June 27, 1960

MEMORY SYSTEMS

Kenneth H. Olsen Jonathan Fadiman

1. SYSTEMS NEARLY COMPLETED

   A. Memory Tester 1515 for TMI. Due to be delivered July 8, 1960. Price - $50,000.

   B. Memory Tester 1512C for Datamatic. Due to be delivered June 29, 1960. Price - $35,000.

2. SYSTEMS UNDER CONSTRUCTION

   A. Automatic Core Tester 2102C for TMI. Due to be delivered August 1, 1960. Price - $18,000.

   B. Memory Tester 1512D for General Ceramics. Due to be delivered about September 1, 1960. Price - $35,500.

3. SYSTEMS UNDER CONSIDERATION BUT NOT YET STARTED

   A. Memory Exerciser 2202 for TMI. Promised delivery four months from receipt of order. Price - $45,000. Probability of receiving order - 100%. There are some changes on original specification and proposal and I have to go over these to see how they will effect the price, and resubmit a proposal.

   B. Memory Exerciser 2203 for IBM. This will be an eight bit exerciser with a considerable amount of flexibility and considerably different from the 2201. Required Delivery September 1, 1960. Price - approximately $20,000. I have to make a firm proposal on this and go over the new specifications carefully. Probability of receiving order - 90%.

   C. Automatic Core Tester for IBM. This will be considerably different from the 2102 in order to conform to IBM specifications. Probability of receiving order about 60%. Price - in the neighborhood of $20,000. I have to go over the specifications and changes and make a proposal to IBM.

   D. Automatic Core Tester for General Ceramics. This will be quite similar to our 2102 with some modifications. Price - in the neighborhood of $20,000. Probability of receiving order - 90%. I have to go over the specifications for this Core Tester with Wally Weeton and make a formal proposal.

   E. Core Evaluator 2104 for Electrodata Division of Burroughs Corporation. Price - $11,125. Delivery date 60 days from receipt of order. Probability of receiving order - 100%. The logic for this has already been worked out by Dick Best.

F. Coincident Current Word Address Memory similar to MT-1515 for Electrodata Division of Burroughs Corporation. Price - $40,000 to $50,000 depending on exact specifications. Proposal is being submitted and the specifications gone over by Wally Weeton. Probability of receiving order approximately 80%.

cc: Harlan Anderson
Richard Best
Walter Weeton

INTEROFFICE MEMORANDUM

DATE June 23, 1960

SUBJECT PROPOSED SECURITY PROCEDURES

TO H. E. ANDERSON FROM BOB DILL

Re: Drafting

At present a copy of each existing drawing has been made and is stored at Stan Olsen's home. As changes are made, a copy of the new drawing is made on the blue print machine and given to Stan to be filed. In this manner a copy of every drawing up to date is maintained outside the company site. If a storage problem starts to exist at Stan's home, the drawings can be microfilmed semi-annually and the drawings destroyed and a microfilm can be retained in the company safe deposit box.

Re: Silk Screening

As a new negative is made up, it is given to Jim Myers who is maintaining an up-to-date file. This file should also be maintained at Stan's home to insure an up-to-date source outside the company site.

Re: Quality Control

Test specifications are subject to the same obsolescence as drawings; therefore, I think a duplicate of all test specs should be made and as changes are made, a copy of the new specs be given to Stan to maintain.

Re: Acct: Purchasing: General Office:

These records should probably be microfilmed semi-annually. The months of January and July seen to be the most convenient after talking with various department heads.

RE: Engineering:

Correspondence that is outgoing should be microfilmed as well as the notebooks which the various engineers maintain.

Re: Advertising:

Jack thought that a copy of all literature should be made, also advertising job tickets which have valuable pricing and distribution information. The mailing list has a copy maintained outside the company site.

RE: Personnel:

A list of current employees and the insurance records of the individuals should be microfilmed semi-annually.

Re: Executive Records:

Do you and Ken have any records that should be microfilmed?

June 2, 1960

Ben Gurley

Harlan Anderson

I have scheduled you to go to Cleveland to lecture at Case Institute on June 13, 1960. A reservation has been made for you at Wade Park Manor for the previous night (June 12).

HEA

ep

INTEROFFICE MEMORANDUM

DATE June 1, 1960

SUBJECT Analog to Digital Converter

TO Jack Brown/Ken Olsen FROM Harlan Anderson

Dick Foulke of Eltron called today to say that he knew of several possible analog to digital converter things that maybe we should look into further. The first of these is at RCA in Natick connected with their new process control work, and the other is at Baird Atomic where I believe we've already been active. Both of these places are apparently interested in the Packard Bell converter where the M-3 model sells for about $4,500 and the M-2 model sells for about $9,000. I told Dick of our building block items that might be pertinent, but this will take some more investigation than just that. The RCA one sounds particularly good, and like something we ought to check into further. Dick Foulke will call Jack Brown either Wednesday afternoon late or Thursday morning.

HEA

# # #

ep

dec MEMO

DATE 5-24 60

TO Ben Gurley; Harlan Anderson

FROM Ted Johnson

Attachment (see para.H) will follow under separate cover.

INTEROFFICE MEMORANDUM

DATE 24 May 1960

SUBJECT

TO Ben Gurley; H. Anderson FROM Ted Johnson

A) What are plans on CRT?

1. Camera (describe)
2. ~~Avid lines~~ Grid Lines
3. Price
4. Display rate and pertinent criteria

B) What is name of Ed (?) at B,B, and N. Also, can I recommend people to him? When is PDP-1 to be installed.

C) Lear and Aerojet have recommended PDP-1 and PDP-3 as "best available for price" to management.

D) What can we offer as available routines for transforming, say, 704 programs, 7090, etc. Big selling point if we can convert some of more common languages to be handled by our computer. (See Philco S2000 sales feature).

E) Please describe in a memo our plans for programs, maintenance, and the status of compiler and SAAP. Will treat as noted.

F) Dr. Sid Fernback has really developed interest in PDP-1 since the Livermore meeting. Has asked group (our customers) to look over the facts and write up an evaluation. Like CRT, Printer Output and Mag Tape.

G) Looking into leasing agencies here. Lockheed MSD very interested but cannot buy.

H) Lear has slow op. (described on attachment) - testing highly precise gyroscope. Sales features:
CRT
Additional processing available

I) General comment at Aerojet -- how can we do it for the money? Right now need to help customer's sales case by saying what help we can give on easing programming problems.

J) What is involved in adding memory to a 1000 wd. unit? Replace or need extra field switch to go to extra equipment?

K) Why does CRT cost what it does?

L) Delivery on PDP-3. Limitations (fin. of final system desired -- how?).

M) Not clear on Punch plans, prices, etc.

N) What is argument for assigning so many Index Registers

O) Still haven't received copies of PDP programs.

INTEROFFICE MEMORANDUM

DATE May 24, 1960

SUBJECT Memory Test Literature

TO Jack Atwood
Harlan Anderson
Jon Fadiman
Wally Weeton
Lou Yeager

FROM Ken Olsen

We are developing an impressive collection of literature on our memory test units. I propose that we make a brochure on our memory exerciser which should probably be four pages and in color like the other ones we have. In addition, we should have a two-page in color on the RCA or the TMI linear selection memory tester. We might even have a one-page brochure on the tester for CBS.

Then we should print covers and spiral bind all our memory test literature together and send it to all potential customers for these units. Another approach would be to take the sheets we have and print inside the cover paragraphs on the special units we make. They could be long paragraphs with good-size pictures.

I should think that for most of these sheets that there is almost enough information available for Lou to take over the whole project.

KHO

# # #

EP

digital equipment corporation
MAYNARD, MASSACHUSETTS

dec MEMO

File

DATE May 24, 1960

TO Harlan Anderson FROM Eleanor

I just got a call from Mr. Kenison at the telephone company re having a "prestige" phone number. He says that this is an impossibility with the type of equipment that is in the Maynard exchange. This is not the same type of equipment as for example in the Boston area. There can be no "000" numbers. The first number in any sequence must be "1" as is in our present number.

In regard to having 10 lines in sequence, the price is $7.15 for the first line, and $3.95 for each additional line.

# # #

May 20, 1960

Planning Research Corporation

Ted Johnson

Harlan E. Anderson

During the WJCC, Howard Metcalfe of Planning Research Corporation talked with me quite a while about our PDP, and I wasn't sure that I had passed him name on to you. Their office is at 1333 Westwood Boulevard, Los Angeles 24, California, and their telephone number is GRanite 9-7725. Metcalfe said the man to see at their company is Burton Whipple. He apparently reports to a vice president named Steward Krieger. Sounds like it would be worthwhile dropping over to see these people sometime in the future.

# #

HEA:ecp

INTEROFFICE MEMORANDUM

DATE May 9, 1960

SUBJECT Sales Manual

TO Jack Brown

FROM Ken Olsen

We should develop a sales manual that explains the operations and policies of the Sales Department. This sort of thing is a tremendous project if one sets about to do it all in one time, but if we keep a file folder and throw in notes periodically we can combine them into a complete manual later on. If we all dictate notes on sales policy as we think of them, you can file them until we have enough to start a manual. Here is my first contribution:

All letters inquiring about our products deserve a letter in return. It is quite rude to send back just literature when someone writes a letter to us. If we are ever too swamped to do this, I would like to know about it, and we will figure out a way to at least answer these letters. One obvious thing to do is have a group of stock letters which answer most inquiries. There should be one to people who send us a request to bid which tells them that we do not make that type product or we do not do that type of work. There should be another stock letter that goes along with our literature for those people who just request literature.

When we have some help or we have secretaries that have some free time, you can have them go back over some of our old letters and pick out choice paragraphs. At times we have written some good letters, and if we have a file of choice paragraphs we might be able to generate some sales letters rather easily. We might even make a stock letter booklet which lists all letters and paragraphs and instead of dictating letters each time we could call out paragraphs and letters.

I answer all inquiries about DEC stock on my personal stationery and sign it myself. I think this seems good to the people who request the information, but the only work involved on my part is to sign my name because the letters are stock.

Ken Olsen

cc: H. E. Anderson
J. H. Myers
S. C. Olsen

INTEROFFICE MEMORANDUM

DATE April 14, 1960

SUBJECT

TO Harlan Anderson/Stanley Olsen FROM Kenneth Olsen

Mr. George McTammany, in the Purchasing Department, of Foxboro visited our computer with several Foxboro engineers. They were very interested in our products and I offered to show them our plant and be very helpful even though I suspect they are mainly interested in our manufacturing techniques. After the Show I wrote them a letter telling them that we would like to be helpful and inviting them out here because we would like to get to know them better because in the future they will need digital equipment and we will need control devices. They would like to visit us April 21 between 9:30 and 10:00. I encourage this and told them we would just love to show them the place and show them how we do things. I'm not sure that they want to buy anything, they may just want to know how to do etched wiring; but it would be worth while getting to know them, I figure. Two men, Mr. Henry Milo of their Standard Engineering Department with about 100 people working for him will be here, and Mr. Vendenti of the Model Test and Methods Department who has about 40 people working on electrical and mechanical testing will be here. Mr. Wells the Purchasing Agent or George McTammany, one of his assistants will probably come along also. Their phone number is KIngswood 3-5311 or CApitol 7-0866. Mr. McTammany's extension is 2393.

They are working on a project which sounds like Electronic Consolable Control. This is thirteen instruments tied into one unit for process control. Honeywell is trying to do the same down at Fall River but apparently without success even though Foxboro has been doing it for two years.

Kenneth Olsen

April 28, 1960

Convair, San Diego

File

H.E. Anderson

Mr. Stanley Rogers of Convair, San Diego, telephoned two days ago indicating an interest in our PDP computer. Mr. Rogers is the gentlemen who bought some of our test equipment during the 1959 Eastern Joint Computer Conference. The machine he wants basically would be a 24 bit machine, 16,000 words of memory and expandable, cathode ray tube display, 4 tape units with a control unit. They expect to be placing an order within two weeks if they are able to get a go ahead. He mentioned that he had been deputized by the Purchasing Department to start negotiations with us pertaining to the computer.

Delivery is of the utmost importance to them and they are talking about 120 days after receipt of order for the main computer. On the tape units I pointed out that delivery of tape units from Ampex was not good enough to meet 120 days and we talked of 150 days for that part of it. I wasn't able to give any firm information about prices on the machine but it looked to me like it would be somewhere between $200,000 and $225,000 for the machine without tapes.

He indicated that we should go ahead and prepare a firm quotation addressed to Mr. E.L. Dierker, c/o Mr. Stanley Rogers, Mail Zone 7-08, Convair Division, P.O.B. 1950, San Diego 12, California.

We will plan to meet with Mr. Rogers during the Western Joint Computer Conference in San Francisco next week. I sent him new literature covering the machine several days ago.

HEA/l

MEMO

DATE April 13, 1960

TO Jon Fadiman FROM Harlan Anderson

Irv Wieselman, from Telemeter Magnetics, will be here at 10:00 A.M. on Friday, April 15.

cc: Ken Olsen

INTEROFFICE MEMORANDUM

DATE April 8, 1960

SUBJECT USNOTS

TO Ben Gurley

FROM Harlan Anderson

Lloyd Maudlin from the U. S. Naval Ordnance Test Station in Pasadena called this morning to say that they would like to have an opportunity to discuss with us some details of the circuits and the logic in our machine May 6 and 7 while we are in the Los Angeles area. He was also interested that we bring along some of the circuit diagrams. This request actually stems from the visit of McCool and Sullivan who came here during the week of the I.R.E. Show. They have had a most unpleasant experience with a computer that was for fire control purposes which was delivered by a manufacturer but failed to pass the evaluation test and had to be completely rebuilt and many of the circuits completely redesigned by McCool and Sullivan at the Navy station. In general, their visit here during March was quite satisfactory and this is the next step in the chain.

INTEROFFICE MEMORANDUM

DATE April 8, 1960

SUBJECT

TO Woods Hole Oceanographic Institute Sales File

FROM Harlan E. Anderson

I spent Thursday, March 17, visiting these people at Woods Hole discussing their needs for computer equipment. The key man involved there is Mr. Ray Stevens. Associated with him is Robert Brockhurst and Mrs. Harlow Farmer. They apparently have a computer there at the moment with which they are not completely satisfied. I am guessing that this is the Recomp computer. Their needs are many and varied and their interests are still somewhat preliminary in nature. They do not like the Friden typewriter nor the Soroban typewriter, for that matter. They think that the teletypewriter is far preferable. I don't know whether this is so much of a factor that they would not consider buying a computer unless it had a teletypewriter on it or not but they did keep coming back to that point many, many times. Nothing further to do there for the moment. Perhaps in a month or so we ought to contact them again to see how they stand.

Harlan E. Anderson

DEC INTEROFFICE MEMORANDUM

File

DATE April 8, 1960

SUBJECT Sales Trip

TO H. Anderson & Sales Department FROM Jonathan Fadiman

1. Installed Memory Tester Model 1512B at Philco Corporation, Willow Grove, Pennsylvania. Project Engineer there is Dan Newhall, and the person who works for him who had a great deal to do with the operation of the machine is named Jim Williams. Machine was operating successfully, and passed ten of their planes by noon of Monday, April 4. In order to purchase the machine, they will definitely want a Calibrated Sense Amplifier which will provide both a maximum and a minimum level for the one output as well as a maximum level for the zero output. Telephone number down there is OL 9-7700, Ext 480.

2. Philco Corporation, G & I Division, Laboratory D1, 4700 Wissahickon Avenue, Philadelphia, Pennsylvania. Tried to see Mr. Raymond H. Lazinski, but he was busy. Instead spoke with Mr. Jim Drake and Mr. Jim Williamson. Both of these work for Mr. Lazinski. Jim Drake, Ext. 8087. Jim Drake is preparing a bid for a large system now in which he plans to use EECO logic. I sketched out how we would do some of the work and our prices seemed just about the same as EECO. Jim Drake is very price conscious. He is interested in our decoders Model 4150 and Model 4151, and also in our Digital-to-Analog Decoders 1561, and possibly the bridges for driving this Model 4677. He would also be interested in our Intensity Amplifier Model 4676. He would like our logic pamphlets A400 and would also immediately like our spread on the 1000-4000 Series.

3. General Electric in Philco, Military Space Vehicle Division, 3198 Chestnut Street. The following people should immediately be placed on our mailing list. Mr. Gerry L. Conklin, Manager Data Processing Equipment Design; Mr. Henry J. Hayes, Data Processing Equipment Design; Mr. Fred Fanella, Manager Electronic Buying; Mr. Joe Hyde, Data Processing Equipment Design; Mr. John Ryskamp also Data Processing Equipment Design. I first spoke with Mr. Jack Troy who had been up here to visit us. We should also keep him on our mailing list and immediately send him our sheet on the 1000-4000 Series. He had a large scale system that he was preparing but decided to use NAVCOR logic. He said the reason for this is that they are a Philadelphia firm and that he personally much preferred our units. He put me in contact with the people that I just mentioned. I spoke with Mr. Ryskamp, who was the only one available. They definitely have applications for our units and seem to be favorably impressed with what I told them. They were interested in who in the Philadelphia area was using our equipment. I mentioned Remington Rand and Philco and I am sure there are others. Jack Brown, you might follow this up. Telephone number down there is Evergreen 2-7800 and Mr. Henry Hayes is on Ext. 876.

4. Remington Rand in Philadelphia. I talked with Mr. Richard Hill who is involved with memory testing and core testing. He has been associated with the LARK Project. A decision is being made now as to whether to produce cores at a 1 microsecond core memory or whether to go into some very fast new elements of 1/10th microsecond timing. If they decide to produce cores and a normal core memory, Mr. Hill is very definitely interested in our Automatic Core Tester and also later on the Plane Tester. Mr. Hill thought our Core Tester was very good, however, he wanted considerably better than 1 millivolt discrimination on the zero core output. He also required slightly different program. I have a copy of the core specs and the required program. I next talked with Mr. Fraunfelder. Note to Harlan Anderson: He wishes to return a Model 50 and Model 60 Driver and 2 749 supplies in exchange for some 10 megacycle flip-flops. I don't imagine that we can do this, but one of us better write a note to him to this effect. He is definitely going to order some more equipment. He has evidently asked for a quote on some blank test equipment units which we have not sent him so far. We ought to do this. This is up to Jim Myers I believe. I spoke also with Mr. Jim Murphy down there who is using a good deal of our equipment - Ext. 635. He has complained that guides are needed for our test equipment plug-in units and that we ought to reinforce the top of our test equipment racks so that it doesn't bend as easily. He also claims that the adjustment on the 302 and 401 is too coarse so it is too difficult to make a good setting. He also complained about the jitter on the 302 Delays. The general complaint from Dick Frick who is the test equipment maintenance repairman is that there is much greater upkeep time required on our units than should be necessary. There were several open on etched wiring, one in a Tube Pulser and there were two rotary switches on Clocks which were bad and had to be replaced. Evidently, though they like our equipment, our quality control has not been high enough for the units sent to Remington Rand. Several transistors were blown out, but I believe that was caused by the fact that they were driving two DC emitters from the output of a Flip-Flop. New literature ought to be sent immediately to Jim Murphy.

5. I visited Kurt Schkact down at General Ceramics in Keasbey, New Jersey. They have our Memory Tester MT-1511. In general, they are very happy with this contrary to what Chris Synder seems to have told Ken Olsen. They had a certain amount of problems getting the proper termination of the current waveforms, but they have solved this with variable termination panel. They have made their own voltage calibrator for the Sense Amplifier output, but would be very interested in our calibrated sense amplifier. They have also added the extra positions on the checkerboard pattern switch. Their main difficulty seems to have been switch plug-in units #1971 going bad. Six units have gone bad that they have repaired. In five cases, the 1N270 Diodes were open and in the sixth case, both the 1N270 Diodes and one of the switch transistors 2N670 was open. They also had one defective First Level Select circuit 1673 with a bad 2N438 transistor. Otherwise, they are very happy with our machine and the necessary modifications have been completed.

6. I then visited Weston Instruments at 614 Freylinghysen Avenue, Newark, New Jersey - Bigelow 3-4700. I talked there with Mr. John Nagey, Ext. 400. They are at present only interested in digital volt meters for accruately measuring voltages across resistances. However, in the future, they may be interested in systems for comparing the results from digital volt meters and automatically sorting resistors on this basis. Something similar to a Core Tester for resistors. We should send all our literature to Mr. Nagey immediately and he might be interested in our units in the future, not at the present time. Another contact there is a person by the name of Mr. Earl Adams. Evidently, they are getting a 650 Computer for doing some of their processing of the information from resistors. I telephoned the Bendix Corporation in Teterboro, New Jersey, and talked with Mr. E. C. Ashenberg. He didn't have very much to say and merely said that there was nothing he wished to discuss with me at the present time. I called Bell Labs. in Murray Hill and spoke with Mr. Bill Highleman. He would like further information and prices on our 10 megacycle building blocks and also on the 500 kc and 5 megacycle units. I also spoke with Mr. Mounts and he would also like further literature on our 10 megacycle building blocks. At the moment, they do not have any use for these, but expect to in the future. I went down to Bell Labs. in Whippany, and talked with Mr. Genke. He is quite happy with our circuitry and will be buying some more in the future. He immediately needs literature on the 3 Digit Parity Circuit 1130 and our new catalogs including the 1000-4000 Series catalog. Also, complete literature should be sent to Mr. J. A. Solewski 3B-217 Bell Labs., Whippany, New Jersey. Also spoke with Mr. Frank E. Demotte who is also using some of our equipment and seems quite happy with it. Literature should also be sent to him. I visited ITT Labs. in Nutley, and contacted Mr. Fred Starita at 492 River Road. He is interested in possible memory tester applications in the future and also in using our building blocks though he has no immediate application. We should send him our complete literature immediately. I stopped in at Kearfott Electronics in Clifton, New Jersey. The only interest there was from Mr. Khahijkera. We ought to put him on our mailing list and send him complete literature. No immediate interest, however. I stopped in and spoke with Mr. Carl F. Swenson at Star Parts Incorporated, 2 South Main Street, South Hackensack, New Jersey. He is interested in a comparison circuit for a six bit code to see if the word following a particular word is the same or different. They make automatic machinery for type setting. However, what he really wishes is a very cheap circuitry and for us to make up special cheap circuits on our plug-in units. I assume that we would not be particularly interested in this job. He would like a 100 or 200 identical units to sell for somewhere between $200 and $300 to do this job electronically,

INTEROFFICE MEMORANDUM

File

DATE April 7, 1960

SUBJECT

TO Harlan Anderson/Ben Gurley FROM Ken Olsen

Dr. James Petersen, a radiologist friend of mine, is going to bring out the instrumentation engineer from Mass. General x-ray department to see us next Friday at four o'clock. This fellow is giving lectures at Harvard and is out brushing up at Tracerlab on what equipment is available in our field. He is a Ph.D type from M.I.T. in electrical engineering. It would be nice if we had the ARC program set up so we could demonstrate it, preferably with somebody's head.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE April 7, 1960

SUBJECT Daystrom

TO Jon Fadiman

FROM Harlan Anderson

Jerry Smith called today and said that they are having trouble with the tester such that when they turn the mode switch, the tester starts indicating that an error has occurred. He would like us to fix this as soon as we can. Realistically, he will not be using the tester for about three weeks, but at that time it will be very important to have had this fixed, so could you take care of this. He also indicated that he had expected you to visit him last week and I told him I didn't know anything about that.

Harlan Anderson

INTEROFFICE MEMORANDUM

DATE April 6, 1960

SUBJECT

TO Ben Gurley

FROM H. E. Anderson

A fellow by the name of Jim Fitzgerald, of Lincoln Lab, Group 22, called today and they are looking for a cathode ray tube system to tie into their 7090 computer and wondered if we had anything for them. They probably want something like what was on 709 including a large scope for viewing and a small scope for camera work.

I told him that you would call and tell him more about what we are doing in this area. However, my own feeling is we should not waste much time on this since it would probably be stopped by Lincoln Lab Purchasing Department anyway since it is in the same category as the tape buffer unit that we talked about. Give him a call and invite him out and tell him what we are doing but other than that I wouldn't waste any time on it.

H. E. Anderson

INTEROFFICE MEMORANDUM

DATE April 4, 1960

SUBJECT

TO Jack Brown

FROM Harlan Anderson

Mr. Lawrence, from Johns Hopkins University, telephoned today and said that they were planning on combining three inquiries into one order. The first inquiry is #23636 with a total for the equipment of $28,079.00 plus shipping charges of $40.81. The second inquiry which will be included is #23825 with a total of $2,543.00 worth of equipment. On this inquiry they had asked for air freight shipping which we quoted at $15.74, however, he indicated they would like to have that quoted at motor freight rate which we agreed would be $1.50 based on shipping weight of 30 pounds and a rate of abour $4.00 per 100 pounds. The third order which will be included has no inquiry number but was quoted by us on February 29 by teletype. It was probably in response to a telephone inquiry from Mr. Buser. The total for this is $15,658.00. The shipping charges via motor freight are $7.42 per our teletype of February 29. This will entitle them to a 15 per cent discount.

Harlan Anderson

cc: Jim Myers

INTEROFFICE MEMORANDUM

DATE April 4, 1960

SUBJECT General Electric, Pittsfield

TO Jack Brown

FROM Harlan E. Anderson

Mr. Chuck Wales of the Ordnance Department of General Electric in Pittsfield telephoned today and said they were submitting a bid for a radio telescope in which a digital servo was going to be involved. He asked for literature and whether we would be interested in building a complete unit for them if they were to get this job. I replied affirmatively on both questions for now. A deadline for firming up the prices on this project would be April 15. This is going to be a one of a kind thing and in general they are working to meet the Air Force military specification 4158E, but he thought they could side step that for this part of the job. Mr. Wales is not in the computer part of their activity which would normally do this kind of thing. The computer group is way too busy to do this at the moment.

The technical aspects of this involve four distinct areas. The first of these involves reading from a Baldwin 18 bit shaft encoder in gray code and converting it into a binary code. The second part involves comparing this number with another number supplied by a separate computer and generating an analog voltage proportional to the difference of the two numbers. The third area involves a buffer register to hold the numbers supplied by the external computer. The fourth area involves a position indicator to tell the present position of the antenna. They would need two complete systems to do this, one for elevation and one for azimuth. Both working to an accuracy of .005 of a degree. The encoder should be read 10 to 20 times per second.

Harlan E. Anderson

INTEROFFICE MEMORANDUM

DATE April 1, 1960

SUBJECT Report on Memory Systems

TO K. Olsen

FROM Jonathan Fadiman

A. Systems under construction at the present time for which we already have purchase orders.

1. Philco Automatic Core Tester Model 2101. Status: Just about completed to be shipped April 11, approximately. Price: $17,300.
2. Automatic Core Tester Model 2102 for Telemeter Magnetics. Status: Most of the panels are completed. Logical block diagram is completed, wiring diagram being drawn up today and wiring of the mounting panels will start April 5. Lee Butterworth is taking care of this. Expected shipping date, May 1. Price: $17,800.
3. Coincident Current and Word Address Memory Tester Model 1514 for RCA. Status: Some panels completed, block diagram in the process of being drawn up by Wally Weeton and Bob Reed. Expected shipping date, May 15. Price: $52,000.

B. Orders that are sure but for which we have no purchase order as yet.

1. Automatic Core Tester for RCA in Needham, Model 2102. They expect to order on April 10, and request that we ship by May 9. Price: $17,800.
2. Memory Exercisor Model 2201. They expect to order on April 10, and request shipment on May 9. Price: $26,000.
3. CBS Laboratories Danvers. Had received proposal on a Logic Tester. Price: about $11,300. They will purchase soon.

C. Possible future orders.

1. Lockheed Automatic Core Tester 2101 or 2102. Price: $17,300 or $17,800. Very interested. Proposal has been sent.
2. Telemeter Magnetics Coincident Current and Word Address Memory Tester Model 1515. Very interested. Proposal has been sent. Price: $42,500 for 64 x 64 or $50,000 for 128 x 128. Will probably want 128 x 128.
3. Coincident Current Memory Tester Model 1512B for Datamatic. Price: $34,000. Very interested. Proposal has been sent.
4. Remington Rand in Philadelphia. Interested in a Memory Plane Tester Model 1512B. Price: $34,000. Interested in an Automatic Core Tester Model 2102. Price: $17,800. No proposals have been sent as yet. I will contact on April 5.

5. Sylvania Needham interested in a Model 1512B Memory Tester. No proposal as yet.
6. RCA Camden. Some interest in a Model 2201 Memory Exercisor. Wilbur Miller discussed this with Ken Olsen. No proposal as yet.
7. Electrodata Corporation has requested proposal on a special Core Tester. No proposal made as yet.

D. Orders shipped already.

1. Philco Philadelphia. Memory Tester Model 1512B. Presently rented as of April 1, 1960 for $3,000 per month. Selling price: $34,000.

cc: H. Anderson
W. Weeton
R. Best
J. Fadiman

dec MEMO

DATE April 1, 1960

TO Harlan Anderson/Ben Gurley FROM Ken Olsen

Briggs, from the Civil Engineering Department at M.I.T., called to be sure he was on the mailing list for any future documents on PDP-1. He has talked to many people in the department on this machine and has created quite a bit of interest in its use for traffic problems. They use the word "traffic" to mean traffic in the very common sense like there is on Commonwealth Avenue in Boston.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE April 1, 1960

SUBJECT BULLETIN NUMBERING SYSTEM

TO All Concerned

FROM J. L. Atwood

This is the numbering system now in effect for all technical and promotional literature. Individual pieces will be filed numerically within the catalog sections designated by the letters A through G. For examples, see the back cover of the folder distributed at the I.R.E. Show.

A. General

100	Company Information
400	Utilization Information
700	General Catalog Information

B. Digital Test Equipment

100	5 mc Line
3000	500 kc Line
5000	10 mc Line

C. System Building Blocks

1000	5 mc Line
4000	500 kc Line
6000	10 mc Line

D. Associated Equipment

E. Applications

100	Digital Test Equipment
400	System Building Blocks
700	Mixed Units

F. Systems

10	Programmed Data Processors
1500	Memory Testers
2000	Memory Systems

G. Miscellaneous

10	Maintenance Information Schematics by Number

INTEROFFICE MEMORANDUM

File

DATE March 29, 1960

SUBJECT

TO Harlan Anderson

FROM Kenneth Olsen

Here are some notes on the tech. rep. from England. His references were the Midland Bank of New York and the U. S. Chamber of Commerce. Their company is six years old and before that for four or five years they were a department of the parent company. The company now consists of two engineers with two assistants and two in the model shop. They have three sales engineers and three inside sales people. They have three in the service department and seven in the maintenance department. Their meter maintenance department is a significant part of their business because they are one of the few people truly approved for doing meter maintenance.

Kenneth Olsen

INTEROFFICE MEMORANDUM

DATE March 28, 1960

SUBJECT Termination of Group Insurance

TO H. E. Anderson

FROM J.C. Conley

Insurance premiums on our group policy must be made in full month payments. This creates a problem when employees terminate their policy by choice or on leaving the company. If an employee is not reported as dropped from our roles on the last day of the month preceding his termination of employment, we will be billed for a full month's premium in the month of actual departure.

The problem, from an employee relations standpoint, is what to do about payroll deductions for the termination month. Should we deduct the remaining amount due for the month from the last paycheck; only the employees contribution or the total amount due the insurance company? Should the time of the month the employee leaves be considered? Should the company pay the premium as a fringe benefit?

I recommend the following course of action. As a company policy I feel we should pay the premium for those who leave employment after the 15th of the month and not pay for those who leave before the 15th of the month. This would mean any one leaving employment before the 15th of the month would have deducted from his last pay the full amount due for the remainder of the month. This would include the employee and company share of the premium. Those leaving after the 15th would have no deduction for the period after the last day of employment.

In order to keep from putting a hardship on anyone who does not want to continue insurance after he leaves the company, the employee should be allowed to terminate insurance at end of the month prior to time he plans to leave the company. This would require a notice to all employees explaining that they will have insurance premiums deducted if they do not notify the Personnel Office of their changed status in the month prior to leaving the company, if they intend to leave before the 15th of the next month.

It should also be noted that taking a payroll deduction for the full month is cheaper than the cost of paying the premium individually to the insurance company. Also it should be noted that there is not 30 days of free insurance after the termination of insurance but only a 30 day grace period within which to resume coverage on an individual basis. The first premium, on an individual basis, would be for a full month beginning with the termination date of the company group insurance.

JCC/hl

INTEROFFICE MEMORANDUM

File

DATE 3/28/60

SUBJECT National Equipment Rental, Ltd.

TO H. Anderson FROM H. Crouse

We received the enclosed literature from National Equipment Rental, Ltd. last week; for the purpose of comparison and general interest I worked out a lease program of the Paragon-Revolute reproduction machine through National.

Basic cost of machine $1,850.00, length of lease 36 months.

	National	Chandler
Monthly payments	*1st yr. $74.00/mo. 2nd yr. $64.75/mo. 3rd yr. $43.11/mo.	$61.05/ 36 mos.
Renewal option	$111.00/yr.	$111.00/yr.
Purchase option - cash price	** ?	$543.75
Deposit	(1850 x 10%) $185.00	None

---

*The average monthly payments for the full 36 months is $60.62.

**There doesn't appear to be a purchase option.

The total cash paid to National over 36 months is as follows:

1st yr.	$74.00/mo.	$888.00
2nd yr.	$64.75/mo.	$777.00
3rd yr.	$43.00/mo.	$517.32
		$2,182.32
	Basic cost	$1,850.00
	Total Interest paid	$332.32
	Total Interest paid to Chandler	$347.80

The basic differances between the two plans are:

(1) National requires a 10% deposit for the period of lease. In the above case $185.00 for three years.

(2) National doesn't appear to offer a purchase option.

National Mr. + ances. - ref'd to Henry 5/30/60 - pv

dec MEMO

DATE March 21, 1960

TO Ben Gurley/Harlan Anderson/ Stan Olsen

FROM Ken Olsen

Ted Johnson says that JPL is very much interested in a computer like PDP-1 for format control. The competition is the small CDC computer. They are expert programmers and not at all disturbed by the fact that we are limited in our programs. They simply want to do a simple fixed program. The two people interested are Mr. Tom Mitten and Mitchell Baim. They are going to be at the I.R.E. Show and so we should keep an eye out for them.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE March 18, 1960

SUBJECT Interviews at Tufts

TO Helen LeBlanc FROM H. E. Anderson

The following is a brief rundown of the students that I interviewed at Tufts University on Tuesday, March 15.

Wes Baker - Wes is actively considering only two companies at this point, having rejected consideration of all others. DEC is one of these and Norden, in Hartford, is the other one. If he went to work for them, he would be doing microwave work. If he comes to work for us, he would prefer to work in the Engineering Department as opposed to sales or application type of things. His interest and enthusiasm for the company is indeed high, in view of the fact that he was the driving force that got all the other students to sign up for interviews. I think we should make Wes an offer which we can send to him right after the I.R.E. Show.

Phillip Valence - Mr. Valence is a young fellow who had a pleasant personality. His grades are quite low, but have been improving slightly during the four years that he has been in school. He worked last summer at Computer Control Company as an assembly man and did not really gain any engineering experience while there. He was interested in application and sales type things and could possibly do quite well at this. I think we ought to invite him out here so that some of the other people might have a chance to talk with him. He was apparently interested enough in us to mail in his application blank, which I received in yesterday's mail. Would you write him a letter inviting him to come out and see us right after the I.R.E. Show.

Howard Cramer - Mr. Cramer is the fellow who is the medical problem and I think we ought to have him come out after the I.R.E. Show if the report that Stan got from Dr. Houck concerning this disease is optimistic enough. Check with Stan and if he thinks it is likely enough, we might hire this fellow. Then send him a letter inviting him to come see us. I am particularly concerned that we do not lead this man on if we are not willing to hire him because of the medical problem. Be sure Stan sees the report from Dr. Horenstein which is in the folder.

Vincent Denietolis - This fellow was terribly young and too immature in my opinion to be very useful in sales work. Please send him a letter indicating that we don't really feel that we have any openings for a man with his qualifications at this time. This letter probably ought to be signed by Stan.

Edward F. Seaward - The same situation applies to this fellow.

Donald Laffert - Mr. Laffert's interview was scheduled for 11:30 A.M. but he did not show up.

James Cudmore - This fellow is a reasonable prospect. He worked last summer at the Graphic Arts Research Foundation with Professor Caldwell from M.I.T. The type of things he was doing there was debugging a logical machine consisting of relays to be used for typesetting. He seemed intrigued with this possibility and apparently did a reasonably good job, got interested in it and might like our type of work. I think we should seriously consider inviting him out here right after the I.R.E. Show.

In summary, we should make an offer to Wes Baker and we should perhaps invite three other people out here for further interviews and show them our plant. These people are Cudmore, Cramer, and Valence.

H. E. Anderson

Attachment - Tufts folder

INTEROFFICE MEMORANDUM

DATE March 18, 1960

SUBJECT

TO Ben Gurley

FROM H. E. Anderson

I just talked with Mr. Sid Sternick, of the University of Michigan, in Willow Run. They have been planning on buying a data logging system which would normally consist of an Ampex tape reproducer which would give them 14 channels of analog data which is then converted to decimal digits and placed on a digital magnetic tape unit. This turns out to be quite an expensive gadget by the time it has a little format control and logic and converting equipment.

They called us because they are considering whether a small computer could do the main part of this job and give them lots of flexibility. The job consists of taking 400 samples per second and distributing them between these 14 analog channels, converting to a digital number having one per cent accuracy (8 bits).

I told him to send a man to the I.R.E. Show (joke) and he said he would. I also suggested that if he couldn't locate me, he ought to talk to you about this problem. They are about to write a specification and send it out for bid and they want to know whether they should rewrite it to include a general purpose computer to do the job instead of just a limited data logging system. I have written him a letter today and I am sending him two copies of PDP-1 manual. The display scope in our computer intrigued him considerably.

INTEROFFICE MEMORANDUM

DATE March 14, 1960

SUBJECT

TO Ken Olsen/Dick Best/
Jack Brown/Stan Olsen

FROM H. E. Anderson

At a meeting held on Wednesday, March 10, it was decided that a new quantity discount schedule would go into effect on all orders shipped after April 1. This discount schedule is as follows:

Orders over $5,000	Discount 3%
Orders over $10,000	5%
Orders over $20,000	10%
Orders over $40,000	15%
Orders over $100,000	20%.

These quantity discounts apply only to Building Block equipment and do not apply to any systems which are always quoted at net prices.

H. E. Anderson

INTEROFFICE MEMORANDUM

DATE March 11, 1960

SUBJECT Trip Report

TO File - Navy Guided Missile School, Virginia Beach, Virginia, March 8, 1960

FROM H. E. Anderson

I spent the day discussing our low speed test equipment with Lt. (j.g.) Robert Beckman and three of his instructors. Names of two are Baron and Yates. Baron spent three years maintaining the Bendix G-15 computer.

They have established their own symbology for logic blocks and we have committed ourselves to supply them with some special versions of our units. The special features consist of slight regrouping of elements, different symbols and ability to pass 0.4 usec pulses through our diode units.

They need reasonably firm prices by tomorrow. I gave them tentative prices today as listed on the attached sheet. They have about $50,000 to spend and plan to get 26 complete student setups.

The skipper of the school is quite impressed with our equipment and took photos to use in an illustrated lecture he gave at an educational convention of some kind. He has to approve purchase and is favorably inclined.

Beckman is our key contact man and will be in Washington talking with Deacon who visited our place recently. The follow business possibilities look good for Great Lake and other places later.

Their schedule calls for obtaining the equipment sufficiently ahead of May 8 to use it in the course that begins then. If they miss that, they hope to use it for the course that begins June 9. They are prepared to act promptly as far as initiating procurement on a sole source basis.

These people are warmly disposed toward DEC and could be real boosters. They feel that they are likely to be setting the pattern for Navy training in this area.

H. E. Anderson

Attachments
Tentative Procurement
Tentative Front Panels

INTEROFFICE MEMORANDUM

M-1084

File

DATE March 11, 1960

SUBJECT INQUIRY HANDLING

TO H. E. Anderson
J. B. Brown
J. Fadiman
B. M. Gurley
T. G. Johnson
K. H. Olsen
S. C. Olsen
W. E. Weeton

FROM J. L. Atwood

Because of the heavy flow of inquiries coming in as a result of advertising and product publicity, we are taking the first step in what will be a thorough overhaul of our inquiry handling system.

As of the moment, the system remains too advanced for the size of our sales force and our capability for following up the leads produced. Consequently it has to be altered at least temporarily to accomplish two goals: (1) a reduction in the amount of filing and sorting required of the Sales Department and (2) a more complete qualification of the leads produced as to their potential value.

The first step will be to forward to the interested parties only the sales lead forms on prospects who make a direct inquiry to the company -- either through a reply card, letter, phone call, sales contact, or some other means of direct communication. Sales lead forms on reader inquiries sent to us by trade publications will not be forwarded for now.

Thus every sales lead form you receive will indicate that the prospect has made more than a bingo card-type effort to find out what we make.

The method for handling inquiries is outlined on the following page. It involves only one additional responsibility for the person receiving the sales lead forms: he must pass the inquiry along to the next man in line if the inquiry concerns more than his immediate area of interest, and he does not intend to follow up the lead personally. For example, and inquiry about PDP, Memory Testers and Building Blocks would go to Ben first. He would then forward it to Wally, and Wally would forward it to John.

On Reader Inquiries:

Type up on white Sales Lead set
Use the label for the envelope
Use the No. 1 copy for AID
File the No. 2 and 3 copies in boxes by months.

On Direct Inquiries

Type up on buff Sales Lead set
Use the label for the envelope
Use the No. 1 copy to check the mailing list
Forward the inquiry and the No. 2 and 3 copies as follows:

Any inquiry concerning computers, PDP included, to Ben Gurley

Any inquiry concerning memory testers to Wally Weston

Any inquiry concerning building blocks to Jack Brown

Inquiries concerning two or more of the above go to the person highest on the list. He will retain the No. 2 copy and forward the original inquiry to the next person concerned (Wally and/or Jack).

Exception -- All inquiries and No. 2 copies from states serviced by the California office should go to Ted Johnson, and the No. 3 copies should be distributed as above.

digital equipment corporation
MAYNARD, MASSACHUSETTS

INTEROFFICE MEMORANDUM

DATE March 9, 1960

SUBJECT

TO Ben Gurley

FROM Ken Olsen

At the AR&D Stockholders' Meeting, I talked with Manning Young from Addage Company. He said that Convair in San Diego, Electronics Division, needs a computer to process data resulting from destructive testing of airplanes. He suggested that we immediately get in contact with Stan Rogers and Paul Sherertz.

He also suggested we send a letter to Mr. Bill Furney, National Research Laboratory, Sound Division, Electronic Branch, Washington.

Ken Olsen

cc: H. E. Anderson

INTEROFFICE MEMORANDUM

DATE March 7, 1960

SUBJECT

TO Ben Gurley/Harlan Anderson FROM Kenneth H. Olsen

Mr. Frawley, who is in charge of Harvard Business Review, called to find out our present thinking on subscription maintenance with the PDP-1. I said we still think it's practical and were enthusiastic about it. Jim Watson of the Watson Service Bureau, who had visited us with Frawley, has been down to see the Readers' Digest installation. They use a Univac and have a fabulously complicated system. HBR would not need one this complicated but we might learn more about the problem if we would visit Readers' Digest. Frawley said we most likely could do this. The next step is for Frawley and Watson to lay out a block diagram of the problem. When we see the flow of information we can tell them more what the operation would be with a computer.

I have collected information from the different addressing equipment companies, but I have not yet heard from Anelex as to whether they could print labels on the format needed by the Cheshire label adhering machines.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE March 7, 1960

SUBJECT

TO
H. E. Anderson
J. L. Atwood
R. L. Best
J. B. Brown
R. A. Hughes

FROM Kenneth H. Olsen

This is my understanding of our plans for literature for the I.R.E. Show. If anyone understands differently or has better ideas, be sure to bring them up.

We will have five pieces of literature ready by March 21.

1. "Digital Makes," a four page brochure that lists all the plug-in units and literature on other products
2. New 100 Series literature
3. New 1000 Series literature
4. New 3000 Series literature
5. New 4000 Series literature.

In addition, we will offer to mail to people literature on the following:

6. PDP-1
7. PDP-3
8. Memory Tester
9. Core Tester
10. "How to Use DEC Building Blocks"

Both Test Equipment brochures will take the form of the present 3000 Series brochure. A photograph of the Test Equipment in a mounting panel will be sufficient for both block diagram and unit picture. We will correct and bring the text up to date.

The 1000 and the 4000 Series brochures will have a photograph on the front of a mounting panel almost filled with units. On one of the back covers will be a large picture of a single unit. These brochures will fold out to form one long sheet. The 3000 brochure

INTEROFFICE MEMORANDUM

DATE 3/7/60

SUBJECT Lease of Tektronic Oscilliscopes

TO Kenneth Olsen
Harlan Anderson

FROM Henry Crouse

Chandler Leasing Corporation:

Tektronic

2 - 543 Oscilliscopes	$1,275.00/ea	$2,550.00
2 - CA Plug-in-units	$ 250.00/ea	$ 500.00
1 - 180 A Time Mark Generator	$ 575.00/ea	$ 575.00
		$3,625.00

Lease Schedule

$119.63 a month for (36) months

$3,625.00
3.3%
$ 119.625

36 x $119.63 = $4,306.68
3,625.00
$ 681.68 Cost of Lease

Option:

Renew Lease.....$217.50 a year - $18.13 a month

Purchase.....$543.75

Delivery Time - 2 Weeks

INTEROFFICE MEMORANDUM

DATE 3/2/60

SUBJECT California Sales Tax

TO H. E. Anderson

FROM Accounting

Since 2/15/60, the date of our Certificate of Qualification, we have billed three sales to California customers.

1. Invoice #1621 dated 2/16/60 to Telemeter Magnetics for $1,000 seems to be subject to 3% sales tax and 1% Los Angeles sales tax. OK

2. Invoice #1623 dated 2/17/60 to Computer Equipment Corporation for $1,080--------Computer Equipment P. O. is marked with a Resale No. and checked "No Tax".

3. Invoice #1628 dated 2/23/60 to Boothe Leasing Corporation for $4,252 seems to be subject to 3% sales tax. — Since item is not for use in Calif. I doubt if the tax is justified here?

Should we bill Telemeter and Boothe for the sales tax as stated above?

In connection with our using the date of our Certificate of Qualification, 2/15/60, as a starting point in billing the sales tax, it should be pointed out that on our Registration Form with the State of California Department of Employment we stated that we started operating in California 1/1/60.

We have written to California asking for an application for a permit and for information and forms for the sales tax levied by the city and county of Los Angeles.

INTEROFFICE MEMORANDUM

DATE 3/2/60

SUBJECT Employee Insurance

TO H. E. Anderson FROM Accounting

As we understand it, the insurance for an employee leaving anytime during the month must be paid for the full current month either by the employee or the company.

For example, A. P. Reguera is leaving on 3/4/60. The deduction for insurance on her pay check for week ending on 3/4/60 would be $12.12 if employee is to pay. This $12.12 is figured through 3/31/60, but until we receive an actual bill from John Hancock, we cannot be positive as to what system they are going to use in billing us.

We do not know if the employees realize the above, i.e. about paying for the full current month.

Therefore, we would like a ruling from you as to how the company wants this matter handled.

INTEROFFICE MEMORANDUM

DATE March 2, 1960

SUBJECT Canadian Aviation Electronics Ltd.
Montreal

TO File , FROM H. E. Anderson

I telephoned Mr. J. Prieur today to tell him which of our standard products comes closest to meeting the requirements they have as listed on their request for quotation No. 10114 dated February 22, 1960. The 4209 flip-flops seem to be the closest; however, this was still much more expensive than what they had in mind. They really were thinking about the Sprague Electric type of flip-flops for this application.

H. E. Anderson

INTEROFFICE MEMORANDUM

DATE March 1, 1960

SUBJECT Sales Trips by Engineers

TO K. Olsen, H. Anderson, J. Brown, W. Weeton, R. Hughes, R. Best, J. Fadiman, S. Olsen

FROM Jack Brown

Even though we have been and are still trying to add men to our Sales Department, to date we have just one. Until we can get more men in Sales, we will have to get help from our Engineering Department. This memo describes a tentative travel schedule for the next 3 months.

A. The Ground Rules Are:

1. W. Weeton, J. Fadiman, R. Hughes and S. Olsen will make one 3-day trip per month for the next three months.

2. J. Fadiman and W. Weeton will never be away at the same time and will have at least one week a month together.

3. S. Olsen must be available a week on each side of the IRE.

4. No one will be away during the IRE.

5. Everyone will be in Maynard at least one week of the month.

6. Each man will more or less attend to one area and two of the 3 trips will be into this same area. Effort should be made to take advantage of anyone's previous contacts or knowledge in choosing areas.

B. It is hoped the system will work in the following manner.

1. Approximately one calendar week before a trip is planned (as per Jack Atwood's suggestion) a form letter prepared by the Sales Department will be sent to selected portions of our mailing list. This letter will include a post card for return which will indicate whether anyone would like to see us.

2. The Sales Department will make a list of all companies in the area and state a priority for visits.

3. The Engineer on the trip will try to contact all companies in the area. He will carry a portable dictating machine and make out a Sales Trip Report on return.

4. The Sales Trip Report should be as complete as ppossible since it will serve as a reference file for new Sales personnel. The Sales Department may provide a form for

these reports, but in any case it will be the responsibility of the Engineer to keep adequate records to make a detailed, formal, written report on all companies visited.

C. It would be appreciated if each of you would review the attached schedule, give me your suggestions, and write me of any conflicts that become apparent. As you notice the program would start next week, so we must straighten out the details as soon as possible.

TIME	3/7/60 M T W T F	3/14/60 M T W T F	3/21/60 M T W T F	3/28/60 M T W T F	4/4/60 M T W T F	4/11/60 M T W T F	4/18/60 M T W T F	4/25/60 M T W T F	5/2/60 M T W T F	5/9/60 M T W T F	5/16/60 M T W T F	5/23/60 M T W T F	5/30/60 M T W T F
OVERALL MEN	←WW→ ←BH→	←JB→ ←no→	←IRE→ ←no→	←JF→ ←JBB→	←SO→ ←JB→	←WW→ ←BH→	←no→	←JF→ ←JBB→	←SO→ ←JBB→	←WW→ ←BH→	←no→	←JF→ ←JBB→	←SO→ ←JBB→
OVERALL AREA	Washington Syracuse	Boston	- no -	No. Carolina New Jersey	Long Island Chicago	Philadelphia IBM Loop	—no—	Baltimore Texas	Florida Chicago	Washington Syracuse	None	New Jersey Boston	Long Island No. Carolina
INDIVIDUALS													
W. Weeton	x					x				x		x	
J. Fadiman				x				x					
R. Hughes	x					x				x			x
S. Olsen					x				x				x
J. Brown		x		x	x			x	x			x	
R. Best			Floating							Floating			
AREA													
Washington	x									x			
Syracuse	x									x			
Boston.		x										x	x
No. Carolina				x								x	
New Jersey				x									x
Long Island					x								
Chicago					x				x				
Phila.													
IBM Loop						x							
Baltimore						x		x					
Texas								x					
Florida									x				

dec MEMO

DATE March 1, 1960

TO K.Olsen/
H.Anderson/
S. Olsen/

FROM Helen LeBlanc

Re: Chest X-Ray

Mr. Tarantino, Middlesex Health Association, was in today - have made arrangements to have employees x-rayed on Friday, March 18, from 1:30 to 2:15 PM. Mobil unit will park right outside building. Fee is $.70 per x-ray. Company will be billed end of month.

INTEROFFICE MEMORANDUM

DATE February 26, 1960

SUBJECT Patch Cords

TO K. Olsen
H. Anderson
W. Weeton
R. Hughes
S. Olsen
File

FROM Jack Brown

The statistics below may give an idea of how many patch cords one should suggest to a customer, as well as the relative amounts of each length. Data was collected from actual sales records.

Item	Sold in period from 11/5/59 to 2/25/60
Test Equipment Blocks	1104
Patch Cords, 911-2	2725
Patch Cords, 911-4	2442
Patch Cords, 911-8	1945
Patch Cords, 911-16	1105
Patch Cords, 911-32	418
Total Patch Cords	8635

7.82 Patch Cords per unit.

31.6% Patch Cords, 911-2
28.1% Patch Cords, 911-4
22.6% Patch Cords, 911-8
12.8% Patch Cords, 911-16
4.9% Patch Cords, 911-32

INTEROFFICE MEMORANDUM

DATE February 24, 1960

SUBJECT Catalog Production

TO H. E. Anderson
J. L. Atwood
J. B. Brown
R. A. Hughes

FROM Kenneth H. Olsen

Steps in Production

1. Quick mimeograph sheet on all plug-in units which we sell but on which we have no sheets

2. Good looking sheets on our main product line

3. A tutorial booklet on "Designing with Digital Equipment"

Immediate Assignments

1. Bob Hughes is, with a crash program, going to produce the mimeographed sheets on all units which we are now willing to sell but on which we have no literature. These can be brief and in some ways incomplete, but there should be a sheet which at least has the pin connections and rough characteristics.

2. The crash program we are developing good looking literature on each of the units which we feel is our main product line. We will only produce sheets on those units which we feel are the main line so that we don't give the impression that you need forty kinds of units to use our equipment. In addition, we will produce a good looking type set sheet that will list with one paragraph all the special units.

I propose that we develop two completely different formats; one for Test Equipment and one for System Building Blocks. The heading for the five megacycle line should be in light brown and the heading for the 500 KC should be in blue. All printing should be in black and set in type.

In addition, there should be an Accessory Section which includes the mounting panels and power supplies. For now, we can get by with the literature we already have on power supplies and mounting panels and the sheets within the section do not have to be consistent. There should also be a sixth section called Miscellaneous which would include things like current drivers.

The System Building Block sheets will have a photograph of the unit, a block diagram of the contents with pin connections, and a schematic.

The Test Equipment will have a photograph which will show the block diagram on the front panel and a schematic.

Jack Atwood is having the replacement schematics made for all units for which we do not now have schematics and he is having photostats made of all those we have. When we get the photostats, we will paint out all component values and unnecessary marks to simplify the drawing. If they can be read conveniently, we may leave load resistor values in; but if it confuses the drawing, we'll leave them out and specify in the text what the output load resistors are. We will not specify the transistor types because we change these often.

Jack Brown is collecting text for each of these pages and Bob Hughes is giving information when needed.

To get started, we are generating all simplified schematics and all photographs in parallel, but as soon as we have the components we will make one sample sheet to get everyone's approval before we, in parallel, make the whole bunch.

All catalog pages will be numbered so that catalogs can be brought up to date by using a Table of Contents. The page will consist of two parts - the model number and the date. This page number will be printed in the lower right-hand corner of the front page of each catalog entry and will be as follows:

1667-2/60 .

When we have the catalog sheets done, we will staple them together in booklets, such as Harvey-Wells distributes. We can give these out freely because they won't cost too much and we will include the same sheets with separators in our looseleaf notebooks and a new

Table of Contents that will tell them what should be in their loose-leaf notebooks.

3. Everyone will generate outlines and thoughts as to what the tutorial booklet should contain and after the big push is over on the literature we will start to work on it.

I propose that we include in the finished sheets only those units that are included in the 4000 Series booklet, the Test Equipment booklet and the System Building Block booklet, or the modernized versions of them, and that all other units be included under the Other Products Section.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE 2/24/60

SUBJECT **Lease-Paragon Reproduction Machine**

TO **Ken Olsen**
✓**Harlan Anderson**
Stan Olsen

FROM **Henry Crouse**

Lease Arrangement: Chandler

Cost of Machine	$1850.00
	3.3%
Monthly Rental	$ 61.05
Length of Rental	36
Total Rental Paid	$2197.80
Cost of Machine	$1850.00
Interest Paid	$ 347.80

End of rental period options:

(1) Cancellation
(2) Renew lease @ 6% per year rental or $111.00/year.
(3) Purchase machine at 15% of initial base price of $1850.00 or $277.50.
This last option is not written in contract but is a verbal agreement.

Total cost of lease to own machine:

Initial Interest	$347.80
15% option	$277.50
	$625.40

INTEROFFICE MEMORANDUM

DATE 2/19/60

SUBJECT Reproduction Machine

TO Ken Olsen
Stan Olsen
Loren Prentice
Roger Melanson

FROM Henry Crouse

COSTS

	Basic Cost	Rental Per Month	Cost of Acquisition
1. OZALID			
Streamliner 200 42"	$1295.00	(24)-$59.44	$1426.26
		(36)-$42.74	$1538.46
*Streamliner 42"	$ 895.00	(24)-$41.77	$1002.47
2. PARAGON			
Revolute Rockette 42"	$1295.00	(24)-$59.44	$1426.26
		(36)-$42.74	$1538.46
Revolute Meteor 42"	$2050.00	(24)-$95.67	$2296.16
		(36)-$67.65	$2435.40
3. BRUNING			
Model M-320 42"	$1525.00	(24)-$71.17	$1708.12
		(36)-$50.33	$1811.70

The cost of rental is based on 4.667% for 24 months and 3.3% at 36 months from Chandler Leasing Corp. of Cambridge.

*The Streamliner is a used machine at $895.00, it is at least three years old. The one important feature this machine does not have is synchronized developing and printing speeds.

The turn-in-value of our Viking Reprofax is:

Ozalid----------$375.00
Paragon----------$200.00
Bruning----------No Offer

Paragon uses the Bruning Finance Plan. Those machines are available on the following basis:

Revolute Rockette 42"	$1295.00		
Viking Allowance	$ 200.00	(24)-$53.96	$1295.04
Base Price	$1095.00		

Revolute Meteor 42"	$2050.00		
Viking Allowance	$ 200.00	(36)-$56.25	$2025.00
Base Price	$1850.00		

M. Sandler

This Job Classification Draft is hereby presented in order to classify the job or task structure of our organization, and in order to provide a planned program for advancement of our employees.

The progression or advancement concept of the classifications is twofold:

1. Tasks are arranged in order of increasing responsibility and job knowledge required, and

2. People will advance by increasing achievement within the classified tasks and by decreasing degree of supervision required.

E. Trainee or Primary Group - Tasks of routine and simple nature performed in training under close supervision.

Cut and bend components
Add brackets
Add split eyelets to boards
Eyelet panels
Add spaghetti to panels
Clean units
Tin leads and add clips - transformers
Wash boards
Chromicoat
Cover components
Cut wire to length
Stamp model numbers
Add label to handles
Wind simple transformers
Add lugs to brackets

D. Semi-Skilled Group - Workers in this group should do Primary (E) tasks without close supervision and will then train, under supervision, for advancement to skilled assembly tasks. This is the introduction to the soldering iron groups of tasks:

Solder back panel wires
Mount transistors
Serial numbering
Punch copper boards
Add handles to units
Wire and solder 901 panels
Drill (under supervision)
Wind complex transformers
Pot transformers
Assemble system panels

C. Skilled Group - Workers in this group should do Primary (E) tasks and most Semi-Skilled (D) tasks without close supervision, and will learn to perform skilled assembly tasks:

Assemble components
Attach plugs (SPU)
Fill lugs and check backs (circuits)
Drilling
Repair units
Change components
Wire system panels

B. Highly Skilled Group - Workers in this group will perform tasks in Groups E, D, and C, and will learn to perform advanced tasks:

Wire and assembly power supplies
Wire and assemble current drivers
Special wiring jobs

A. Advanced Skilled Group - Workers in this group will perform tasks in all other Groups and will learn tasks of advanced responsibility:

System panel wiring from blueprints
Interpanel wiring
Able to make technical quality judgments

INTEROFFICE MEMORANDUM

DATE February 16, 1960

SUBJECT

TO Harlan Anderson/Jack Atwood/
Ben Gurley

FROM Ken Olsen

A special and personalized, but brief, release on PDP should go to the Digital Computer Newsletter, Office of Naval Research Mathematical Sciences Division. This Newsletter is now a part of the communications of the ACM and gets wide distribution. You should look at page 29 and forward to see the blurbs other people put out on their computers in the Newsletter of January, 1960.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE February 16, 1960

SUBJECT

TO University of California
File

FROM H. E. Anderson

Ted recently visited the University of California in Livermore and Berkeley and said that there was some interest in PDP up there. Mr. McNaughton apparently sent in a reply card and Ted contacted him and detected some real interest in PDP-1 for a satelite type computer. That would be satelite to some larger computer installation. Another gentleman involved there is Dr. Fernbach, and we should definitely plan on contacting him sometime before too long. Ted felt that a visit from someone back here to that area before too long would be very desirable.

H. E. Anderson

INTEROFFICE MEMORANDUM

DATE February 15, 1960

SUBJECT Recruiting at Tufts

TO Helen LeBlanc

FROM H. E. Anderson

Wes Baker called me today to report on some of the details of recruiting at Tufts. Apparently, any displays or bulletin board type things must be cleared through the Placement Office of Tufts. A lady by the name of Mrs. Saltmarsh is the person to be contacted there. Wes said that the only DEC information at Tufts now is of a technical nature and that some additional information about the types of jobs available would be real helpful. I would suggest that we have a mimeographed letter made up on company letterhead which discusses types of jobs and a little about the company history and activities.

Wes said that any presentation of technical information to the student engineers has to be done through the I.R.E. and the A.I.E.E. student societies. Their program for March is already under way but he has told them of our interest and availability for a future meeting. The April meeting is not planned at the present time and they may contact us about that. No pitch about why they should come to work for DEC could be given during this kind of a presentation, however, the indirect advantages would certainly accrue just by giving a technical talk.

Wes thought the Tufts weekly paper would be a definitely worth while thing to use. He felt the use of the Tufts radio station was quite questionable since it would only be heard on campus and only about three or four electrical engineers live on the campus.

H. E. Anderson

H. E. Anderson

INTEROFFICE MEMORANDUM

M-1079

DATE February 15, 1960

SUBJECT DC Adder Technique

TO File

FROM H. E. Anderson

While thinking about PDP several months ago, the feasibility of making a DC adder was investigated. By a DC adder, I mean an adder where the carries are propagated from one digit to the next using DC techniques as opposed to our P pulse carry which we normally recommend and which is described in the literature. The logic diagram for doing this is shown in the attached sketch. The carry propagation time will now be the delay of two inverters in series as opposed to our propagation time of the pulse carry where only one inverter in series exists. Therefore, carry time will be longer. However, our normal pulse adder is a two step process whereas this is a one step process. It turns out that for adders having a large number of digits the pulse method is faster, but for short adders the DC method is faster.

For the 4000 Series, assuming that the delay through an inverter is 0.3 microsecond and the flip-flop setup time is 2 microseconds, the break point is roughly 6 bits. This means that for less than 6 bits a DC adder would be faster and for more than 6 bits a pulse adder using two steps would be faster. Making the same comparison for the high speed equipment, the break point turns out to be 13 bits.

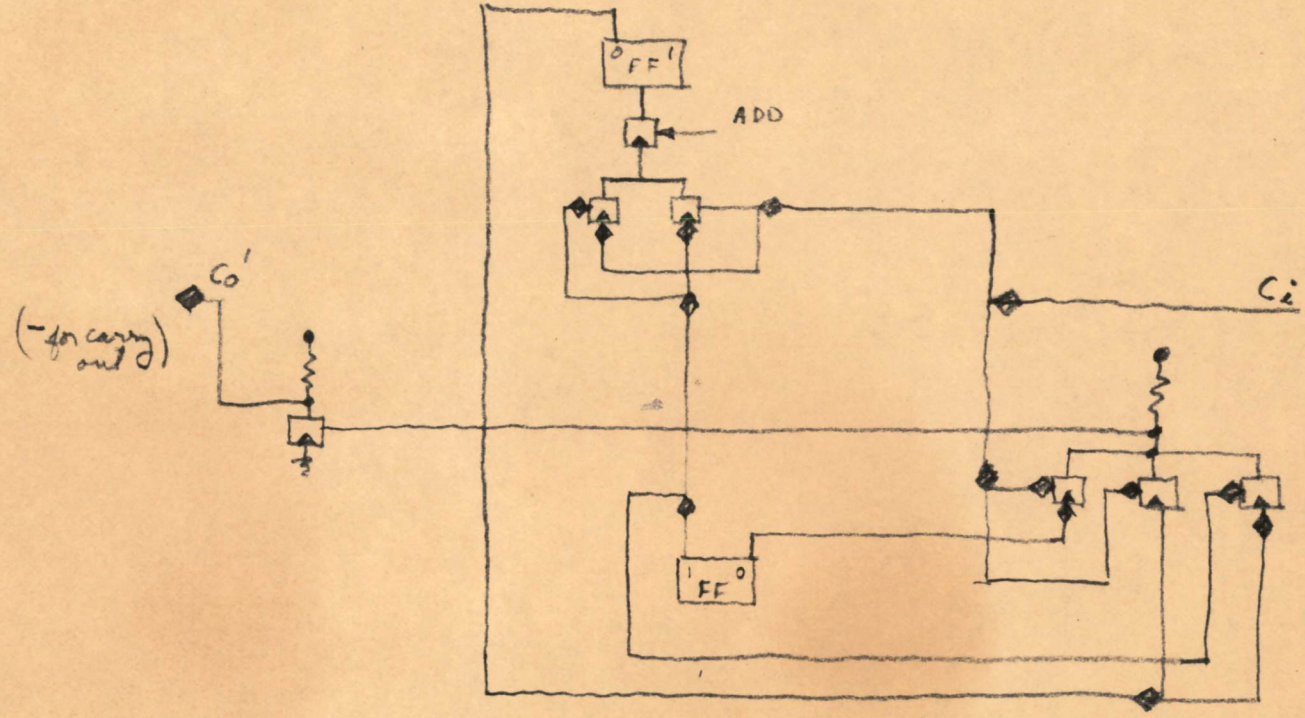
Making a cost comparison between the two types of adders for the 4000 Series, the DC adder costs $137 per bit and the pulse adder costs $133 per bit. The DC adder consisted of one Type 4209 and one and one-sixth Type 4106 units. The pulse adder had one-half of a Type 4209 and one Type 4201 and one-half of a Type 4106 inverter. This assumed that the accumulator would require a read-in transistor in either method. This is important because the 4209 has such a transistor internally connected to the one input of the flip-flop. Unless one makes this assumption, the 4209 is at a one transistor disadvantage.

Since the Type 4209 dual flip-flop has a complement input to it, it can be used for the accumulator. This is not true in the case of the 1000 Series and, therefore, 1201 flip-flops would have to be used.

H. E. Anderson

Attachment

SA-00926



BOOLEAN TABLE

C_0	A_{n+1}	A_n	M	C_i	A_c
0	0	0	0	0	0
0	1	0	0	1	1
0	1	0	1	0	1
1	0	0	1	1	0
0	1	1	0	0	0
1	0	1	0	1	1
1	0	1	1	0	1
1	1	1	1	1	0

$C_o = A_n' M C_i + A_n M' C_i + A_n M C_i' + A_n M C_i$

$A_c = A_n' M' C_i + A_n' M C_i' + A_n M' C_i + A_n M C_i'$

SIMPLIFY TO

$C_o = M C_i + A_n C_i + A_n M$

$A_c = C_i M' + M C_i'$

C_o = CARRY OUT C_i = CARRY IN

A_c = COMPLEMENT ACCUMULATOR CONDITION

M = MEMORY BUFFER A_{n+1} = ACCUMULATOR AFTER ADD

DC ADDER LOGIC

H.E.A. 2-15-60

H. E. Anderson

INTEROFFICE MEMORANDUM

DATE February 12, 1960

SUBJECT

TO John C. Conley

FROM Kenneth H. Olsen

I've lost track of what jobs you are doing now, but here's one that I would like to have you start if you are free. A little investigation may prove that it is not worth while, in which case, you should stop it immediately. The digitally controlled milling machine project at M.I.T. is a contouring machine which is quite different from the point to point type machine which we are working on with the Oil Gear Company. The first step in the contouring machine is to compute the curves on a fairly capable machine like the 709. The output of this calculation is a normal digital tape which is fed into a special purpose device which does parabola curve fitting and generates an analog magnetic tape. This in turn goes to the third device which directly controls the milling machine. I have the feeling that a PDP-1 can do both the calculations now done on a 704 and generate this analog tape. It might be necessary to first do the calculations and generate a digital tape and then on the separate pass convert this to an analog tape, but if one machine can do both operations I think it would be a significant contribution to the field.

I think M.I.T. would be a rich source of information for this, seeing that most of the work came from there. Several people left and went to Concord Control and have carried on the work since then. I'm not sure that we want people at M.I.T. or Concord Control to know our ambitions in this area because we may eliminate the need for one of their key products which is the device that converts the digital to analog tape.

The analog tape, as I understand it, is not very difficult, It is not analog in the usual sense but a saturated square wave in the critical factor is that phases which run asynchroze which drive the milling machine. We may need a special analog tape unit on the machine, but the circuits would be grouped for saturating type write circuits driven from one flip-flop for each coordinate plus one or three reference signals depending on whether they have three phase reference or one phase reference.

I think it would be worth while, if you have the time, to look into this problem to see if it looks fruitful.

Ken Olsen

cc: H. E. Anderson
B. M. Gurley

digital equipment corporation
MAYNARD, MASSACHUSETTS

INTEROFFICE MEMORANDUM

DATE February 12, 1960

SUBJECT

TO General Electric Sales File FROM H. E. Anderson

Mr. Jack Troy, from the General Electric Missile and Space Vehicle Division, in Philadelphia, Pennsylvania, telephoned this afternoon. He had picked our name out of the EEM directory as being a company that supplied building block equipment. The kinds of activity they get into are ground support checkout units for missile work. Most of their work in the past has been done with electromechanical type equipment.

They are planning on building a unit with a punched paper tape input ahd solid state components now. Since this is quite new to them, they are trying to become acquainted with the characteristics of transistor circuits. Our five megacycle equipment seems more than what they really need and he was quite interested in the fact that we have a 500 kilocycle line.

Mr. Troy and Mr. Frank Visich are planning on visiting us Wednesday morning, February 17, at 9:00 A.M. at our place in Maynard to discuss our equipment and how it might be used in their work, etc. They may have some rough block diagrams with them as illustrations of what they are trying to do.

H. E. Anderson

INTEROFFICE MEMORANDUM

DATE February 11, 1960

SUBJECT Philco

TO Dick Best

FROM Harlan E. Anderson

Ken just called from Philadelphia and told me of a conversation he had with the Philco people with regard to their word address memory tester needs. They decided three days ago to construct the unit themselves since they got the impression from us that we would not do anything special which might be required to meet their specification desires on the unit. They anticipate it will take them about three months to do the job and their current plans call for using the Fairchild 699 transistor as a current source. As we understand it, the dissipation on this transistor is too high at two megacycles to do their job, but they are perfectly happy to operate it at 50 kilocycles on it. I assume they are using this instead of the equivalent of our vacuum tube current drivers.

For the switch transistor, they are planning on using the 599, The other problem which they are going to handle a little differently apparently than we had planned to do for them is the physical location of the switches. They plan to put these right up next to the memory stack in order to reduce capacitance.

Ken would like us to think about this and has verbally offered that we would take another real quick look at it today and tomorrow and that we would be willing to do some special things in order to make this tester for them. Some of these special things may jeopardize its usefulness as a coincident current memory tester, but this is really of no concern. Ken will be back tomorrow (Friday) and would like to have us have a letter in the mail to them by Friday night or another telephone call or something indicating that we will do something special because they are apparently willing to reconsider their decision if we give them information quickly enough.

H. E. Anderson

Houston ISA Show Notes 1960

A gentleman who seemed particularly interested in our equipment at the Houston Show was Paul Williams from Texas Instruments, in Houston, Texas. His address is 1224 Demaret Lane. It seems like it would be an awfully good idea to get in touch with him whenever we are in the area. (HEA)

Mr. M. W. Wilson, from the David Taylor Model Basin in Washington, dropped by and said that many of his people might be interested and he would see about setting up a demonstration. I should write him a letter in about a week's time to see if the idea is still appealing to him. (JBB)

I just talked with a Dr. Tripp, at Grumman Aircraft Company, Long Island. He is in their flight test activity and seemed to be interested in this type of equipment and said we might expect to hear from them sometime in the future. When in the area, it might be a good idea to drop in and see him, or at least telephone him, and probably put him on our mailing list. (HEA)

We must be sure to send to Mr. T. C. Wherry, of the Phillips Petroleum Company, all the information on our PDP. He was quite adamant about wanting all the information we could possibly get together. (HEA)

Mr. Andrews, of the Phillips Petroleum Company, stopped in. This is the gentleman who Mr. Wherry said would probably drop by to see our equipment and also is a fellow who had asked for literature on it. We should be sure that he is on the mailing list and keep him up to date from time to time. (HEA)

Mr. Jerry R. Raciti, from General Electric in Lynn, is going to contact us in the future about building a special tester for him. He makes about fifteen different kinds of boards himself and wants a tester where he can put any given board down on the frame in order to complete functional as well as voltage resistance plus continuity check of his particular board. He is going to layout all the logic involved and then wants to subcontract the whole deal. He might be willing to wire the thing up himself so we could just supply him with the regular products. One stipulation is that we would have to have wire wrap Amphenol mounting panels. He estimates the job is somewhere around $50,000 or $60,000. (JBB)

of buying or renting an IBM 1620 for doing analysis of water works and that general type of city problems for the City of Dallas. They were quite interested and will undoubtedly contact us before long. (HEA)

Eeco has one megacycle and five megacycle building blocks which are not yet described in their literature. These sound very much like they will be competitive with what we do. (HEA)

Mr. E. M. Thomason, from Monsanto Chemical Company in Texas City, Texas, came back again today after having thought about our equipment for several days. He has concluded that he has some definite applications in his area of work, and we will probably be hearing from him before too long. (HEA)

It's been interesting to note that the oscilloscope that we had in our booth actually has somewhat detracted from our own equipment. Quite a number of people asked whether we made the oscilloscope and we have very seldom actually used it to demonstrate anything about the equipment. (HEA)

The gentleman who is very well qualified to talk about the seismographic work done at Humble Oil was named Frank Fagan, and we should be sure to add him to our mailing list. He was one of the gentlemen who made the trip to M.I.T. last spring and saw the TX-0 computer up there. He is the boss of Seixas. (HEA)

This is Jack, and I'm talking about the problem that Mr. Grimmell of the Rotron Company that Mr. Tenuse brought up. It turned out that he brought over Mr. Constance Van Rindge, who is president of Rotron, and he is quite disturbed that we haven't done anything on the problem. Their contact man at this company, at the Rotron Company, is A. B. Hubbard, their assistant chief engineer, and is the man we can call to ask any questions. (JBB)

There are two pipeline companies that may need this computer for measuring the flow of gas. The one that is the hottest at the moment is Columbia Gulf Transmission Company, in Houston. This is the company that is setting up the gas plant to use the Rotron meters and will have need to purchase the digital computer from us. The assistant chief engineer is the man that we should talk to there and his name is Charles Morrill. The project is the gas plant at, it looks like, Tulane, Louisiana. The Gulf Columbia Transmission Company has written a one and one-half page specifi-

cation of what digital instrumentation they need and will put us on the bidder's list. The president of Rotron guarantees that all the people in his company will help us out. Bill Stevens, of Rotron, is their engineering man as well as Hubbard on the job. Glenn Dorflinger is the man they have in Houston for sales work and will drop anything he is doing to go around and talk to people with us, and he is going with me to talk with Morrill. The least we should do is write back to these people what the outcome of the whole deal was. (JBB)

dec MEMO

DATE February 10, 1960

TO Jim Myers FROM Ken Olsen

I don't know what we have done about this before, but will you collect several pieces of test equipment and system building blocks with reject transistors that are particularly good looking that we can give away as office decoration to several key people. Check with Stan as to which ones we should use for this.

Ken Olsen

cc: H. E. Anderson

DAP 984

dec MEMO

DATE January 12, 1960

TO Jim Myers FROM H. E. Anderson

Would you check and see if we have two books which have recently come to my attention. The first of these is a hard bound book called DIGITAL TECHNIQUES put out by the Instrument Publishing Company, 845 Ridge Avenue, Pittsburgh, Pennsylvania. This is the company that publishes Instruments and Controls magazine.

The second is a paper bound report called "Manual of Digital Techniques" and is put out by Control Engineering magazine and is currently being offered as a free manual if you enter a new subscription to this magazine.

Let me know if we have either or both of these in the company.

H. E. Anderson

INTEROFFICE MEMORANDUM

DATE FEBRUARY 10, 1960

SUBJECT PDP

TO CUSTOMER FILE

FROM BEN GURLEY

Four people from RCA in Moorestown came to visit us Tuesday, February 2nd. They were Alex Bezgin, Sid Kaplain, A. M. Lampson, and Norm Halperin, who is a former Whirlwind man. I think he was the boss.

Alex Bezgin was the one who called and seemed so very hot for PDP-3. However these people didn't quite give that impression, either to myself or to Ed. It may be that they really are interested, but they didn't sound so terribly interested and mostly tended to chat about other things.

They were concerned about double precision, which is something that we really haven't looked into much. I'll intend to look into it and see how tough it is.

H.B.G.

CC: KEN OLSEN
HARLAN ANDERSON
BEN GURLEY

H. E. Anderson

File

INTEROFFICE MEMORANDUM

DATE February 5, 1960

SUBJECT

TO All Engineers & Technicians FROM Kenneth H. Olsen

We are now posting outside the library the results of each week's job tickets. It is a good idea for everyone to check this list to be sure that we are not making mistakes in our accounting of time. It would also give the engineer in charge of a project a good idea as to who is signing time to that project. We might also be able to keep better control as to which jobs get assigned to general engineering.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE February 5, 1960

SUBJECT

TO Harlan Anderson

FROM Ken Olsen

Bill Congleton called Thursday, February 4, to say that next Wednesday, February 10, they are having a visit from a fellow who is starting up a computer consulting business. This fellow is someone you apparently know about who did quite a bit of programming for Dupont. They are now looking for capital and American Research is wondering if maybe they should become part of Digital, or at least they would value our opinion of them. We, of course, like to have everybody know about our computers.

Bill Congleton wanted to come out here but when he found out I was not going to be in town, he wasn't quite sure and he will call you and work out something. I think it would be worth a trip for you and/or Ben to go in and talk to this fellow just so they know about us.

American Research was very unhappy when they realized that we didn't use them in the Eta Kappa Nu publicity.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE FEBRUARY 3, 1960

SUBJECT CURRENT ENGINEERING ACCOUNT NUMBERS

TO ENGINEERING, DRAFTING, ACCOUNTING, & M. SANDLER

FROM R. L. BEST

EN 1000 General Engineering
EN 1010 High Frequency Building Blocks
EN 1011 Compatible Low Speed B.B.
EN 1012 Non-Compatible Low Speed B.B.
EN 1013 Current Generators
EN 1014 Digital-to-Analog Converters
EN 1015 Typewriter
EN 1016 Core Memory Development
EN 1017 Signal Converters
EN 1018 Memory Tester Development
EN 1019 Sales
EN 1020 Programmed Data Processor No. 1 (PDP-1)
EN 1021 Core Handler
EN 1022 Power Supplies
EN 1023 Mounting Panels
EN 1024 Paper Tape Reader
EN 1025 Paper Tape Punch
EN 1026 Magnetic Tape Equipment
EN 1027 Display
*EN 1028 PDP-3
EN 2002 Telemeter Magnetics Memory Tester 1512
EN 2003 Memory Tester 1512B
*EN 2004 Memory Tester 1513
*EN 2005 NSA Computer
*EN 2006 Automatic Core Tester 2101

Supersedes Memo Dated October 28, 1959.
* New Numbers Added.

H. L. Anderson

File

DIGITAL EQUIPMENT CORPORATION
Maynard, Massachusetts

SUBJECT: COST ACCOUNTING ON PROJECTS

To: All Engineers

From: Kenneth H. Olsen

Date: February 4, 1960

Approved: Kenneth H. Olsen

ABSTRACT

As a final step in all projects, we will summarize the cost accounting results in a report so that everyone can tell the areas of success and failure in the project. This is important to the company and to the engineer so that we can learn how to do fair pricing and so we can measure our efficiency.

We keep very detailed accounts on all jobs, but as yet we have not fully used them in our projects which are built by the Engineering Department. From now on, a summary of the costs and results of a project will be considered as part of each project. This report should be very simple and the Accounting Department will help in preparing it. The first part should list the following items:

1. The gross profit on the project as a percentage of sales cost

2. The gross profit on the System Building Blocks that went into the project, as if they were sold at list price

3. The gross profit on the rest of the system.

One can readily make a good gross profit on an over-all system but really lose money on the part which does not include the Building Blocks; and, in general, we should make a generous gross profit on both parts of it.

The second part of the report should be a brief itemizing of the cost estimates in the original price evaluation and a comparison with the final cost. This should be broken down into engineering labor, technician labor, drafting labor, DEC parts, and other parts. It should be stated how many units were expected to be sold when the price was set and, where possible, this same number should be used in the comparison.

In addition, any words of explanation that are pertinent should be included in this report. Only one copy of this report will be made and it should be kept filed in a notebook that is kept in the Accounting Department. If, in addition, the engineer desires a carbon copy for himself, he is welcome to keep one but we should be very careful about the distribution of this information.

Signed: Kenneth H. Olsen

Kenneth H. Olsen

dec MEMO

DATE February 1, 1960

TO Harlan Anderson/Ben Gurley FROM Ken Olsen

Mr. G. B. Young, from American Standard, Norwood, Mass. (A.M. phone Norwood 7-5300, P.M. phone Norwood 7-3220) called and spoke to Maynard Sandler. Mr. Young mentioned that he had previously spoken to Jack Brown and Andy. His friend, Lt. Bob Beckman, Guided Missile Training Center, Dam Neck, Virginia, will be coming here on Tuesday, February 9, with a representative from American Standard. They wish to discuss a computer to be used for training.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE 1/29/60

SUBJECT Paragon-Revolute Reproduction Machine

TO Ken Olsen
Harlan Anderson
Stan Olsen
Roger Melanson

FROM Henry Crouse

Mr. L. W. DeGraff was in from Paragon-Revolute Corporation (subsidiary of Bruning).

The turn-in-value of the Viking Reprofax is $200.00.

The machines discussed were:

1. Revolute Meteor 40, 42 inch printing width, 20 feet per minute developing speed, synchronized, console model. 200-240 V, 60 cycle, single phase, dry process.
   Total Cost----------$2,050.00
   Chandler Financing-------$56.25/month for 36 months.

2. Revolute Rockette, 42 inch printing width, table model, 15 feet per minute printing speed, synchronized. 220 V, 60 cycle, single phase A. C., dry process.

   Cost of basic machine-----$1295.00
   Floor stand--------------$ 130.00
   Total Cost---------------$1425.00

   Bruning Financing---------$53.96/month for 24 months.

Each machine has a 90 day guarantee. The cost of bulb replacement is:

Meteor 40-----------	$170.00	one year guarantee
Rockette-----------	$ 85.00	90 day guarantee

Delivery on both machines is one week.

INTEROFFICE MEMORANDUM

DATE January 25, 1960

SUBJECT Avco Crosley Div. V. Scott tel. call 1/20/60 re: building blocks Tel. KIrby 1-6600 ext. 530

TO Ken Olsen

FROM

There situation there is that they have a twenty month project to construct a computer for industrial purposes. They anticipate very high reliability requirements, something like continuing operation of a hundred and sixty hours a week for twenty years, is what he told me. They plan to use a drum for memory in the computer and they anticipate a clock rate not to exceed 400 kc.

They're conducting a preliminary screening of building block manufacturers and hope to have this completed by the end of January. At that time they expect they will have two or three remaining organizations with whom they will conduct one month of detail analysis and investigations concerning the equipment involved. At the end of that time they will select one manufacturer whos equipment will then be used from this point on. They anticipate that there will be between twenty-five hundred and three thousand building blocks involved in this program.

Every indication is that they are making what appears to be an exceedingly thorough investigation of equipment and he rattled off a list of some twenty or thirty different types of questions which they would be interested in asking us. Some of these questions relate to what polarity logic we do, clock distribution system, types of flip-flop and building blocks involved, minimum clock pulse energy, delay of each circuit, kinds of gates, standardization of voltages, interconnection ruled, fan-out capabilities, fan-in restrictions, input-output loading, quantitative evidence of reliability, susceptibility of circuit to noise or cross talk design criteria, involving derating philosophy, availability of marginal checking, type of connector used, mounting rack capabilities, temperature effect, etc.

I promised Mr. Scott that we would send him the 3000 series literature and preliminary sheets on the 4000 equipment immediately and would telephone him early next week, perhaps the 25th or 27th of January to arrange for a further get-together with him. That telephone conversation should probably be made by Dick Best and perhaps should be followed with a visit by Dick to Cincinnati, if it seems worthwhile after the telephone conversation.

Mr. Scott indicated that he would be busy on the 26th of January so that it is not a good day to contact him.

INTEROFFICE MEMORANDUM

File

DATE January 22, 1960

SUBJECT

TO Harlan Anderson/Dick Best/
Ben Gurley/Stan Olsen

FROM Kenneth H. Olsen

Mr. Gordon, of ARDE Engineering Company, somewhere in New Jersey, called today offering their services. They are, they claim, consulting engineers but they are really an organization that rents engineers either on our premises or on theirs. They perform drafting services and, I think, more ordinary type engineering. It might be that they have people who are expert on MIL specs which we might include in our price on some military bid which we send in.

IBM used a number of this type people in the SAGE system while we were early in the program. Usually the engineers are not the most inspired and they are rather well paid but there are instances where it is worth while using them.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE

January 21, 1960

SUBJECT

TO

J. L. Atwood
R. L. Best
J. B. Brown
H. J. Crouse
B. M. Gurley
H. M. LeBlanc
S. C. Olsen
A. E. Pontz
M. Sandler
W. E. Weeton

FROM

Kenneth H. Olsen

Those departments and groups which are not directly involved in solving customers' problems often lack the attention and interest they should get from the rest of the organization. The groups often don't get the suggestions and criticisms from their users that they should and they don't have the opportunity to pass on criticisms and suggestions to the users. I am now proposing that we set aside a time each month where each service group will meet with those users which are interested.

I propose that 8:30 Monday morning we set up a meeting in my office for one hour or less. If this meeting is permanently scheduled, then we can adjust our other appointments around it. I suggest that the first Monday of the month we meet with the Accounting Department, the second Monday the Personnel Department, the third Monday the Publishing and Advertising Department, and the fourth Monday the Purchasing Department. If there are five Mondays in a month, we'll have a vacation that Monday.

We'll try this for a few weeks and maybe after that we'll have some better ideas as to how we should run it. We'll start next Monday, January 25, with the Purchasing Department.

Kenneth H. Olsen

File

January 21, 1960

"Blue Line Equipment"

Dick Best/Maynard Sandler

Walter Weeton

RCA, Needham and IBM (Capozzi) have informed me that they would be purchasing in the next week some of the "Blue Line" equipment. In checking with production on this, it was confirmed that several of the units have not been released. The below chart is a summary of the situation. Production has checked with engineering and has been given the dates on which they would have the releases. Based on this release date to production and the assumption that there would be no further changes once production is started, production has given me the delivery dates to give to the customers. The order from RCA was taken this morning and the delivery date of 2/9 was furnished to them. The purpose of this memo is to inform the involved people of the situation so that the appropriate steps may be taken.

Type	Release Date	Availability	Owed at Present	Expected New Orders IBM
3101	OK	In Stock	4	28 / 2
3110	OK	In Stock	1	8
3201	1/20/60	2/8/60	16	3 / 6
3301	1/21/60	2/8/60	8	/ 2
3401	1/25/60	2/8/60	1	/ 1
3410	1/22/60	2/8/60	3	5 / 2
3601	OK	In Stock	5	/

Walter Weeton

cc: Jack Brown
Harlan Anderson
Ken Olsen
Bob Hughes

INTEROFFICE MEMORANDUM

DATE 1/21/60

SUBJECT Ozalid Reproduction Machine

TO Ken Olsen
Harlan Anderson
Stan Olsen
Roger Melanson

FROM Henry Crouse

Mr. Sumner B. Bruns of Spaulding Moss was here in regard to a new reproduction machine.

The turn-in-value of our Viking Reprofax is $375.00. The original cost was $550.00, purchased April 9, 1959.

The two new machines we discussed were:

1. Streamliner 100. Thirty inches printing width, synchronized printing and developing speeds up to 14 feet per minute, 115 volts, 60 cycles, single phase, table model.

Cost of basic machine----	$995.00
Wire basket holder-------	$ 12.75
Optional stand----------	$175.00
	$1182.75

2. Streamliner 200. Forty-two inches printing width, synchronized printing and developing speeds up to 14 feet per minute, 220 volts, 60 cycles, single phase.

Cost of basic machine----	$1295.00
Wire basket holder-------	$ 12.75
Optional stand----------	$ 175.00
	$1482.75

Both the 30" and 42" machine are guaranteed on parts for 90 days, F. O. B. Johnson City, N. Y.

Leasing Agreement: Based on the 42" machine at $1295.00 the cost would be; $42.74 per month for (36) thirty-six months. At the end of (36) thirty-six months there is an option:

A. Renew the lease @ $77.70/per year
B. Purchase outright for----$194.25

Chandler Leasing Corporation
17 Dunster Street
Cambridge 38, Massachusetts

$42.74
x 36
$1538.64

3. Used Machine, 42" printing width, developing speed 5 feet per minute, printing speed 14 feet per minute, not synchronized,

220 volts, 60 cycles. This machine has not been made for at least three years.

Cost of machine----$895.00

Leasing agreement not available.

A 90 day guarantee comes with all three machines, the cost of bulb replacement is approximately $85.00.

Delivery on a new machine 4-5 weeks, delivery on used machine 2-3 weeks, if one is available.

Spaulding Moss will accept payment on the following basis: 25% down, balance within one year @ 6% interest.

dec MEMO

DATE January 20, 1960

TO Cambridge Center -Sales Folder FROM H. E. Anderson

Mr. Charlton Walter of Cambridge Research Center telephoned today to follow up earlier discussion with some people who apparently work for him at CRC. They are interested in obtaining a new computer for systems simulation work. I promised that we would send him a copy of the PDP-3 specification as soon as it is available in mimeograph form and that I would then call him for a visit at our place.

His address is Mr. Charlton Walter, Cambridge Research Center, CRRBI Hanscom Field, Bedford, Massachusetts.

dec MEMO

DATE January 19, 1960

TO _____ FROM H. E. Anderson

SUBJECT: Houston Trip

We received in the mail today a reply card for PDP, from Mr. Rainer Kogon of Applied Research Association, P. O. Box 8173, Houston 4, Texas. Perhaps we should contact Mr. Kogan on our forthcoming trip to Houston.

He indicated on the reply card that he was interested in PDP for simulation, language research, flow studies, operations analysis. He also asked what are the prices for PDP-3 and when will it be available.

INTEROFFICE MEMORANDUM

DATE January 20, 1960

SUBJECT System Development Corp.

TO Ken Olsen

FROM H. E. Anderson

Recently, without cover letter, I sent our brief PDP-3 literature to Bob von Buelow at SDC. He telephoned this afternoon and said that they were definitely in the market for a computer. We have been talking with them for the last two years about a computer to be used for their simulation activity. Up until the present time this has never been a recognized and funded program within SDC. Therefore they were always attempting to minimize the cost and had entertained such ideas as buying a Bendix G-15 or a traded-in IBM 701. Now however, they have set up a thing known as the System Simulation Research Laboratory of SDC, which is a growing activity.

A fellow by the name of Harry Harmon is head of this new laboratory and Von Buelow works for him. von Buelow is charged with the responsibility of evaluating which computer they should buy. The four that he is now actively considering are the IBM 7090, Control Data Corp. 1604, the Philco S-2000 and the Honeywell 800. They anticipate making up their mind in about one month from now as to which one they will buy and they are looking for a twelve month delivery time.

One of the most important characteristics they want is versatile in-out capability. They also expect that they will need 32,000 words of memory and perhaps would like to have a forty-eight bit word length. I promised that we would send him the PDP-3 specification as soon as it was completed in its preliminary form. Also he and Harry Harmon will be making a trip to the East during the week of February 1. They will be visiting the Naval Center at Newport, R. I. during this time. They will be operating on a very tight time schedule and probably will not be able to visit our plant. In lieu of this I made a tentative appointment, probably for you, since I will be in Houston that week, to meet with von Buelow at the Beach Hotel and Motel, Newport, R. I., February 3, at 7:00 P. M. After von Buelow has our preliminary literature we probably should call him just before the first of February to confirm that date and check and see whether he and Harry Harmon will be able to visit us in Maynard, since I think this would be an important opportunity for them to see our plant to overcome any reluctance about the size of our organization.

dec MEMO

DATE January 19, 1960

TO Sales File

FROM H. E. Anderson

SUBJECT: Baird Atomic

Dick Bennett called several weeks ago and said that he had been speaking with John Fitzmorris of Baird Atomic and told him about our thinking on the subject of a data center. Fitzmorris apparently is in the same part of the company as Jim Cunningham with whom we have spoken earlier. It appears quite likely now that Baird Atomic will not be able to buy a computer due to the financing problems, but would be quite interested in renting time on even a PDP-1, particularly if they could attach a flying spot scanner to it. Bennett's impression was that they would be willing to rent up to $5,000 worth of computer time per month. We should follow this up sometime in the next month.

H. E. Anderson

cc: Reminder File
2/15/60

dec MEMO

DATE January 19, 1960

TO Maynard Sandler FROM Harlan E. Anderson

SUBJECT: Use of Defense Priority Ratings

The man whom we should contact if we need any help in filing priority ratings with our purchase orders, particularly for transistors, is Mr. William Fearing. He is part of the U. S. Department of Commerce, located in Room 232, the Post Office Building, in Boston. He is the man from whom we obtained the regulations about ten days ago. His telephone number there is CApitol 3-2319 and he was quite willing to help us in any way that he could.

H. E. Anderson

dec **MEMO**

DATE January 19, 1960

TO Jim Myers FROM Harlan E. Anderson

SUBJECT: New Sales Lead

John Teel, of Group 37 at Lincoln Lab, telephoned Jack Brown today and is very interested in our 4000 Series of equipment. Potentially, he may buy $25,000 worth.

We should add this to our list of sales leads that we are following up and drop a note in the Reminder File for about two weeks that we do something about this.

Harlan E. Anderson

INTEROFFICE MEMORANDUM

DATE Jan 18, 1960

SUBJECT

TO Harlan Anderson

FROM John Fadiman

While down at Daystrom Instruments at Archbald Pennsylvania , I spent some time talking with Gerry Smith. He felt that the main reason that we lost the bid for I.T.T. Memory Tester to Harvey Wells was not that we were greatly underbid, evidently there was a difference in price of only about $2000, but that our specifications were supposedly not complete enough. Evidently Harvey Wells made a great point of providing extremely detailed specifications which exactly followed what I.T.T. wished and it is on this basis evidently that they received the contract. Supposedly I.T.T. felt we were not cooperative enough in providing detailed specifications for what we intended to do. I must say that it seems to me that our ten sketches plus a letter of explanation should have been adaquate.

Gerry Smith also stated his reasons for using Sylvania type plug-in units rather than our plug-in units in the Memory System itself. His reason is that we did not provide him with exact information as to minimum and maximum delays through our circuits: pulse amplifiers, inverters, flip-flops, etc. Evidently he asked for this, but did not receive sufficiently detailed information. Therefore even though our units may be slightly faster than the Sylvania units, nevertheless Daystrom could not guarantee to I.T.T. the exact speed of our units,

and supposedly he could on the Sylvania units. I think this is quite important and we should see to it that our literature specifies exactly what minimum and maximum delays are to be expected in our logic units. This is evidently an important point sales-wise, for obtaining a contract, especially with a company which is as much as a stickler as I.T.T.

Gerry Smith also said that we should definitely in our literature indicate the advisability of using 10K load resistors in an exclussive Or Circuit such as we used in the Error Detector Circuit in MT 1513. This is a trick which we ourselves use and ought to be made available to customers using our equipment. We should specify exactly under what conditions the 10K load resistors ought to be used.

INTEROFFICE MEMORANDUM

DATE January 14, 1960

SUBJECT Customer Order Shipping List

TO Sales/Engineering/
Pat Reguera/Harlan Anderson

FROM Kenneth H. Olsen

The present list of customer orders has not been completely satisfactory because it does not list the date at which engineering is committed to release the units. Even more serious, copies of this list are not sent to engineering.

On the list generated for January 15, we will start a new format and send copies to the Engineering Department, in addition to the Production, Administrative, and Sales Departments. The format will be close to the present one but will be divided into three sections - those overdue as of the date of the list, those to be shipped the following week, those to be shipped the week after, and those to be shipped later. The headings will be: Customer, Our Number, Their Number, Units, Due Date, and Engineering Release Date. In general, most units will not need engineering release and the words "None" should be typed in.

In addition, we should have a separate sheet titled "Units Waiting for Engineering Release." This sheet should list all those in the previous categories that need a release with the following headings: Unit, Engineering Model Date, Engineering Release Date, Test Data Sheet Date, First Production Batch Date, Next Production Batch Date.

We'll try this system out this Friday and make improvements as we need it.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE January 12, 1960

SUBJECT Visit with John Hancock Insurance Company Personnel

TO File

FROM H. E. Anderson

On Monday, January 11, Ken Olsen and I visited with two key people in the data processing activity of the John Hancock Insurance Company. These were Mr. Harold Hatch, who is a second vice president, and Mr. George Wallace, who works for Mr. Hatch. These people apparently have been in the forefront of the activity at the Hancock Company and are quite proud of their successes to date. These have centered around use of, first, a UNIVAC I and now two UNIVAC II's. They still are only doing a small part of the potential data processing that could be done on computers.

Their economic success in this area centers around the fact that their business has been growing at a rate of some 20 per cent per year and they have not had to add any personnel or space in the part of their work which has been put on computers.

One of the next jobs that they plan to put on the computer is calculations of dividends and generating dividend notices for their policy holders.

A thumbnail sketch of their eventual hope would involve the daily searching and updating of the policies of 15 million policy holders. This is the present number of policy holders and this is growing annually at a very significant rate so one would have to allow for considerable growth in doing any planning here. This could continue to be up to 20 per cent per year. They estimate at the present time that they need about 600 digits of information on each one of these policy holders.

They had questions about how our computer might handle the alphabetical type data. They are familiar of course mainly with decimal type computers. During our conversation it became apparent that significant parts of their data would never have to be converted from decimal to binary since they represent things like policy numbers, policy holder's name, address, date of birth, premium dates, etc. This type of data does not need any data processing and, therefore, does not need to be converted.

They are quite pleased with the reliability record of their machine. They feel that they have had excellent results. For example, they have never had to put any of their data processing activities on someone else's UNIVAC machine because theirs was inoperative. They are quite strongly in favor of off-line equipment to do printing, etc., and at present they do all of the printing with two line printers.

They are at present thinking about what kind of computer they will need next and are somewhat favorably inclined to a machine in the category of LARC or STRETCH. They really don't have any firm technical base for saying that that is what they need, but they feel that maybe the next improvement of their data processing equipment should be a real significant one rather than merely go to a 7070 type computer. An important fact here is they have demonstrated during the past several years to the management of the Hancock Company the potential and some actual payoff in benefits from using data processing equipment for their work. This means that they will have a good chance of selling management on the idea of buying a more capable computer in the future.

Ken and I attempted to suggest the idea of using several small computers instead of one very large computer for their work. The reliability advantages of doing this did not get any favorable reception at all from these people since reliability apparently has not been a problem with them. The cost advantages might become significant to them. However, it is too early to talk about that right now. After the meeting Ken gave some preliminary thoughts to a method of hooking several computers to a common high speed memory and also to a patchboard where a large group of magnetic tape units could be patched in to different computers at different times. Using 200 bit per inch density and standard tape reel length, the amount of data that they are talking about for 15 million policy holders would be approximately 1200 tape units, which is virtually out of the question.

Since this was strictly an exploratory meeting, we will probably have another meeting with them after we have given further thought to the problem.

Harlan E. Anderson

HEA/jv

INTEROFFICE MEMORANDUM

DATE January 12, 1960

SUBJECT Electronic Associates, Inc.

TO File

FROM H. E. Anderson

Jerry Kennedy, from Electronic Associates, telephoned this morning to find out the status of the Navy computer project in California. I outlined this to him and gave him some of the technical data, such as, signal levels and mode of operation of our in/out transfer system. A man by the name of Don Bauman also came on the line and discussed the thing somewhat further. He is project engineer on their Addalink system. I promised to send them a copy of our computer specification when it is completed. This should be put in the Reminder File for approximately the 10th of February.

H. E. Anderson

January 12, 1960

Business Interruption Insurance

John Connoley HEA

TomMotley stopped in this morning and asked if we had given any further thought to the Business Interruption Insurance. I told him we had not and that I would get in touch with you and review the status of your investigation of the subject. Would you when convient bring me up to date on this subject:

Copy to Mr. Olson

SALES TRIP REPORT JBB

January 4 - January 8, 1960

The firms contacted were Johns Hopkins, NSA, and NRL in Washington, and Philco, Monitor Sys. Inc. and RCA.

Johns Hopkins

Most of the work here is on advanced radar which is quite digital in character. Greenly is presently using our equipment for making auto correlation studies. He clips in analog sig, differentiates set and clears a flip-flop, runs the info into a shift register to delay the signal, and then uses the output of a bit to gate through the analog signal directly. This output is then integrated to obtain the correlation function.

Greenly has ordered the 1MC → 1 sec counter primarily to an evaluation. Johns Hopkins has contract for the ground control station for the Pacific Missile Trocking Sys. where a ground station fmx will track a satellite and determine its position by doppler effect. Their similar equipment can be used anywhere on earth to look at the satellite and determine their position on earth within 1 or 2 miles. Greenly will use our counter to count down on a known source and compare it with WU1V and an atomic clock. China Lake is performing the same evaluation but with 3C. equipment. It seems to be a static vs. Dynamic Logic comparison. If we win there mgy be large volumes involved. At any rate, Greenly will supply reliability data for use.

Talked to Bernard Quinn and Frank Mohan. Both are in love with our equipment and will continue to buy. They had a 10% failure rate of Inverter clamping diode but believe it was just a bad lot. They are not too upset by this.

Talked on phone to John Walton. His group is just beginning to get started in digital field - want literature - and will definitely be in the market. Has simple applications and wants to educate his men. He saw our stuff at Bernard Quinn's.

Follow up:

1. Send Greenlee - 2 Ckt Books, 12 Tracing Paper for 1901
   - find out BW of our delay lines.
2. Bernard Quinn - Blank Planel of FF & Inverter
   - Asked if I could get clearance and come down and discuss particulars.
3. John Walton - Be sure to follow this man. Put in reminder file to contact him in 2 weeks.

Philco

Harry Scholy appeared satisfied with the 264 bit shift register idea, and we went over his block diagram calling out all he needed. The only question is on a difference amp. He wants to take his analog signa and digitize it. The input must have hysteresis between two levels. The output must be able to differentiate 10MV, and the entire packages must be in SBB.

Follow up:

1. Call Scholy on Monday with:
    1. Price of Equipment
    2. What we can do on difference amp. He will eventually need 64 such amp.

Monitor Systems

Telephoned Dr. Schubert. They are planning their own modules, but may have use for ours. Size and temperature are important. He thinks he might have need for test equipment and would like to receive literature. He says the tie with Epsco is not strong.

Follow up:

1. Add Dr. E. Schubert and Leighton Meeks to mailing list and follow up with a telephone call in two weeks.

RCA

A talk with Albinson revealed that the power supplies were for general use in production. He suggested that Ed Davis, X 4158, was the man to contact on the digital test equipment side here in Camden, and that Hugh McGamney or Al Linch might be good men down at their Flight Center in Deleware.

Follow up:

1. Introductory letter to Ed Davis, Hugh McGomrey, and Al Lench.

NSA

Discussed the 10MC shift register with Atkinson on his problem. There is a lot more here for us than meets the eye. Atkinson works for Ray Tote who is in charge of one-third of the entire electronic equipment division. Tote is doing this job for Frazer and delegated the job to Atkinson. Due to security, Atkinson would not tell me where they were getting the 10MC info, but did say that the work was being done over at NSA in Fort Meade. The contact man there is and has lots of 3Cs equipment.

The 10MC shift register is straight forward except that he will have to use a buffer which will require an inverter package at 10MC. I said we would do it. He needs a Model and Price immediately so he can place an order. We should expect the order in about 20 months. Note W. Schmidt works with Atkinson.

Follow up:

1. Call Atkinson, Tuesday, January 12, 1960 at 9:00 AM with the dope on the 10 MC Inverter. Note, he plans to order 10, 15, or 20 such packages.

NRL

John Rider is satisfied with the multiplier except that he may want us to wire up the chassis. Hugh Peterson is still on vacation but will return January 11, 1960. Peterson's boss is and appears to be satisfied with the dial. We should hear from them by end of week of January 18th. It will have to be put out for bid.

Charles Phipps and Charles' boss were interested in our low speed line, but have no need at the moment.

I

While MM got a lead on the work at NASA which has recently moved to the Naval Receiving Center and will shortly move to their new building in Beltsville. The contact is Looney.

Follow up:

1. Call Rider in one week to tell about wiring.
   Send literature on FDP

2. Write an introduction letter to Looney.

dec MEMO

DATE January 8, 1960

TO Harlan Anderson FROM Kenneth Olsen

In the Eta Kappa Nu BRIDGE of spring of 1959, they say that Columbia and Princeton Universities received a grant of $175,000 from Rockefeller Foundation for the establishing of the nation's first center devoted to the composition of research of electronic music. That outfit probably needs a very simple, very high speed computer with not very many digits. They might even be in the market for a machine like the NSA 10 digit one, in which case, they could do all the computation in the machine and have the actual music come off magnetic tape.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE January 8, 1960

SUBJECT

TO Harlan Anderson and Dick Best FROM Kenneth H. Olsen

I called John Harris at Lincoln Laboratory and told him that we feel a 1000 word memory 6 digits long makes the optimum buffer. They write words on tape every 16 microseconds, but the initial time he requested was 12 microseconds cycles so the needed time is somewhere in between. He has turned the project over to Mr. Popp who is collecting the information and making a study of this. This is particularly a magnetic tape buffer which would be separate from their main processor, and I think we should encourage him to use all our plug-in units in this portion even though the data processor uses CG-24 units. He asked for rough size and price, and I said I thought it would cost about $6,000 for the memory itself. I might be way low on this because of the cost of engineering, but we may want to absorb part of that cost ourselves because this might be a useful catalog item. I don't know how much logic would be involved in addition to the buffer, but it would be worth while working this problem out with them.

Their data processor has a 96 bit register of which they will ship the last 6 digits over to the buffer. They will take care of shifting 6 bits at a time supplying new information to the buffer.

I think we could use low speed flip-flops in the memory address register and the main buffer register and use low speed transistors in our switches, perhaps the indicator light transistor would do.

Kenneth H. Olsen

KHO/jv

dec MEMO

DATE January 7, 1960

TO Harlan Anderson FROM Kenneth H. Olsen

Have we gotten the new travel insurance for the company? If we have, we should send a memo to everybody who travels because I'm still buying insurance.

Kenneth H. Olsen

DAP 984

INTEROFFICE MEMORANDUM

DATE January 7, 1960

SUBJECT Remington Rand UNIVAC
510 Memory Bid Request

TO Harlan Anderson, Sales Department, and Engineering Department

FROM Kenneth H. Olsen

General

Remington Rand would like us to bid on the memory for their new medium size commercial computer. This memory will be in two separate and identical packages, each with one to four 4096 modules of 28 digits. The computer can use these in double length words or have two separate memories and they may want to have the option of overlapping them time-wise. The computer apparently is not very far along in design, but they have a crash program and would like to make the memory in parallel. Because of this, it might be expensive in liaison time to do this project; but because their needs are so close to what we already have, we should give it careful consideration. They would like a price estimate in the next few days, and I told them we would do this. They have a very narrow selection of vendors most of whom have had very little experience in this field of fast memories.

They would like the bid in six separate parts:

1. The cost of the memory. I suppose this should be the frame with one 4096 word module. The price of each additional section of 4096 words would be separate.

2. The spare parts that we would recommend for a 4000 word memory or an 8 or 16.

3. A memory exerciser to test the complete memory which will probably be very close to the one we made for Daystrom. This might become a popular item in the field if the computers sell well. This tester should have the same construction standards as the memory.

4. A tester for the building blocks.

5. Complete manufacturing drawings and instructions which would include the license or right to manufacture.

6. Maintenance manuals which would have to be in the standards of Remington Rand and would have to be quite complete because of the large number of types of people doing maintenance in the far corners of the country.

Mechanical Considerations

They have a proposed frame which would be compatible with the rest of the computer. This frame is made from Unistrut. This frame is much more rugged than we need because it was originally designed to hold power supplies, but we can adapt it as we please although they want it no higher and would like it somewhat lower. We might possibly allow it to be just slightly wider. They have a generous area from the floor up to the rack space because they normally put elaborate cooling. They will put brackets and fasten the outside skins with extrusion trim on the surface of the frame. This frame is roughly equivalent to two 19 inch racks with 49 inches of panel space. This makes it very tight for our memory if we include four modules but we do have room to play with because it is plenty deep to put two racks back to back. We could easily do this with our power supplies if we mounted them on slides (which we probably should do anyway for vibration reasons). If our memory modules are four 19 inch panels, 5-1/4 inches high, we could tie them all mechanically together and put them on slides or hinges. Danger in working this type project is after we work out something they may veto it or they may shorten the height of the racks.

Block Diagram

Each memory cabinet must have its own memory buffer and memory address register with selection. The signals from the computer might be rather sloppy because of the eight or so feet of bundled open wire over which they will come.

The common part to each memory box will be the NAR and NBR and four 8 position switches as first level decoding. In addition, the common portion will contain the power supplies and the timing circuits and the gating necessary to select between the four modules.

The modular portion will contain for each 4000 words of memory a stack 128 switch positions or 32 switch plug-in units, 28 digit drivers or 7 plug-in units, and the read-write switches. The number of wires going to each module I figure is 32 selection wires, 28 input wires, 28 output, plus a few signal lines, or approximately 100. They would like to have all this on a plug so they could interchange modules quickly. They realize, as we did, that it makes tremendous sales point if you could increase someone's memory by just plugging more in.

Miscellaneous

They requested spare plane and spare line coordinate in each plane but they will probably back down on the spare line requirement. They specify the paint on the interior structure but will probably modify this and will not be strict as to the grade of finish. Everything is specified in terms of signals at the computer portion and so the memory supplier must take into account all delays and signal deterioration in his own design. They request cycle time of 6 microseconds and it seems doubtful that much will be gained if the memory ran at 5.

They, of course, want no voltage sequencing.

The computer has a standard 2 megacycle clock that puts out pulses on a low impedance line of about .1 microsecond wide with some +1.25 volt base to a -1.25 amplitude. Their time points are defined as the time when these pulses go through 0 in the negative direction. These pulses can be used by the memory to help synchronize the computer. Address signals and information signals, along with the start write cycle or start read cycle information come in the form of DC levels, one-half microsecond long, which probably should be gated using the clock pulses. The outputs of the memory are DC levels that are held all through the write cycle. In addition, the memory should produce a DC level called a memory busy line which tells the computer when the memory is in use. It must also give a half microsecond level a few microseconds before the end of the cycle to notify the computer that the memory will soon be ready for another cycle.

Their levels are 0 and -3 nominally but their tolerance at -3 is a little tighter than we normally have, but we must give our own voltage a tolerance in any bid we present.

Conclusion

We will probably bid on this job because we can rather easily probably do a better job than anyone else can do. There are dangers, however, and we will have to look very carefully at all the legal aspects. I am particularly concerned about selling the right to manufacture this memory which seems so much better than anyone else can do.

Kenneth H. Olsen

cc: Ted G. Johnson

INTEROFFICE MEMORANDUM

DATE January 7, 1960

SUBJECT

TO Harlan Anderson FROM Kenneth H. Olsen

With our present means of selecting memory, a memory with a small number of bits and a large number of words comes surprisingly inexpensive; and we should look into an IBM 1620 type computer. There is a possibility of doing something like that but significantly faster because of our memory speed.

One possibility would make a 4 or an 8 digit parallel machine but arranged so that in the general case it will be used in multiple precision or in words in multiples of 4 or 8.

In the ARC memory I feel we need 256 words at about 15 or 16 digits. A very interesting question develops here as to whether it might be cheaper to make it 1000 words at 4 bits.

It turns out that slowing down our memory does cut its price because we can use slow speed flip-flops and lower speed transistors in the switch positions. A significant part of the manufactured costs of the present memory is the high speed transistors in each switch position.

Kenneth H. Olsen

KHO/jv

INTEROFFICE MEMORANDUM

DATE January 7, 1960

SUBJECT Buffer for Anelex Line Printer

TO Harlan Anderson/Dick Best/ Ben Gurley

FROM Kenneth H. Olsen

We're going to have to decide fairly soon how we propose using the Anelex line printer. It seems to me that a buffer is going to be necessary. This buffer may be the bulk of the logic in an off-line installation, and it might mean that our Anelex device might be off-line or on-line depending on how it is connected.

It might be possible to make a flip-flop buffer which would be very economical. This would hopefully consist of 6 simple flip-flops in a plug-in unit with a gating that would allow the address of the character written in. On the outputs there would be 6 AND circuits that would AND the flip-flop outputs with the rotation counter. These would all be ANDed together so that when the rotation counter corresponded with the contents of the flip-flops the print hammer would be triggered. Making six very simple flip-flops might be easy, and in fact we might use the thyratron type transistors for this, but how to AND six AND's is not readily obvious.

The other approach is to make a core memory. Because cores do not put out DC levels, one cannot get by with only six cores per character but would need one core per position on the print wheel (about 64). The printer we are now considering has 64 lines across but we should be able to use the one with 160 across. This core array would be 64 words with 64 (or 160) digits. When the number of words is small and the number of digits is high, linear selection seems to be the obvious choice, because the cost of sense amplifiers and digit drivers is less for linear selection. We should consider using large cores with several turns for this. The 64 position switch can be our regular coincident current driving switch but can have low speed transistors. The memory address register should count so that it can be the rotation count. During one rotation the paper will be advanced and the buffer will be read into and the memory address register will be used for

writing the information from the computer. During the next rotation the printing takes place and the MAR is the rotation counter.

An off-line Anelex printer would probably be a very salable product.

Kenneth H. Olsen

KHO/jv

INTEROFFICE MEMORANDUM

DATE January 7, 1960

SUBJECT Buffer Memories

TO Sales Department/Harlan Anderson/Ted Johnson

FROM Kenneth H. Olsen

John Harris, of Lincoln Laboratory, asked if we would be interested in building a memory to be used as a tape buffer for them. This is a quite common problem and I believe Telemeter Magnetics and General Ceramics, and Epsco do a significant business in this line. Lincoln Laboratory wants this to store 96 bit words and take them off 6 bits at a time to feed on the tape. The more general case would be the one to take long words, store them and put them on tape 6 bits at a time and do the reverse when coming from tape.

Because the usual application is completely sequential, most people take advantage of this and drive with shift register or some other sequential means. We did some rough pricing and it looks like our standard memory technique using standard coincident current memory would make a very economical buffer and give a lot more freedom because it would be used as a memory address register for selection. The price we are looking at for Lincoln would be 1000 words of 6 bits and use all low speed circuitry including a low speed switch transistor for memory selection. The same memory could be made with a 5 microsecond cycle or better by simply putting in high speed logic and high speed switch units.

My first pass at pricing one of these makes it look like a formula price of about $5,000 for the 12 microsecond memory and a formula price of about $8,000 or $9,000 for the 5 microsecond memory. The catalog price I think would be about $7,500 for the low speed unit and about $1,200 for the high speed unit, but this is only a guess right now.

Kenneth H. Olsen

KHO/jv

INTEROFFICE MEMORANDUM

DATE January 7, 1960

SUBJECT Mr. V. A. Van Praag, of Electro-Logic Corporation

TO File

FROM H. E. Anderson

Mr. V. A. Van Praag, who is president of Electro-Logic Corporation, stopped to see us for about an hour on Wednesday, January 6. He is a former student of General Doriot's at the Harvard Business School and had been down at American Research before coming out here. His background is that he was at Bendix in their computer department for quite some time and is intimately familiar with the marketing of the Bendix G-15 computer. More recently, he had been at Packard Bell Computer Corporation and was one of the founders of it, I believe. He has just recently left there and formed Electro-Logic Corporation, which has its headquarters at 515 Boccaccio Avenue, in Venus, California, telephone EXbrook 6-3137.

His purpose in coming here was to determine suitability for some of our building block equipment to be used in conjunction with their new products. Their products are going to be in the area of inexpensive analog to digital converters. The main one that they are talking about is an analog time delay transformer. We had a brief product information bulletin, dated December 1959, on this unit. Basically, what it does is to convert a very low level analog signal such as the output of a thermocouple into a time interval. The place where our equipment might fit in is to measure the time interval by counting at a fixed stable frequency.

Most of the things that they expect their unit to be used for are very low speed, and as such he thinks that our 500 KC units probably would do the job. We did not discuss the fact that we do not have the real stable clock in the 500 KC region. This may be a problem.

I gather that they will be making these things somewhat tailored to customer requirements and the fact that we have worked out many different kinds of decimal codes for our units might be very helpful to them. For example, the excess 3 code, the 8421, the 4221, etc. He was also interested in the fact that it was so easy to make a counter which would count up and down with our units.

Their needs and requirements are not really well defined yet because it is too early. However, we should keep in touch with them. I mentioned the fact that Ted is in El Segundo, and Van Praag said he would be very happy to have you come visit them or would come see you sometime.

The main thing to do for the immediate future is to keep in touch with him on a periodic basis. I will place in our sales folder for Electro-Logic Corporation the product bulletins that he left with me and I'll have copies of these made and sent to Ted.

Harlan E. Anderson

cc: Ted Johnson

INTEROFFICE MEMORANDUM

DATE January 5, 1960

SUBJECT Comments on PDP-3

TO Ben Gurley

FROM HEA

The general discription in section 1A seems to be missing any hint as to possible applications of the machine. Also is it truly what we would call a synchronous type machine. Section 1B probably should be labled mechanical discription of equipment. Should a discription of the cooling provisions be included under the equipment description in section 1B? The word"central processor" has been used without being defined. Section 2-1 confuses me about whether it is a fixed point machine or a machine with no binary point. The first sentence says it's a fixed point machine and the third sentence says that digit 0 is a sign digit. On page 2-1 we have made a reference to converting decimal numbers to the binary system and a subroutine for doing this. This seems to be strictly a programing matter and as such might be better handled in the section on utility programs. Section 2-1 should not proceed 2-2, since 2-2 is the introductory material to the whole section. On page 2-2 it seems to me we should tell that the index registars are really just a certain group of regular memory registers. We should be consistant in calling it an indirect addressing or defered addressing. Shouldn't the description of indirect addressing be in the same section of the specification with indexing? If index register address X is a 0 this specifies that no index register be used. Shouldn't this be mentioned somewhere? On page 2-7 octal digits 7 through 11 specify Y in skip on negative index. This should be mentioned at this point for easy reading. The same thing for skip on possitive index.

Where is the detailed description of the rotate and shift instructions and their octal equivalents?

INTEROFFICE MEMORANDUM

DATE January 4, 1960

SUBJECT Notes on PDP-3 Proposal

TO Harlan Anderson/Ben Gurley FROM Kenneth H. Olsen

I. A.

PDP is a general purpose, high speed digital computer designed to be the center of a computing system or a high capacity control system. Its high speed instrument program control makes it a particularly versatile machine. Its completely solid state logical elements make it economical in space and power and makes possible the reliability needed for control applications.

PDP is a parallel, single address, single instruction computer. The main storage element is a coincident current magnetic core memory available in modules of 4096 words. Magnetic tape is used for auxiliary storage and as a means of transferring information.

I. B. Equipment

PDP-3 is modular in design to make it possible to adapt machine to customers' particular needs and to make modification easy at a later date. The F medic element and control take about 7 feet in the center of the main frame. To the right there is a 32 inch module added for each three banks of 4096 words of memory. To the left there is 22 inches added for each magnetic tape handler. This main frame is shipped in pieces and can be added to on the ends or between the units at any time.

The console is a separate desk approximately 7 feet long and contains all the operator controls and all the indicators necessary for operating the machine and maintaining it.

Figure ___ is a photograph of PDP-1 which is mechanically similar to PDP-3 but smaller in size.

I glanced through the rest and don't have any hot suggestions but I think we ought to rework this first part over and over again to see if we can't beef it up a little and make it read real smooth because it's about as far as most people get.

I think we should have John Conley go over the instruction portion of this in detail looking for mistakes, besides having as many people in the company read the thing as possible.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE January 4, 1960

SUBJECT

TO Harlan Anderson/Dick Best FROM Kenneth H. Olsen

John Harris, from Lincoln Laboratory, called today and wanted to know if we were interested in giving them a price on a 24 digit 256 word coincident core memory for use as a buffer in a magnetic tape loading system. They wanted the price with electronics and with just the stack alone. I told them that we don't supply just stacks and told them who did. I also gave him a list of the other people who might make this system for him.

They want a buffer about 6496 digit words which they will then put 6 bits at a time on tape. I asked them if they would consider 1000 words of 6 digits and he said most likely they would. I think they will always use the memory sequentially, but he wasn't completely clear about this. The 256 word memory has 50 microseconds per cycle, but the 1000 word unit would have only a fourth of that.

Kenneth H. Olsen