unresolved)
3. Schedule Confirmation and Documentation (Firm configuration and new schedule will be mailed to us by ITT. We have preliminary information on these items.)
4. Renegotiation (They are still looking into this.)
5. Spares (We have provided them with spare parts ordering information for modules. We have yet to furnish them with a list of spare mechanical parts.)
6. ITT was Undercharged by $5,000 on ADX-0 Purchase Order (They will rectify this.)
7. Maintenance Training will begin on February 5, 1962 at ITT.
8. Unfinished Business
   a. Reprice Sequence Break
   b. Reprice Line Unit Duplex Switch
9. Discussion of purchase order for 48 computers

This last item should be discussed in a little more detail. The discussion on this subject began with our laying out the possible pitfalls for both DEC and ITT in a large order of this size; specifically, we pointed out the problem that we could have if they

were to cancel our orders. We also indicated that an order for 48 computers in a given year starting immediately would perhaps be too great a burden on our production capabilities.

Bob Hughes agreed that any order for as many as 48 computers should be handled differently than their initial order for 12. He mentioned the following specific possibilities:

1. They would definitely build all their own line units from ADX-5 on.

2. They would, in all probability, build their own tape and tape control units.

3. They would consider building their own extra core storage.

4. They would be willing to commit themselves to a large portion of this order without a cancellation agreement as we have in our present contract.

5. The orders could be spaced on a gradually increasing basis, building up to a rate of four a month - maximum.

It is interesting to note on this subject that the people at ITT have a marketing staff of about 30 people just selling ADX Systems. It seems by the law of averages, that they should be getting many orders soon.

So far as our delivery technique on this large order goes, we mentioned that we would take the approach taken by IBM in quoting delivery dates; that is, we would only give delivery upon receipt of order. We would not commit ourselves to a large, long range delivery schedule projected into the future until we had received a firm order.

Bob Hughes mentioned several times that they were dead serious about this large quantity order. They were not kidding!

They need the following information from us, however, to adequately plan for the advent of an order of this nature:

1. A specific quotation on what our production capability is.

2. What is the largest order that we would accept?

3. What is the largest delivery rate we could sustain?

4. What additional conditions might we want to attach to an order of this size?

INTEROFFICE MEMORANDUM

DATE February 6, 1962

SUBJECT Punch Paper Tape, Typewriter Paper, and Friden Paper Tape Cement

TO PDP-1 Users

FROM Bob Savell

The above named items are now stocked by Jim Myers in Finished Goods and should be ordered in the same manner as any other type of finished goods. The Sales Department will keep track of our stock of these items and restock automatically.

dec INTEROFFICE MEMORANDUM

DATE February 5, 1962

SUBJECT Record of Trip to Visit Brooks Research Corporation in Rochester, New York

TO Ben Gurley
Ken Olsen
Stan Olsen
Harlan Anderson

FROM Bob Savell

On Friday, January 26, John Koudela and myself visited a Mr. Kurt Enslein at Brooks Research Corporation in Rochester, New York to discuss the possible purchase, being instigated by him, of a PDP-1 and some special equipment to go with it. We also talked with a Mr. Tom Keenan who is the director of the Computation Center at the University of Rochester and a Mr. Harold Iker who is working at the university using the 7070 computer there to work on problems in psychology and psychiatry.

Mr. Enslein is trying to buy a PDP-1 with National Institute of Health funds. He has a personal interest in getting a PDP-1 since he has a problem to solve, and would like to have a computer of this sort to work with. He would like to try and convince Doctors at the university hospital that the PDP-1, or some other computer, would be a useful device to use for keeping track of a patient's condition in the operating room by means of analog inputs of EEG, EKG data, etc. He would also like to have the computer installed at the university or at the university hospital so that he himself would not have to operate it, but would have it available for his use. Both John's and my impression was that he is probably going to have a tough time trying to convince them that they need a computer. Mr. Keenan and Mr. Iker both seemed to have a very negative attitude toward the whole thing. Mr. Enslein claims that if he can't get the computer in the university or the university hospital, that he has been told that National Institute of Health would provide funds for him to run the computer in his own company. In any event, he would like a quote from us on a PDP-1 system which has has outlined to John and also on a CRT equipped with photo-multiplier and film transport to read 70 millimeter chest X-rays into PDP-1 and also a 12-channel analog to digital converter to use for inputing the operating room data.

The A to D converter for inputing the operating room data would have to handle mostly frequencies lower than 20 cycles per second and very rarely frequencies as high as 60 cycles per second. It would be provided with any reasonable amplitude voltage inputs we requested, preferably around the 1 volt level. The converter should be able to convert at a rate of 20,000 conversions per second, have approximately 10 to 12 channels input, and approximately 1% conversion accuracy. John says that we have quoted on a system similar to this for some other customer before, so that the quote on this one should be no problem.

The requirements for the scanning device to read in 70 millimeter X-rays are as follows: The number of elements per picture should be somewhere between 10,000 and 30,000. The device should be able to differentiate approximately 8 to 10 levels of intensity information. The size of the raster must not change more than ±1/2%. The stability of the raster should be not more than ±1/2%. Spot size can be anything less than 1% of raster size. He would like to read this data from PDP-1 to magnetic tape with one pass per frame, so at the tape speed it would take approximately 1 second per picture to input his data.

Since the film would only move one frame per second, a simple film transport would be sufficient. It should have automatic film advance. The accuracy of positioning is not important since all the data will be taken in one pass. He would be willing to trade resolution for the number of levels of intensity available. In other words, i.e., for 10,000 picture elements, he would want 8 levels of intensity but if 40,000 elements were present only 2 levels would be required he says.

He has also asked Image Instruments to quote on this scanner system with an analog to digital converter and a mag tape to use simply for the purpose of getting the X-ray data onto tape. The tapes would then be processed on another computer.

He also expressed interest in shaft encoder inputs similar to those used on the TX-2 but did not ask us to quote on them.

One thing that seemed to throw all of us a bit was the high cost of our added memory modules with respect to the cost of the basic computer.

dec INTEROFFICE MEMORANDUM

File

DATE February 5th, 1962

SUBJECT

TO Dick Mills

FROM Kenneth H. Olsen

Security is going to be even more difficult when we take over building 5 because of the passageways and stairways in between. We could make a stairway from our machine shop up to the top floor of building 3 and have all our traffic go over the upper bridge. This would have the advantage of breaking up the flights of stairs necessary to make a trip.

This then opens the possibility of securing the stairway between the third and fourth floors of building 5 and giving us complete security throughout the plant. The people on the fifth floor have no need of this stairway or elevator except for emergency use and a seal breaking system for opening a door would take care of their emergency needs. Bradley Plastic has access to that stairway and elevator but I don't think they use it and might possibly give us permission to close off that area.

Will you contact Mr. Berg and ask him if this is a possibility. If we closed off the stairway to Bradley we would be happy to even leave a key with the main office of Bradley so they could use the doorway or elevator, if necessary. We would then paint the passageway on the top floor of building 3, the bridge, and the stairway in building 5.

cc: Stan Olsen
Harlan Anderson
Jack Smith

Kenneth H. Olsen

dec INTEROFFICE MEMORANDUM

DATE February 2nd, 1962

SUBJECT

TO Jack Atwood

FROM Kenneth H. Olsen

I would like to have two types of salary review forms printed so that we can maintain some systematic way of carrying out our annual salary reviews. With a system, we might also find it desirable to review even in the half year because it is somewhat unfair to an employee to have his salary function according to the present attitude of his supervisor.

The first form I would like to see should be on reasonably heavy board because it will be a record for many years of his salary. On the top there should be the name of the man, last name first, and the most significant data on him such as any degrees received and dates and year joined DEC. Then there should be a number of columns: first column is date, the next is reviewer, then the five categories under which they are reviewed, the names of which you can get from Harlan Anderson. Next column is total because these are points which the person reviewed is given numerical value. Then, there should be a wide space for calculation and notes. Next column should be old salary, next dollar raise, next column percentage raise, next column new salary. This probably should go across the long section of a standard sheet of paper.

The second form should be on relatively light paper, the sort of thing we normally offset printed forms on. It should be decent looking so that it will gain the respect which it deserves. This form should first of all have a paragraph explaining each of the five points which we want to review a person and give some hint as to what the meaning of the numbers are and then there should be space for the reviewer to record the value he puts on each of the five points. Then the following questions should be stated and there should be room for them to be answered. Name three people who are comparable with this man who's value to DEC you would rate higher to this man. Next question is the same but three people who you would rate lower than this man. On the top of the page should be the name of the man and the name of the reviewer and the date. All of these forms should probably have Company Confidential across them.

I am disappointed that we don't have the new job application form already. I have a very capable secretary, who at time, I am not able to keep busy. Is this in shape that she can with her Executive typewriter prepare it for printing.

Kenneth H. Olsen

cc: Harlan Anderson

INTEROFFICE MEMORANDUM

DATE February 1, 1962

SUBJECT Request for price quotation from Dr. Philip Hamilton of Itek Laboratories for a Flying Spot Scanner System

TO Ben Gurley
Ken Olsen
Harlan Anderson

FROM Bob Savell

Dr. Philip Hamilton of Itek Laboratories called last week and requested a price quotation on two scanners to be delivered in September 1962. The specifications are as follows:

The system does not include the CRT's or the tube mountings nor does it include any tables or cabinets. Each unit must drive two deflection yokes and two focus coils. They were considering buying the yokes and focus coils, but if we wish to quote on these as part of the package, this is agreeable.

The device is to be a flying spot scanner which scans one line in 30 milliseconds with a raster height of 3000 lines. I told him we could expect retrace in this system might take 50 microseconds and this was agreeable to them. I still cannot get any further specifications from them as far as accuracy, stability, and so forth, other than the unit will operate in normal room temperature and that reasonable type accuracies and stabilities consistent with the type of presentations are expected. They are more interested in short term stability than long term stability as they will be scanning one picture in approximately 90 seconds and would not want things upset in the middle of a picture. If things change over a longer time than this they are not particularly concerned.

The quote for these two units must be in by February 15. Do we wish to make a quote?

February 1, 1962

Holiday Schedule - Calendar Year 1962

K. Olsen
H. Anderson
S. Olsen
M. Sandler
R. Mills

Bob Lassen

The following is a holiday schedule including movable days as suggested by the Personnel Committee:

January 1 - Monday
April 19 - Thursday
May 30 - Wednesday
July 4 - Wednesday
September 3 - Monday
November 22 - Thursday
November 23 - Friday - Movable Day
December 21 - Half Day
December 24 - Monday - Movable Day
December 25 - Tuesday

We may run into a problem if we are not given permission to work on such days as November 12th (Monday).

INTEROFFICE MEMORANDUM

ADX General File

DATE February 1, 1962

SUBJECT Basic ADX Configuration

TO Harlan Anderson
Stan Olsen
Gordon Bell
Benn Gurley
ITT File

FROM Nick Mazzarese

In order to simplify our communications with ITT in discussing ADX machines, Bob Lane of ITT and I have come up with a definition of what shall be called a minimum ADX Machine.

This machine shall contain the following:

1. Basic PDP-1 Computer with no options
   a. Punch at 63.3 char/sec
   b. Paper Tape Reader at 200 char/sec
   c. One Standard Typewriter
   d. Sp. ITT Console
2. 64 Sequence Break Channels
3. 8 Completion Pulse Traps
4. 4096 of Additional Core Storage
   a. Type 15 Memory Switch
5. High Speed Control Type 19 (3 Channels)
6. 1 Tape Control Unit Type 52
7. 3 Tape Units Type 50
8. 8 Line Unit Connections
9. ~~1 Punch (63.3 char/sec)~~
10. ~~Paper Tape Reader (200 char/sec)~~
11. ~~1 Typewriter~~
12. 1 Set of Reproducible Drawings

A Half Duplex Machine will contain the following standard features:

1. An 8 Bit SW Register (to connector)
2. Duplex Transfer Path
3. Duplex Transfer Path Indicators
4. Duplex Switches in the Tape Units
5. Duplex Control

dec INTEROFFICE MEMORANDUM

ADX-0

DATE February 1, 1962

SUBJECT ADX-0 Delivery Date

TO K. Olsen
H. Anderson
S. Olsen
A. Blumenthal
B. Gurley
A. Hall
E. Harwood
ITT File

FROM Nick Mazzarese

A review of the ADX-0 rework schedule indicates that we are presently about four work days behind. This would mean delivery of the computer on February 20th if we assume Saturday work is continued.

The slippage can be accounted for by the following facts:

1. Late delivery of console. (2 days)

2. Late delivery of modules (at least 5 days) due to DX priority of other jobs.

3. Electrical Modifications more involved than anticipated. (5 days)

In addition, ITT would like some additional modifications made on their Line Units, which will take a few days more. It appears, therefore, that the overall delivery date of ADX-0 will be approximately February 23 or eight days late.

dec INTEROFFICE MEMORANDUM

File

DATE February 1, 1962

SUBJECT Additional Tasks for ADX-0 Reworking

TO Harlan Anderson
Stan Olsen
Gordon Bell
Ed Harwood
Loren Prentice
ITT File

FROM Nick Mazzarese

Mr. Geoffrey Finch of ITT, during his visit of 1/26/62, discussed the possibility of DEC picking up some additional tasks to be performed on ADX-0 before its shipment to ITT in Paramus. If these tasks could be performed here, he felt that a good deal of time could be saved. In fact, he recommended we be given an additional few days to complete these tasks.

These tasks should be reviewed and a time estimate placed upon them. Of course, it is imperative that this be completed before the shipping date of February 15, 1962, in order that we may make a decision as to whether or not we will go ahead with these modifications.

The modifications are as follows:

a. The two extra core banks are authorized and will be packed together in an extra cabinet not attached to the main frame.

b. The present line unit cabinets are to be switched left for right so that the half-empty cabinet will be adjacent to the level converter cabinet. This is to insure shorter cabling and the placement of the odd blue-frame cabinet in the corner of the room. (Gordon Bell and Loren Prentice have agreed that this can and will be done with no change in the February 15th delivery date.)

c. An extra 729 power supply, which has already been ordered, be mounted on the door of #2 line unit cabinet.

d. The following modifications of line units are desired:

1. Make the OLU outputs match the ILU inputs; that is, 0 volts = idle condition. (This is already incorporated in ADX-1.)

2. To include switch filters in the incoming unit input circuit. This card will replace the solenoid drive presently used for duplex switching. To date, this has been packaged externally to the line unit on ADX-0 and ADX-1.

3. Include direct flag level lines from line unit logic to indicator panel.

4. The override switches should be arranged such that the "up" is "line on."

5. Add one ribbon cable connector at line unit indicator panels to contain OLU and ILU direct flag levels and OLU flag override lines.

We are aware of the above modifications, and Bob Reed has been supplied with wiring lists, etc., by G. Finch.

from Jack Small

File

PROGRESS REPORT ON COMPUTERS AND SPECIAL SYSTEMS

The below outlined steps have been taken to supplement our capabilities and to increase our computer output to 3-4 systems per month.

1. Mechanical

Computer Cabinets: Purchase Orders have been placed with Donnelly Manufacturing for 50 computer cabinets completely fabricated. These cabinets will arrive fully painted with plenum doors, casters, and seal strips mounted. The cabinets when delivered will be completely ready for the installation of logic.

Delivery date: 1/26/62

Computer Doors: Purchase Orders have been placed with Nye's, Inc. of Chelmsford to paint 150 computer doors. When delivered, the doors will be assembled and delivered to stock.

Delivery date: 1/24/62

An additional requisition has been placed with Prelco for the fabrication of an additional 200 doors.

Delivery date: 1/31/62

End Panels: Purchase Orders have been placed with Donnelly Manufacturing for 50 computer ends. To date 10 have been delivered unpainted, the remaining 40 will be delivered painted and complete with trim strip.

Delivery date: 1/31/62

Fan Housings: 50 fan housings are currently in stock unpainted. If it becomes necessary we can ship them out to be painted.

Delivery: 2 weeks

Trim Strip: Purchase Orders have been placed with Metalic Ants for 200 bottom and 200 top trim strips. The strips will arrive ready for installation on cabinets.

Delivery date: 1/29/62

Cabinet Connecting Clips: 50 of conner type and 50 of center type to be delivered from Donnelly.

Delivery date: 1/26/62

Hardware for Doors, Springs, Pins, etc: Most of these items were manufactured on a screw machine and were therefore ordered in large quantities. In stock presently, 1 years supply.

Transport Door: There are 20 doors and trim in stock completely fabricated.

Short Doors for Mag. Tape: Purchase Orders have been placed for 50 doors with Prelco.

Delivery date: 1/16/62

Frames for Display Tables: Ten are in stock primed.

Table Tops for Console End, Typewriters, and Displays: Ten are in stock ready to be mounted.

2. Wiring

Engineering Model Shop, Ashland, Mass.: They are currently delivering to us Bay 1 and Bay 2 completely wired every ten working days. Within three weeks they will be delivering to us Bay 1 and Bay 2 completely wired every five working days. I feel that we have pushed these people to the limit of their capabilities.

Elasco Corporation, Roxbury, Mass. : We have Purchase Orders placed with these people for four Computer Memory Systems. The first system will be delivered 1/16/62. Each week thereafter they will be capable of delivering one system per week. These people have very large capability. I feel quite confident that they will be able to handle Special System work for Jon Fadiman as well as the one Memory System per week for Computers.

Macleod & Hanopol, Charlestown, Mass. : These people are currently wiring Memory Buffers 2007. We are currently using these people for Special Systems wiring only. Their capabilities are limited, but I feel that they can handle more of our work. They are presently delivering 9 panels of logic per week. Together with Elasco, they should be able to handle our over flow of Special Systems work for Jon Fadiman.

Pastorizo, Boston, Mass. : We have Purchase Orders in work with these people for one Sequence Break System 208 for ITT #3; delivery date: 1/26/62. Also we have four Tape Control 52, on order; delivery date: for two of them 1/26/62; for the other two 2/9/62. Additional Purchase Orders are being placed for one In-Out (11A-11B-11C) sub-assembly per week. These people are our next best source to Engineering Model Shop. They have quite a large capability and will be able to handle all our Magnetic Tape work in addition to the one In-Out sub-assembly per week. Their current capabilities are about 15 panels of logic per week.

3. Summary

Mechanical: By the end of January we will have in stock the necessary amount of all computer parts to enable us to construct 10 computer systems consisting of 6 cabinets per system. Minimum quantities have been set up on each computer part card to enable the construction of 5 computer systems. As our needs increase, this minimum quantity will be increased.

Wiring: In three weeks we will be receiving Bay 1 and Bay 2 completely wired every five working days, one In-Out sub-assembly

every five working days; so it can easily beseen that we will be receiving assemblies for onebasic computer every five working days.

Pastorizo is capable of handling two Magnetic Tape Control 52 per week or a similar amount of wiring.

Our present outside capabilities are 50 panels of logic per week.

Our own wiring group is kept busy mostly with rush jobs of one nature or another, modifications, engineering changes, cabling, and tieing together.

Subject: PDP-4 Cabling

To: Harlan Anderson

Date January 31, 1962

c.c.: Ken Olsen
Ben Gurley
Ed Harwood
Richard Best
Stan Olsen

From Gordon Bell

The enclosed sketch describes the PDP-4 cabling problem and gives a rough layout of the cabinets.

The specifications for the "IO NEST" or "LO MODULE" are not quite firm. I'm trying to solve the problem for the average process control case, and it's difficult to specify an average number of 9 or 18 bit output variables. This average number drastically affects the space required for drive selection (3/4 - 1 1/2 modules/device selected) and cable outputs. The present system will conveniently select 64 inputs and 64 outputs.

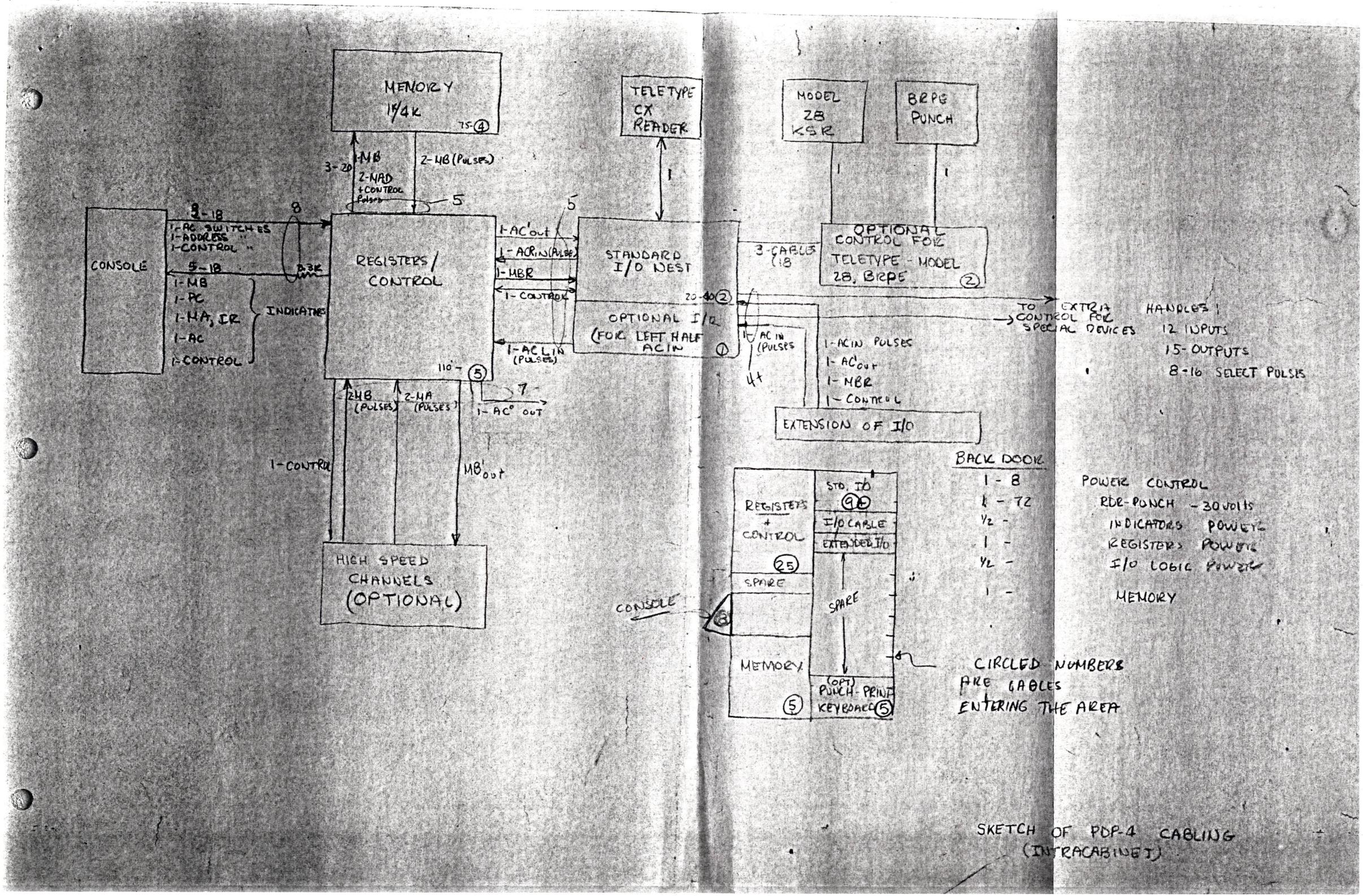
All inputs and outputs are to and from the AC. The MB, and MA are available for direct data interrupt too. I'm currently thinking of allowing only 9 bit input to the AC, with an option for the remaining 9 bits, perhaps the whole thing is initially wired up. Taper pins will be used in the "IO MODULE" so that data are fed directly in to the MODULE. A taper pin block will be provided for AC outputs. The MB outputs (both sides) are used to select the I/O device.

I need help with the cable problem! Is it possible to have 25 cables eminating from a section of 110 modules? Is there a better way to handle series resistors than:

1. Resistors on sides of panel (see Type 52 Tape Control).
2. Blocks over modules with series resistors. (PDP-1)
3. 1669 packages
4. A plug-in-unit extender like device with series resistors.
5. Cable with a series resistor at sending in.
6. A taper pin block (3 x 20) with 3.3 K ohms, rather than 0 ohms fron to back resistance.
7. The use of a pin space and overhead block for series resistor and cable connector. From a wiring list standpoint, the cables in central part will yield a list at least x 25 x 18 or 450 cards long.

I would appreciate suggestions, and might even yield to edicts.

# # # #



SKETCH OF PDP-4 CABLING (INTRACABINET)

COMPANY CONFIDENTIAL

File

dec INTEROFFICE MEMORANDUM

DATE January 31, 1962

SUBJECT Plant Visit to Somersworth and Dover New Hampshire - January 27, 1962

TO Ken Olsen
Harlan Anderson
Stan Olsen
M. Sandler
J. Smith

FROM R.F. Mills

SOMERSWORTH, N.H.

The property we saw is item 81 in the book entitled " Industrial Properties in New Hampshire" presented to us by Mr. Allen P. Chase, Industrial Agent for the New Hampshire State Planning & Development Commission.

First Impression:

We met Mr. Filion, Mayor of Somersworth and Mr. St. Lawrence, President of the Somersworth National Bank, at the bank and then drove about a mile and a half to the plant, which is located right on the river next to a dam. The first impression of the plant was that it had been left there to slowly rot away, and this proved to be the case once we got inside. There are 50,000 sq.ft. in three brick buildings; 37,000 sq.ft. in the main mill consisting of 5 floors, sprinklered with a very small elevator and heating system in desperate need of repair. The windows - most of them broken - were open on some floors, which has allowed the weather to enter and do a real job on the floor. The building was as filthy as I have ever seen and the estimate of the cost to bring this building up to a point where we would be able to occupy it including, increasing the heating capacity, bringing in power, a general clean-up, painting, new floor in one area, putting in new mens and womens toilets on each floor would run in the field of $100,000.00+.

Purchase Price:

The stated purchase price before we went up there was $20,000. and while we were talking to the two men, theyexpressed the opinion that it probably could be bought for $15,000. and as the day progressed for $10,000. and at the very end the statement was made that we could probably buy it for almost anything. Maynard, Jack and I all felt that there was some hope here, since the purchase price was so low and the taxes on the building were $475.00 per year, but after going to Dover, we completely wrote off the Somersworth plant as being quite undesirable for many reasons, which will show in the investigation summary attached.

 COMPANY CONFIDENTIAL

DOVER, N.H.

First Impression:

This property is item 80 in the same book as mentioned on page 1 of this memo. This is 50,000 sq.ft. on the third floor of the old Pacific Mills in the center of Dover; with a 13 ft. ceiling, sprinklered, with elevators, loading dock at street level in the rear, which we did not see. This property is in like-new condition with full power, very clean, well painted and it looks as if all we have to do is move in and start work. We all voted for this property due in large part to its excellent condition, location, the attitude of the city government as evidenced by their Mayor, Mr. Stuart Shanes, Mayor Pro-Tem, Mr. Tuttle and the following members of the Development Commission: Mr. Carl Frieze, General Manager of Eastern Air Devices, who are in the floor above and the floor below and Mr. Ellis, District Manager of the N.H. Public Service Corp. These men represent the first businessmen government in Dover for many years, having thrown out "politicians" and are now trying to put the city government on a business like basis and in particular to encourage new industry.

Prices of Property:

The 50,000 sq.ft. was quoted at 24¢ a sq. foot, which would be $12,000. per year or a little less than half of what we pay for the same space and is better space than we now have here. They gave us evidence of the fact that this price is subject to negotiation, which seems to me a lower price. Any negotiations would be handled through the Dover Industrial Corporation, in Dover, N.H. which is headed up by Governor Powell and our dealings would be directly with him. Mr. Hugh Hamilton, who normally handles these arrangements for Governor Powell, is away for four months.

Future Contact:

It was left that we would contact them for the labor information which we asked them to put together for us and which are the questions as listed on the investigation summary attached.

MANCHESTER, N.H.

Allen Chase of the New Hampshire Planning and Development Commission called me Monday to set up an appointment to see some more property in Manchester, New Hampshire which he feels would be "just right" for us, with an available labor supply far exceeding anything that would be available in Dover. We tentatively plan to go up there this Saturday February 3rd.

# # # #

COMPANY CONFIDENTIAL

INVESTIGATION SUMMARY

	Dover	Somersworth
1. Building Area:	50,000 sq.ft.	50,000 sq. ft.
2. Cost:	24¢ per sq.ft./$12,000. per yr.	$5, - 20,000.00
3. Repair Cost:	None	$100,000.00
4. Real Estate Taxes:	Included in rent	$475. on present valuation
5. Power:	Installed	To the buildings only
6. Water:	Available	Gallongge rights to river water City water available
7. Personnel Feeding	In Town/possibility installing, in plant-some machines	In Town
8. Heat:	Included in rent	Needs to be completely redone-package unit & HDT boiler, not in good condition/requires survey
9. Labor:		
ages?	Unknown	Unknown
How Many?	Unknown	Unknown
Areas to draw from?	Portsmouth, Dover, Somersworth - in New Hampshire Berwick, York, Ogunquit, Sanford - in Maine	
Past work experience?	Stated as high quality-semi skilled and skilled help	Unknown
Rates of pay?	Unknown	Unknown
Cost of living index versus Mass.?	Unknown	Unknown
10. Other Industry:		
How long there?	GE - 15 years no union	Unknown
How many have left, & who are they?	None, because of help and conditions	None, because of help and conditions
Special fringe benefits?	None	None

COMPANY CONFIDENTIAL

11.	Schools: % of taxes for schools	Information to follow	46% (50% of school children in Parochial Schools
12.	Corporation Taxes:	There are no Franchise or Income Taxes on Corporations in N.H. and the only tax they have is a property tax which is the same basis as a personal property tax - on all property in the plant of stock nature at Dec. 31 of each year, which is taxed at the Towns tax rate.	
13.	Individual Taxes:	There are no wage or personal property taxes in N.H. on individuals - the only taxes they have are a Real Estate Tax, and a 3% State Sales Tax, and a 4.25% dividend and interest tax.	
14.	Freight:		
	What are truck rates per 100 lbs/electronic parts?	Unknown	Unknown
	Available truckers are:	M&E and Garvey	M&E and Garvey
	Air Freight?	No schedule	No schedule
	Nearest freight - Boston		
15.	General Transportation:		
	Air?	None	None
	Bus?	Greyhound/Trailways	Greyhound/Trailways
	Train?	None	None
16.	Travel from Boston?	75 miles	app. 90 miles
17.	Building cost per sq.ft?	Estimated for basic frame & sm. area for offices, $8.00 per sq. ft. They built 38,000 sq.ft for $300,000. in their new industrial park	
18.	Workmans Compensation per $100. ?	Unknown	Unknown
19.	Town Financing?	100% financing	None
20.	Banking Facilities?		
	local:	National Bank	National Bank
	Boston Affiliation:	Unknown	National Shawmut Bank of Boston First National Bank of Boston

dec INTEROFFICE MEMORANDUM

File

DATE January 24th, 1962

SUBJECT Disposition of surplus PDP equipment

TO Ben Gurley
Ed Harwood
Harlan Anderson
Gordon Bell

FROM Kenneth H. Olsen

There are several pieces of equipment which we have taken off old computers which we should make a formal decision as to their value so that we can get rid of them, or else protect them, if we want to save them.

1. The 1,000 word memory has been kicking around on the floor in the storage area and I suggest that we throw it away or we package it up in a wooden box that was made for it and file it away for future use.

2. The desk type console which was completed, but never delivered with a computer, should be given to Quality Control for a test bench or else wrapped, protected and sent into storage with due labels. If there is a possibility of our selling a computer with the old console, we should save this because it is complete and because the island is complete.

3. The original PDP console with a brown hood has sentimental value, but I suggest that we take the top off and give the table to Quality Control as a test stand. There is a complete scope with amplifiers inside and there might be a possibility of using it for an oscilloscope.

Kenneth H. Olsen

dec INTEROFFICE MEMORANDUM

ok

DATE January 18, 1962

SUBJECT Computers

TO K. Olsen
H. Anderson
B. Gurley
J. Brown

FROM Jack Smith

One of the major problems in computer construction has occured during the final stages of checkout. It has been at this point that our mechanical people have been trying to complete mechanical work on the System. Of course this interfers with checkouts and many valuable hours are lost. In the past ~~is~~ it has been necessary to release systems to checkout before they have been mechanically complete. This has been due to lack of necessary shop hours, design changes, and release of prints from Drafting.

We should at this time be able to eliminate this problem. Our sub-contractors have supplied us with a large quantity of all computer parts. In the future a machine will not be released to checkout until it is mechanically complete. Of course we realize situations will arise such as Bechman where this will not always be possible.

INTEROFFICE MEMORANDUM

DATE January 15, 1962

SUBJECT Job Order Cost System Manual

TO K. Olsen
H. Anderson
S. Olsen
R. Best
M. Sandler
B. Gurley
J. Fadiman
J. Atwood

FROM E. Simeone

Attached is a manual on the proposed Job Order Cost System to be followed by each cost center.

This system is currently being used by the Advertising Department on a test basis to determine weaknesses and to be certain that all areas are properly covered. We will be in a position to evaluate this operation by the end of the month and to make changes, if necessary.

We in accounting feel that this system is straight forward, with very few"frills". However, I would appreciate your appraisal of this manual, with a view towards clarity and understanding, and also to see if your area is properly covered.

Copies to R. Mills

15, 1962

ed by each

sis to
Ve
rake

dec INTEROFFICE MEMORANDUM

DATE January 12th, 1962

SUBJECT

TO Harlan Anderson
Stan Olsen
Ben Gurley
Institute for Defense Analysis File

FROM Kenneth H. Olsen

Al Fullerton who used to be at Lincoln Laboratory and seems to think he remembers me, called this morning, Friday, January 12th to ask what the delivery on the PDP Computer would be. Homer Haggerdorn is the Personnel Manager there now and suggested that they consider our computer. They are neighbors of Bolt, Beranek and Newman and, therefore, have seen that machine and have been impressed with it.

They are very much interested in a three month delivery and I told them that someone would call them back this afternoon and give them the exact delivery. I asked if they could use the machine out here while they were waiting for a normal delivery and he said that this would be difficult unless we had a cleared area because this was classified work that they were doing.

All I know about the machine is that they need a card reader and a card punch with it. I told them about the speeds of our various card readers and got no reaction from him. It might be that he hasn't thought enough about the problem to have any reaction as yet.

Someone has to call him back this afternoon because I promised faithfully that we would do this.

Kenneth H. Olsen

Eleanor

Send F-15B → Send DECAL manual ! sent 1/19

→CDC-1604 - Princeton
CDC-1604 - Washington

HEG.

dec INTEROFFICE MEMORANDUM

File

DATE January 12th, 1962

SUBJECT

TO Dick Mills

FROM Kenneth H. Olsen

Mr. Henry Rosenblatt from the Raytheon Purchasing Department in Sudbury called to give us information on the material they would like to sell us. His phone number is HIlltop 3-9521.

1. There is a 3 ton air conditioner which they will sell to us for $100.00. I think we should buy this.

2. There is a 5 horse power air compressor for $275.00. We should buy this.

3. The cafeteria equipment they would sell for $5,000.00. He is sending a list of these items to us and we should decide as soon as we see the list. I do believe that we should buy it because the furniture would probably cost us almost that much. The ice cream chest and two refrigerators belong to the ice cream company and will go. The ice machine is leased and so that is not included. I suggest that we buy this as soon as we possibly can and then move the tables and chairs into our present area because we badly need chairs and tables right now. Also, the people who are going to stay in the Raytheon area will be using the cafeteria space for lab use for a while. We can move the chairs that we don't need in our present building to the far end of the Raytheon space right now and we can lock, in the kitchen area, all the equipment we buy. I am tempted to give them $5,000.00 for it right now, but, it would be quite unbusinesslike to do it without a list of what the items are.

They want us to pay for this with a certified check which we can send to him in the Purchasing Department at Sudbury. I think when we are already to make the buy, we should telephone him first to make sure that everything is in order.

The 5 ton air conditioner and the ice maker are leased from Boston Filter Company in Charlestown. They deal with Mr. Perkins there. Their lease was renewed each year from June to June and the rental they have been paying is $37.50 for the ice maker and $51.00 per month for the air conditioner. They feel they could break their lease immediately without any problem, but, they would like to know whether we would like to continue the lease or would we like to purchase the units. The purchase price of the ice unit is $282.00

and the air conditioner is $536.00. For these prices, I think we ought to buy them and then figure out what to do with them. The air conditioner is installed and working and, therefore, is well worth the $536.00. This deal should be made directly with Mr. Perkins at Boston Filter, but, we should tell Raytheon immediately what we plan to do.

cc: Harlan Anderson
Stan Olsen

dec INTEROFFICE MEMORANDUM

DATE 11 January 1962

SUBJECT Test Programs for JPL Computer

TO Mr. H. Anderson FROM Mr. N. Mazzarese

Test programs presently in use on the checkout floor have not been compiled in any standard list. The following list of programs has been obtained from Steve Lambert.

This first group of programs is available in Permanent Memorandum form.

1. Complementing Checkerboard Program (M-1068)
2. Punch Test Program (M-1100)
3. Checkerboard Program for 1024 and 4096 Word Memories (M-1120)
4. Memory Addressing Test Program (M-1121)
5. Read Binary Reader (M-1123)
6. Combined Reader and Punch Test (M-1124)
7. Multiply Step and Divide Step Test Program (M-1125)
8. Instruction Test Program (M-1127 and M-1130)
   This program has several errors in it.

The second group of programs which has been prepared is not yet available in written form. These programs are extremely useful in checking out the computer.

1. Magnetic Tape Test - ST
2. Random Multiply and Divide - ST
3. Typewriter Test

dec INTEROFFICE MEMORANDUM

File

DATE January 10, 1962

SUBJECT Supplies purchased from Bolt Beranek and Newman Inc.

TO Harlan Anderson

FROM Ed Fredkin
Roland Silver

In order to allow a smooth transition of work on the DECAL project, certain supplies were purchased from Bolt Beranek and Newman by Roland Silver and Edward Fredkin with the understanding that Digital Equipment Corporation would repurchase them from us. The following is an itemized list of the supplies we purchased from BBN and the amount we paid for these supplies.

Fan Fold Tape Folders	50	@	$ .01	$ .50
Wooden Accopress Crate	1	@	2.00	2.00
Wooden Tape Folder Box	2	@	2.00	4.00
2 Drawer File for Tape Folders	2	@	17.50	35.00
Black notebooks for listing	4	@	4.95	19.80
Boxes of Fan Fold Tapes	3	@	.50	1.50
Typewriter Ribbons	2	@	2.08	4.16
Quadrille Pads	6	@	.38	2.28
Computation Notebooks	6	@	1.60	9.60
				$78.84

All of the above items are now in active use at DEC with the exception of the fan fold tape and the typewriter ribbons. These were requisitioned from BBN in order to meet a crisis at the Air Force Operations Applications Laboratory while we were using their PDP-1 computer.

dec INTEROFFICE MEMORANDUM

ITT File

DATE January 9, 1962

SUBJECT Meeting at Digital Equip. with Mr. Robert Lane on January 8, 1962.

FROM N. Mazzarese

TO

K. Olsen
H. Anderson
S. Olsen
G. Bell
B. Gurley

Mr. Robert Lane of ITT visited us yesterday. A brief agenda of the meeting follows:

1. ADX 0 through 5 configuration schedule, (unresolved).

2. Cancellation I.L.U. and O.L.U. for ADX 2 and ADX 3, (unresolved)

3. Tape unit interconnection, (resolved).

4. Spare parts inventory for ADX 0 through 5, (resolved).

5. Firm quote from us on 50 cycle power and 4th high-speed channel, (unresolved).

Comments:

Mr. Lane indicated that ITT wished to cancel the line units for ADX 2 and ADX 3. His reasons were that A.C. and R. requires a 7.50 unit line code; also they do not require delivery on their system until 1963.

Due to their customer's uncertainty in the input-output area, they felt that it would be wiser to specify these units in about six months. As an alternate proposal, Bob Lane suggested the following:

1. ADX 1 - no change

2. ADX 2 - cancel and use units on ADX 4, (8 sets), and possibly reorder in six months.

3. ADX 3 - cancel entirely (4 sets), and possibly reorder in six months.

4. ADX 5 - (3 I.L.U., 1 O.L.U., with O.L.U. using 7.50 unit line code) to be investigated by us.

I propose we hold a meeting shortly to determine if this proposal is satisfactory.

It is also imperative that we have a meeting to discuss firm prices for 50 cycle power and 4th high-speed channel. This information has been promised to ITT by next Tuesday; therefore, both of these meetings will, of necessity, have to be held this week.

dec INTEROFFICE MEMORANDUM

DATE January 9, 1962

SUBJECT Anelex Printers

TO Harlan Anderson FROM Arthur Hall

Re your request of this afternoon:

Anelex is sending us, on a RUSH basis, six copies of their drawings of all their standard characters. We have here an index giving a description (but not a representation) of all their characters if you need it for reference.

I got from IBM a description of the Fortran characters and the punched card holes they represent. The only character not found on a standard typewriter is a lozenge ⌑ . All these characters are standard with Anelex.

Any change in the print roll from the DEC configuration (Printer #2) will cost $1,550 (plus $30 per character for any non-standard character) regardless of the extent of the change. This is in addition to the price of the printer and does not affect the quantity discount on our order.

Separate print rolls may be ordered for $1,290 and installed in the field in 4-5 hours under ideal conditions. If the separate print roll is different in any respect from previously ordered rolls, the charge is $1,290 plus $1,550 plus $30 per new character.

I will distribute the Anelex character sets when they come.

Arthur Hall

cc: Ken Olsen
Anelex File

INTEROFFICE MEMORANDUM

File

DATE January 9th, 1962

SUBJECT

TO Harlan Anderson
Gordon Bell
Ben Gurley
Stan Olsen
Corning Glass File
Foxboro File

FROM Kenneth H. Olsen

On Thursday, January 4th, we had a visit from Dr. Eckman from Case Institute who is making a study for Corning Glass. Ben Gurley, Stan Olsen and myself had lunch with him and spent quite a bit of time listening to his ideas. Corning Glass has an immediate problem on which he is consulting, but, he claims that the same problem exists in several thousand other plants in the country and, therefore, it is a very large potential market.

The chemical operations are now controlled by units sold by Foxboro or Minneapolis Honeywell which are set up in simple and individual control loops. They consist of a transducer which puts out a standard signal of about 10 milliamps and about 10 volts. This is followed with about $600.00 to $900.00 worth of analog computing equipment which, in turn, drive a valve or other control device. A small process system will contain 200 of these units and a large will have several thousand. The system he is working on for Corning Glass is a small trial system and will contain only 40.

His idea is to try and share one fast computing element with a large switch on the input and a large switch on the output. A digitally controlled valve is now available and made by Conoflow Corp. in Philadelphia for which he is also a consultant.

The system which he would like to make a feasibility and price study on would have 200 inputs. Most of the potential customers have specified static switching. The A to D converter would have 8 bits plus sign. The computing element would have to store the results of the previous calculation and a constant for each of the two hundred points. The output would be 3 bits which will be converted into a frequency code, the maximum frequency being 150 pulses per second.

For some reason, he proposes converting the 3 bits into pulse modulation then going through a 200 position output switch and storing the rate in 200 output registers. The obvious suggestion is to make the whole thing run fast enough so that the computing device will put out every pulse which is necessary. They now sample at 200 points per second, but, if they multiply that by 150, they would not have to have any storage at the output.

The Conoflow valve consists of a stepping motor like the one made by Superior Electric and a gear drive and a valve. The output of their code converter puts out pulses which are positive or negative and one volt and amplitude. An amplifier converts these into 35 volt 1 ampere pulses to drive a stepping motor.

He would like some nonlinearity in this system, so that when the system is way off it is driven hard and when it is approaching the null point there is low drive. He feels he can do this by the device which he decodes the output binary numbers.

The Corning Glass project which he is now working on will have two algorithms $\dot{m}=k_1\dot{e}$ for e > than 10 and $\dot{m}=k_2\dot{e}$ for e less than 10. One can either use a differential equation or an integral equation although the present techniques use integration.

He feels that this also has large usage in flowblending where one has only 2 to 20 inputs and outputs. Quality control is a whole area which is hardly touched now and he feels that most of this can be readily applied to this technique. Pipeline control is also a very valuable operation which can be controlled with these techniques.

The information which he wants from us is as follows:

a. Estimate on a switch which will switch 40 inputs with 1-5 ma, 10k signals at a rate of 200 points per second and expandable to 200 points.

b. An A to D converter which will convert these signals to 8 bits serial binary plus sign in 100 microseconds.

c. Non-mechanical storage for 200 to 800 words.

d. Modules for performing the calculation.

e. A code converter to change 3 bits binary plus sign to 0 to 150 pulses per second 1 volt signals.

f. He didn't mention it, but I suppose he also needs an output switch.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE January 8th, 1962

SUBJECT

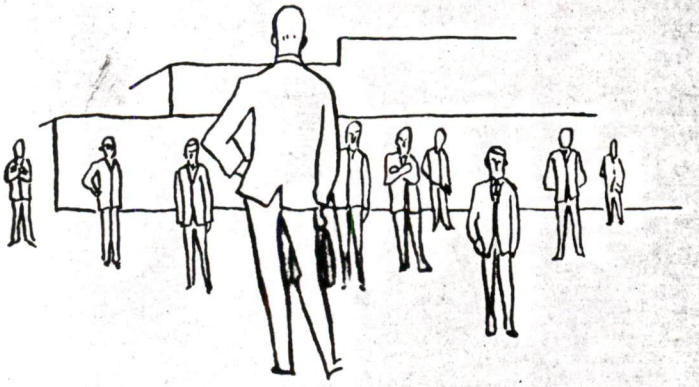
TO Harlan Anderson
Stan Olsen
Dick Mills
Ben Gurley
Maynard Sandler
Dick Best
Gordon Bell
Bob Savell
Jack Brown
Jon Fadiman

FROM Kenneth H. Olsen

I feel that it is important for each of us to develop our abilities to manage. This short course on management being given by the IRE group on Engineering Management looks like it is covering many of the subjects which we should be interested in. If any of our people can go, the company will be very happy to pay the fee. The fee is less if one belongs to PGEM and I would suggest that someone join in order to save the difference. I believe the difference is approximately the same cost as joining if you are already an IRE member.

Kenneth H. Olsen

PGEM WINTER PROGRAM



"The Job of The Manager"

A short course in Management for **Engineers**

CONSULTANT & PROGRAM DIRECTOR

PROFESSOR VAN DYKE BURHANS

Boston University

6 **INTEGRATED LECTURES** **6**

DISCUSSION AND CASE STUDIES

An opportunity to develop a basic approach to engineering management, as well as an opportunity for an interchange of ideas with technical management representatives from a variety of industries, will be provided this year by the Boston Chapter of the Professional Group on Engineering Management. The topic for this series is "A Short Course in Management for Engineers". Starting January 9 and continuing for six consecutive Tuesday evenings through February 23, the course will be given by professional, acknowledged leaders in business management training. It is the first of such courses which we propose to offer annually on different topics. Anticipating a favorable reaction to the first course, plans have already been started for two subsequent series. The course is designed primarily for technical people who now find themselves in a position of managerial responsibility or aspire to such a position. The course will be of benefit to those who have not had formal training in management techniques and a welcomed refresher for others.

The six sessions are listed below:

JAN. 9 THE PLANNING FUNCTION IN MANAGEMENT

Determining objectives and goals; managing by objective

16 ORGANIZING YOUR JOB IN MANAGEMENT

Delegations, priorities, principles of organization

23 THE PROCESS OF DECISION-MAKING IN MANAGEMENT

Human aspects of decision-making; organizing for decisions

30 WORKING THROUGH OTHERS

Motivation, incentives, creativity, communications, developing others; working with supervisors and subordinates

FEB. 6 METHODS OF APPRAISAL AND CONTROL

The control functions; measuring performance, costs and budgets

13 THE CONTRIBUTIONS OF VALUE ENGINEERING TO MANAGEMENT

Analysis of design, procurement, manufacturing and marketing

Lecture outlines and supplementary material will be provided for all registrants

A word about membership. If you plan to take advantage of this engineering management course and would like to become a new member of PGEM, a total fee of $8 will cover both membership fee and the cost of this course.

FOR MEETING DETAILS & REGISTRATION FORMS SEE CENTER SECTION

dec INTEROFFICE MEMORANDUM

File

DATE January 8th, 1962

SUBJECT

TO Jack Atwood

FROM Kenneth H. Olsen

The American Research and Development Corp. annual meeting will be held Thursday, March 8th at 2:00 p.m. at Dorothy Quincy's suite. There will also be a private showing of the exhibits and a dinner for the senior officers of the portfolio companies on Wednesday, March 7th in the evening, and so we should be all set up by that time.

cc: Harlan Anderson

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE January 5, 1962

SUBJECT Letter of Technical Specifications to BBN on Memory Module, Modifications, CRT Display, and Time Sharing Program

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

FROM R. Mills

Bill Pickett called this morning while Stan and I were at Foxboro and talked to Lucy White in what I gathered was an attitude of annoyance and frustration at DEC since he feels he is getting "the old run-around." He asked Lucy to jot down the following list of considerations which he feels must be replied to before he can issue purchase orders to us:

A. 1. Memory Module Type 12 - Ref: F-15B
2. Memory Field Control Type 15 (new) - Ref: Permanent Memo M-1138
3. Tape Transport Type 50 - Ref: F-15B
4. Program Tape Control Type 51
5. Automatic Multiply and Divide Type 10
6. Magnetic Drum System - Ref: Permanent Memo M-1102-A

B. 1. Modification: Typewriter - off line - Ref: PN-100A (off parity - hole 8)
2. Typewriter placement of keys - modification: ( ) location standardized
3. Spare panel input-output. Internal wiring; start, stop, start in sequence break, continue. (Parallel wiring)
4. Light Pen Type 32 - modification of switch on exterior. Check status instruction on PDP.

C. 1. CRT Display - Scope does not meet specifications. Would like this changed.

D. 1. Time sharing program - to be worked out by J. McCarty and Ben Gurley.

His closing statement was a request for a "definite line of communication" to resolve this situation.

In order to clarify this conversation, I called him back this afternoon and discovered that his primary annoyance is concerned with a lack of a central clearing house for all information for BBN from DEC. If my memory serves me correctly, this question was resolved at the meeting with Stratton and Pickett at DEC, and it was decided that Andy would be the clearing house for all communications with BBN. He mentioned the CRT Display by saying that he felt this is the one item he would have to come out to DEC to talk to us about.

# # #

INTEROFFICE MEMORANDUM

9

DATE January 5th, 1962

SUBJECT

TO Stan Olsen
Nick Mazzarese
Harlan Anderson
Beckman Systems folder

FROM Kenneth H. Olsen

I received a telephone call from Ted Novis of Beckman Systems about 4:30 p.m. on Thursday, January 4th. He had a list of 4 items that we were late on, or were about to be late on, and he wanted to know the status of these. I promised him that we would send him a wire first thing Friday morning telling him the status of these things.

1. We owe them a progress report on December 1, which we never mailed. Andy promised that on December 29th we would send this and he had not received it yet and we have to tell them the status of it. This is to be a copy of the production schedule and a progress report.

2. December 19th, they sent a letter to Andy which he passed on to Ben Gurley on quality control questions. He would like to know when they will get the answer to this.

3. We promised to send them a color rendering of the special painted PDP last Friday and the color rendering of the standard computer on January 3rd. He would like to know when he will receive these.

4. He would like to know when we will send them the formal acceptance on their purchase order and change notice.

Kenneth H. Olsen

Dick sent telegram 1/5

dec INTEROFFICE MEMORANDUM

DATE January 5, 1962

SUBJECT Japanese Business

TO Ken Olsen
Harlan Anderson ✓
Stan Olsen
Jon Fadiman

FROM R. Mills

This morning Stan and I went down to the Foxboro Company to see Charles Schwarzler, Vice-President - Marketing, in order to obtain some first hand information about doing business with the Japanese. Charlie has had nine trips to Japan and served on a Presidential Commission with six other members to study United States Business in Japan. He is a man well versed in international matters and his interest is deep enough to encompass not only the traditional concepts but the economic and cultural aspects as well. We spent most of the morning with him and following is a summation of the result:

People:

General

The Japanese people like to live by rules and like to have everything defined specifically. Their first agreement had several areas which were left purposely general and the Japanese did not rest until these general areas were made very specific. If the government tells a business that they should do a certain thing, this thing is done unquestionably with the government obviously the supreme voice. He had found them easy to do business with and much easier than Europeans. His comment about the British is worth noting - once an agreement is written with the British, they then go off and try to find some way in which they can do the absolute minimum thing to come within the meaning of the contract, on the otherhand, the Japanese accept the agreement at face value, meaning the tenor, and until a specific statement is changed by an agreement, they will not try to circumvent it. Charlie attributes this to their love of rules and the fact that the Ministry of International Trade is an absolute power in Japan and governs everything that goes into a contract. The impression he left with us was, that the Ministry of International Trade is trying at all times to foster fair agreements and to create a good image of Japan.

Social:

1. Laughter:

Loud Loud laughter is disliked very much by the Japanese. Women do not count for very much in Japan and hence they are allowed to laugh and giggle at all times, with no apparent affect.

(social continued)

2. Seating:

It is especially important for an American to watch this since he is supposed to sit in a very strict protocol code.

3. Parties:

It is very poor taste for an American to refuse to go to a party or out for an evening with the Japanese since all entertainment expenses are fully deductible in Japan this may very well prohibit several Japanese from enjoying themselves at the expense of the company and Government and the guest is merely the vehicle of accomplishing this. Charlie emphasized that this would be a very serious affront. The saving grace here is, that the parties always have Geisha girls who are nothing more than hired entertainment and go home at ten o,clock with the party being over very shortly thereafter, usually within fifteen minutes, so that it is quite easy to get to bed by eleven or twelve o,clock of an evening.

4. Conferences:

If a group in a room are enjoying a joke, and all Japanese enjoy humor on about the eighth grade level, and another man comes into the room, all enjoyment stops, the conversation goes back to the very beginning to build up the entire story so that the man joining the group does not feel that he was the source of the enjoyment. It sounds extremely sensitive, but apparently very important.

5. Traveling:

Air travel recommended and only by Japanese Airlines as they give the shortest route and the best service. Always arrive at the destination, in this case Tokyo, in the afternoon or early evening as you will be met by the Japanese and expected to go on to business discussions at a time when you would be quite tired from traveling. Their habit is to have an itinerary all laid out and only after close association may the American make a recommendation that the itinerary be changed. He recommends taking approximately $800.00 in cash with a letter of credit through a Tokyo bank for $2000. available. The Imperial Hotel is highly recommended as it has two sections, one old and one new. He prefers the old, and it is centrally located. Do not rent a car as taxis are cheap, a ride costing 70,80, or 90 yen being scaled according to the size of the car. Do not drink water or eat uncooked greens as these are sources of bacteria problems. At all times eat what is offered and he recommends a person having a "strong stomach", as you are apt to be eating grasshoppers and many other so called exotic items. He recommends a one day stay-over in Honolulu for rest with a few days on the beach.

Passport and Visa: He recommends that a passport be obtained and a Business Multiple Entry Visa, so that you can go in and go out with no trouble for two years.

Business:

1. Trading Companies:

He says that even now he has great difficulty and sometimes absolutely cannot palce in perspective the function of the Trading Company. These are sometimes owned by the company you are doing business with or business is funneled to the Trading company through one of the members of the Trading company sitting on the Board of Directors of the customer. They serve a useful function in many instances such as translating services, which he states are almost impossible to obtain in the Boston area, since the language is so difficult and the possibility of finding a technically minded Japanese is next to impossible. They also provide translators to accompany the American on his rounds of Japanese companies, this is a must and here it is important to note that the translitor is usually seated way at the end of the table from the American and about the only way Charlie has been able to get the translator near him is to say that he is hard of hearing and upon that they let him move closer. He states here that their courtesy, which is a tradition, means nothing to them analogous to kicking someone in the shin as you walk by and then saying excuse me and then when you get half way along say to yourself, " Oh, I kicked that man in the shins ". A sort of inbred reflex with little serious meaning.

2. Ministry of International Trade:

Nothing will be accomplished by the American company until they have a working relationship with the Ministry of International Trade. A relationship is developed only upon a call from the Japanese company that they are interested in the American company. Since they regulate everything that goes into an agreement this seems quite basic.

3. Prices of Products:

They have an agreement with the Japanese that the prices of their products will be FOB Foxboro and this is the one point that they allow considerable latitude to the Japanese since the obvious inference here was that the Japanese charge higher prices than Foxboro and they let them get away with it. How much higher, he didn't say. His justification for this was that they are required to maintain inventories and service the equipment.

4. Market Potential:

They estimated that they would have a $1,000,000. market in Japan and underestimated it by a factor of 5, he felt that this was rather traditional and should be kept in mind when making out the contract or agreement, since they would have written theirs quite differently if they had known that they were going to do so much business. I have some direct knowledge of this, since the Japanese upon seeing that the volume was going to be over a million, started agitating for a lower royalty payment. A scale of payments would have handled this quite well.

5. Technical Skill:

One of the biggest mistakes that American companies make is underestimating the technical skill of the Japanese. He feels that the Japanese are far more thorough with their investigations of possible ways of building, checking, and operating equipment, including use of different materials, than we are. The Japanese have constantly embarrassed Foxboro engineers with their very thorough analysis of Foxboro products with their (the Japanese) ending up knowing more about Foxboro equipment, than Foxboro engineers. He feels that they could copy and improve any piece of equipment mechanical or electrical.

6. Patents:

If a piece of American equipment is patented in Japan the Japanese will not copy it! Patents are very easy to obtain and the Japanese feel that since they make it so easy to obtain patents, if an American company does not do it, that American company is not interested in having an exclusive.

Proposed Prodedure for DEC:

1. Who to go?

That Stan Olsen obtain a Passport and Visa immediately for a departure date of approximately the 19th of January.

2. Length of Trip:

Leave U.S. approximately January 19th, for arrival in Tokyo on the 18th with no stop-over in Honolulu on the way over, but with a stop on the way back to rest. This will give the 19th and a half day Saturday, all plants are open on Saturday, through the 26th, arriving back at DEC on the 29th or 30th of January. Jon Fadiman to go to Japan February 10th, to make the rounds of prospective customers on a technical basis for one week; to arrive back at DEC on the 19th of February.

3. Financial Arrangements:

Let each man take $800.00 in cash and we arrange with the National Shawmut Bank of Boston, whose correspondent in Tokyo is the Bank of Tokyo, a letter of credit for each man in the amount of $2000.00.

4. Prospective Customers:

I have been able to obtain from the Department of Commerce in Boston, the full Japanese addresses of the following companies:

Hitachi Ltd.
Central Research Laboratory
Tozuka Electronics Plant

(Hitachi Ltd. cont.)

New Marunouchi Bldg.
12 Marunouchi 2 - Chome
Chiyoda - Ku, Tokyo, Japan

Mitsubishi Electric Mfg. Co. (TV & radio)
3-2 Marunouchi, Chiyoda - Ku
Tokyo, Japan

Fuji Communication Apparatus Mfg. Co.
3-2 Marunouchi, Chiyoda - Ku
Tokyo, Japan

Tokyo Shiboura Electric Co. Ltd.
2 Ginza Higashi 5-Chome Chuo-Ku
Tokyo, Japan

Tokyo, Denki, Kagakii Electronics (Mfrs. of Mag. cores)
123 Kanda Naka Machi Chi yoda - Ku
Tokyo, Japan

Tohoku Metal Industries Co. Ltd. (Mfrs. cores.)
10 Suwa Wakiminami, Koriyama
Sendai - (Miyagi, Japan)

5. Department of Commerce at U.S. Consulate, Tokyo:

It was recommended that we first spend 3 or 4 days at the Department of Commerce in Tokyo and gave us the name of the man he worked through, Mr. Oliver Bongard, who is in charge of trade development in Japan. He gave them an extremely high recommendation. He recommended that we arrange our itineraries with Japanese companies after we arrive in Japan and simply mention in our letters to our prospective customers, that our representative was going to be in Japan and would be in contact with them to determine their interest in our products. He did not recommend that we send a copy of this letter to a Trading Co. since they are quite agressive and would take over the trip and slow down the process substantially.

Summary

It is extremely important that the man going to Japan be on a high level in the Company and that his authority be made explicit and extremely clear to the Japanese, in order that they will honor his commitments. He cited his own case of going to Japan himself, and the next person that went was the Executive Vice President, they accepted him and did not accept Charlie after that; the next person that went was Ben Bristol, the President, they accepted him and did not accept Rex Bristol or Charlie Schwarzler after that. It was necessary that letters be written to explain in clear concise terms the express authority of each one of these people to negotiate, before the Japanese would do anything

further. The pattern evolving from all this, seems quite clear, in that the Japanese appreciate straight forward bargaining, honor agreements and contracts primarily because of the Ministry of Trade's regulations, like to live by rules with everything spelled out quite clearly, will not copy if the item is patented, have a high degree of technical skill, have a growing economy and if notified bdforehand of the schedule of the American, they will not be offended if you get up and leave a conference at a given time. They do not like to have their plans upset due to a strong sense of orderliness and above all do any negotiating in a 1,2,3, basis like you would for an eight year old.

National Shawmut Bank of Boston:

I contacted Linc Barber at the Shawmut before going down to Foxboro, and find that the use of the Irrevocable Letter of Credit, since the amount is charged to the Japanese customers account before the letter is issued, is the usual way of doing business and would not in any way create any bad feeling on the part of the Japanese. He also said that transfers of funds between DEC and Tikyo could be made in a matter of two or three hours. Their correspondent bank is the Bank of Tokyo and most of their Japanese experience has been of a mechanical transfer of funds nature and not of a bargaining or negotiating type.

# # # #

INTEROFFICE MEMORANDUM

DATE Jan. 4, 1962

SUBJECT Salaried personnel vrs. hourly personnel insurance wise

TO ✓Stan Olsen
Maynard Sandler
Dick Mills

FROM Barbara Charnock

We have several employees who fall into a "Limbo" type category in relation to salaried personnel versus hourly personnel; re their insurance benefits.

The income and insurance structure is as follows:

HOURLY

Less than $100.00 per week
$5,000.00 Life Insurance
47.00 Weekly Disability

SALARIED

Less than $100.00 per week
$5,000.00 Life Insurance
* 50.00 Weekly Disability
*Plus 5,000.00 Supplemental Life Ins.

HOURLY

More than $100.00 per week
$5,000.00 Life Insurance
60.00 Weekly Disability

SALARIED

More than $100.00 per week
* $7,500.00 Life Insurance
60.00 Weekly Disability
*Plus 7,500.00 Supplemental Life Ins.