ABSTRACTS OF CERTAIN MEMOS
DONE BY J. A. JONES (770) 9/78

KHO Memos

12/10/59 to Andy / Ben Gurley
List of PDP-1 Prospects based on EJCC. Include Stone + Webster, JPL, Albert Einstein Hospital, NIH, Woods Hole, and others.

12/15/59 to Foren Prentice on maintenance of wood working tools

12/15/59 to Jim Myers / Andy on Carl Beckman's view of PDP-1 ~~—~~ for ITT. Competition is seen as CDC

1/4/60 to Andy / Gurley = Note on someone (?) PDP-3 Proposal

1/7/60 Andy / Gurley / Burt Buffer device for Analex line printer

1/7/60 to Andy, cc: T. J. memory bit to Univac

1/7/60 to Burt Too much gain in one-stage sense amp?

1/12/60 to Gurley standard audio amplifier for computer

1/12/60 to Foren Prentice Taper pins + connectors

1/14/60 Bi Weekly Report reference to sale of a PDP-1 to Ft. Detrick
AEC is "average response computer"
ITT lead for modules: they are going to build a super 24 bit machine

1/18/60 Allen LeBlanc Ken interviewed a Barbara Verity (Kate Stevenson?) at MIT

1/21/60 many a one hour weekly meeting to focus on user-loved departments

1/27/60 Jack Atwood Ken at work writing sales literature!

2/5/60 Burt, Gurley, Hughes design of low speed, low cost module line derivative from 4000 series

2/8/60 Allen LeBlanc Memo about an applicant: "--- suggested he stop in to get to know us. If he is that interested, will have a chance to look at him without being forced to say no."

2/24/60 HEA, Atwood Ken on the module literature

3/9/60	Burt	Some thoughts about selling memory to LL
3/18/60	Gurley	DARC (Digital Average Response Computer)
3/18/60	HEA, Gurley	Selling PDP-1 to non-computer users e.g. machine tool positioning, mailing lists
3/21/60	HEA	JPL PDP-1 lead,
4/7/60	Atwood, Brown	Need for a sales report form
4/7/60	HEA	Reference to an ARC demo program
4/14/60	HEA	Foxboro interest in DEC computers
5/9/60	Jack Brown	Need for a Sales Manual
5/12/60	Jack Brown	A series of paragraphs on DEC modules, apparently in response to a set of questions posed by Tech Reps.

dec MEMO

DATE December 28, 1959

TO Ken Olsen/Jim Myers - February 1, 1959

FROM Ken Olsen

Please request Tektronix oscilloscopes and preamplifiers and probes for the New York I.R.E. Convention.

Ken Olsen

dec MEMO

DATE December 28, 1959

TO Loren Prentice FROM Kenneth Olsen

We have built the pulse generators to tie on the oscilloscopes to trigger off-on equipment, but they look too ugly to give away or sell to other people. It would be nice if we could pot them in epoxy. Epoxy Products Company, whose catalog we have, have very nice little shells for potting. We might buy one of their round ones, about 3/4 inch in diameter, and maybe 3/4 inch high, and screw a banana pin into the center of the bottom and drill holes for leads coming out the sides, and put the transformer and components in the thing and then pot it all up. I think they would be willing to send us a few samples if we'd like to try this.

Kenneth Olsen

dec MEMO

DATE December 28, 1959

TO Harlan Anderson FROM Kenneth Olsen

Have we answered the inquiry from Hyatt Bearings, and would a telephone call be in order at this time?

Kenneth Olsen

dec MEMO

DATE December 28, 1959

TO Helen LeBlanc/Stanley Olsen FROM Kenneth H. Olsen

Please send a letter or call Northeastern University to see how we can get co-op students to work for us. We should stress the point that we have M.I.T.'s best engineers and are leaders in the electronic field, and we are interested only in the best students. Of course, you'll have to put it a little nicer than I've put it.

Kenneth H. Olsen

dec MEMO

DATE December 28, 1959

TO Ken Olsen/Harlan Anderson FROM Ken Olsen

We should call Sam Auchinclass, of Tracer Lab, to make an appointment with Twinning to go over their salary studies, and we should also call John Proctor at Mitre Corporation to see what the latest story is on their Los Alamos studies.

Ken Olsen

dec MEMO

DATE December 28, 1959

TO Ken Olsen/Harlan Anderson FROM Ken Olsen

We should call Sam Auchinclass, of Tracer Lab, to make an appointment with Twinning to go over their salary studies, and we should also call John Proctor at Mitre Corporation to see what the latest story is on their Los Alamos studies.

Ken Olsen

dec MEMO

DATE December 22, 1959

TO I.R.E. File

FROM H. E. Anderson

I telephoned the I.R.E. in New York today to find out about our booth assignment. I was told that an assignment has been made and it was mailed on December 18 to us and we should receive it shortly. Our booth number is 3831 on the third floor. I spoke with Miss Weyand. This assignment conceivably might be changed if they need to in order to keep exhibitors who compete with each other from being adjacent, which appears to be a current problem at the moment. There also seems to be virtually no chance of getting an increase in space. Space availability is tighter than it has ever been before, according to her.

Also located on the third floor with us this year will be Computer Control, Navcor, and IBM.

H. E. Anderson

CC; J. L. Atwood
K. H. Olsen

dec MEMO

DATE December 21, 1959

TO Dick Best FROM K. H. Olsen

Will you get hold of a dictating machine and dictate a memo describing our very high speed analog digital converters; in fact, maybe you should give it a memo number, and I'll send it to our patent lawyer to see if he thinks it's patentable. If he doesn't, we can do two things with it: (1) having sent it to him, we'll show that we have been working on the idea and set a date on it, and (2) we might publish it somewhere so that no one else can get a patent on it.

You should make some notes on your notebook and have somebody sign them. These can be very brief, but at least set a date.

K. H. Olsen

KHO/jv

dec MEMO

OK

DATE December 15, 1959

TO Jim Myers/Harlan Anderson FROM Ken Olsen

Carl Beckman, who used to work for Burroughs and is now a consultant, has been making studies for IT&T and Earl Puge told him about our computer. He looked over the specifications and thinks it's the hottest thing around and something that IT&T and the Ordnance Department should use. I told him what I could over the phone and he was very enthusiastic and thinks we have a machine much better than the CDC machine. He is going to send a letter and from that we can get his address.

Ken Olsen

dec MEMO

DATE December 15, 1959

TO Harlan Anderson/Ben Gurley FROM Ken Olsen

For applications where we need a real timed clock, we might consider the Datex Corporation digital clocks. These have digital education on the front panel and hours and minutes and seconds. They also have a switch which gives the readout interval, but I don't think we need that. They need some synchronism because during the switch there is some ambiguity in the contacts.

When all is wanted is a printout of the time a program is started, the month and date could be entered with toggle switches and a clock that gives minutes and seconds could be used otherwise. The month could be entered in toggle switches and the days and hours and minutes come from the digital clock.

We have bulletins on this unit in the catalog file.

Ken Olsen

dec MEMO

DATE December 15, 1959

TO Bob Hughes FROM Ken Olsen

We have a gross mistake in our literature in claiming that the drive on a diode unit is equivalent to one load when really it is equivalent to three loads. Will you consider methods of correcting this, and maybe we should simply mark up all our literature that we have now or else send out new application notes.

We also have not told people about the problem of putting resistors to -3 from emitters that are used in pulse gates. Will you consider a short application note that will explain this and that we can send out with our next mailing.

Ken Olsen

CC: H. Anderson
R. Best
J. Brown
S. Olsen
W. Weeton

INTEROFFICE MEMORANDUM

DATE December 31, 1959

SUBJECT Literature for Remington Rand

TO Lewis Yeager FROM Kenneth H. Olsen

Tuesday morning, January 5, I have to go to Remington Rand in Philadelphia to try to sell them a computer memory, which looks like a large production item for a long period of time and might be very desirable business; and so I would like to be prepared to show them some of the work we have done in this area to prove our competence.

I would like to have you prepare a notebook for me with photographs and literature of all our memory testers and a little on our memory. I would like to have mounted in celluloid folders photographs, 8 x 10 glossies, of the RCA Memory Tester, the General Ceramics, and the Daystrom Exerciser, and also a photograph of the Single Core Tester. If we don't have photographs of these things, let me know before you go to great trouble to do this. If you have close-ups of the memory and PDP, I would like to have that also. In this notebook I would like to have literature on the Memory Tester and the single sheet we have on the Single Core Tester.

I am asking Ed Harwood to collect photographs of the waveforms of the memory and after he gets them we'll arrange them on a sheet to do inside this folder, and possibly we may want to photograph the sheets so we can use it later. In addition, it might be nice to include a few photographs of the plant that you have collected.

I won't leave this memorandum unless desirable, but plan on the possibility. I think we should use one of our brown and yellow embossed notebooks.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE December 31, 1959

SUBJECT

TO Jack Brown

FROM Kenneth H. Olsen

Jay Forrester, as part of his study of the company, needs some information as to our sales program. He would like to develop an average delay between sales effort and results. What he would like is a very brief case history of a few customers. He suggests three, but I think we will have do several more because of the wide variance in results. I would like you to pick a few and work out this report, which really should contain very little information because all he wants to know is the time from the first contact to the sale and how much of which type people were involved in selling. I think we should also include in this the amount of each sale and perhaps how much future business resulted from that initial contact.

Jay suggested three samples, one which took very little selling, one which took a lot, and one which was in between. I think we should have a few more, and the breakdown should be Jay's way but perhaps in a separate, simple study should be the results of our proposals which we did very little door pounding to get but invested quite a bit in preparing the proposals. Proposals have been very poor but this is important.

He would also like to know what the yield has been from those customers with whom we have given any reasonable amount other than time to. I think this should not include the bids we sent in.

Kenneth H. Olsen

cc: H. E. Anderson

INTEROFFICE MEMORANDUM

DATE December 29, 1959

SUBJECT Oilgear Company

TO Harlan Anderson/Dick Best/ Ben Gurley

FROM Kenneth H. Olsen

Wes Broom, from Oilgear Company, on Route 128, is coming out with one of their project engineers at three o'clock on Wednesday, December 30, to discuss their problem.

My thoughts now are to make a single register device which adds one, subtracts one to keep track of the shaft encoder and also adds and subtracts the contents of the tape register. When a new number is read from the tape, it is subtracted from the shaft counter giving a relative error. When operation is complete, the contents of the paper tape are added to the counter giving the absolute position again.

There are a number of problems with a servo-mechanism, particularly when it is tied to a machine tool which we have thought out, and this is the sort of thing they will discuss with us.

If we could make a simple test equipment counter connected to a DAC converter, it would make an enticing demonstration for them.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE December 29, 1959

SUBJECT Request to Bid - White Sands Missile Range

TO H. Anderson/W. Weston

FROM Kenneth H. Olsen

We received a request to bid on December 28 from White Sands Missile Range. They specified detail mechanical requirements but specify electrically practically nothing and don't even tell the number of units. Andy called to see if he could find out anything from them and got in touch with the Purchasing Agent, a Mr. Mike Elorreaga, who was very helpful and gave the name of the engineer, who is Mr. Robert Foler, at extension 5166. We have a Robert Fowler, which might be the same man, but we don't know whose spelling is correct, our card or the Purchasing Agent's. The Purchasing Agent's extension is 5724.

The engineer suggested three vendors, Harvey-Wells, Computer Control, and DEC.

I wrote a detailed letter to the Purchasing Agent listing our questions and I will try to call the engineer. He was not in today, Monday, but I will try again on Tuesday.

Kenneth H. Olsen

December 15, 1959

Loren Prentice

Ken Olsen

Our woodworking tools have been receiving very little maintenance because they are not a key part in our manufacturing, but there are times we count on them being there and in working order, and I suggest that we set up a regular maintenance program on them. Maybe every two months we should go over them all and make sure that the guides are square, the sawdust is cleaned out, and they are greased and oiled.

I used the circle saw over the weekend and was surprised to see how many parts were loose and that the ripping fence was not square and the mitre gauge wobbled.

I think it would be a good idea to include all electric drills we have in the house in the same maintenance program. If we can catch the Universal motors before the brushes wear down completely, we'll save the price of replacing the whole machine. We have a kit of brushes somewhere which we can use in maintaining this equipment. The vacuum cleaners, of the Sears Roebuck type, also have Universal motors.

The small Dumore drill has not had its brushes replaced since we started, I don't think. I guess what I'm suggesting is that someone prepare a complete list of every motorized unit we have and that every month or two someone goes out and check each one, sometimes it will be a thorough overhaul and other times simply checking that they look okay.

Ken Olsen

KHO/jv

BI-WEEKLY REPORT

Kenneth H. Olsen

PDP-1 TERMINAL EQUIPMENT

The Flexowriter fell flat on its face during the EJCC, and we cannot tolerate it from now on. For a tape reader, we are considering the Digitronics photoelectric tape reader with thyratron drive which costs about $1,800 and looks quite neat. The other contender is the Ferranti photoelectric tape reader. We are also considering making a simple-minded tape reader of our own which we simply drive the tape without a clutch so that you read simple tapes with extreme speed and don't try to stop between lines. If you have to stop, you must be sure there is a long enough gap between information.

For a typewriter, we have tentatively decided on Soroban. Another possibility is the Auto Typist made by American Typewriter Company, in Chicago, which is the standard electric typewriter with a very simple-minded, but rather large, mechanism.

If we have a separate keyboard, we can use any electric typewriter that has electronic drive, such as the IBM output writer. Soroban makes a separate keyboard but it's such a simple job we might consider doing it ourselves. One keyboard which we thought about is a set of iron bars, one for each key that closes a magnetic circuit for each of the appropriate code groups. This mechanism would have the advantage in not having electrical contacts.

We talked to the man from IBM about card readers and card punchers but, in general, were quite discouraged because most of their mechanisms have so much more equipment than we really need; but we requested operator manuals and maintenance manuals on each of the possible contenders. The nicest unit is the 026 or 526 key punch which have reading stations and punching stations on them and very nice card handlers, but these machines are very slow and can only read or punch about 15 cards per minute.

CONSOLE FOR PDP-1

We were surprised to find out how much equipment was necessary in the console and so we are redesigning the table. The trend in design of modern tables now is to have the legs extend all the way to the corners. This will make it powerful for us to fit more equipment in. The back side will contain space for eight 19" x 5¼" power supply type panels or system mounting panels and four 3½" panels.

This will allow us to put filtering, contactors, typewriter control panels, and high voltage power supplies and anything else we need back there and still keep the top of the console quite free.

KHO/jv
12/11/59

December 10, 1959

PDP Prospects

Harlan Anderson/Ben Gurley

Ken Olsen

Here is a list of the most likely prospects for a PDP that came out of the EJCC and a few other contacts.

1. Stone & Webster
2. Republic Aviation (Computing Group)
3. Republic (Urbanik)
4. Baird Atomic
5. Wolf Company
6. Tech Ops
7. RCA (Jan Reichman)
8. Jet Propulsion Laboratory
9. Convair
10. Schlumberger
11. USNOTS
12. Albert Einstein Hospital
13. National Institute of Health
14. Woods Hole Oceanographic Institute
15. MIT Meteorology Department
16. Electric Boat Company
17. Case Institute of Technology
18. Lowell Institute of Technology

Ken Olsen

KHO/jv

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16. Electric Boat Company
17. Case Institute of Technology
18. Lowell Institute of Technology

Ken Olsen

KHO/jv

dec MEMO

DATE December 10, 1959

TO Ben Gurley/Jim Myers FROM Ken Olsen

David Caldwell from the Physics Department of MIT called and wanted detailed information about 18 digit and our 36 digit computer. They have some Air Force money that they can spend on this sort of project. They would like to have zero but would like more precision on the oscilloscope than 9 digits would, and they would like more computing speed because right now they have to read information off and put it into the 704. They like the machine particularly for their atomic trace studies but would also like to use it for a regular computation within the Physics Department. They are having a meeting today and that was why he was gathering the information together right now.

I invited him out here to see the machine and told him that it's possible we could even bring it down there and plug it in his wall and give it a try there.

Ken Olsen

December 8, 1959

IBM Card Machinery

Henry Crouse/Ben Gurley

Ken Olsen

Here is the list of possible IBM equipment with their prices as we got them from Mr. Cummings of IBM. The prices are in rent per month and does not include the 10 per cent tax. The selling cost is usually fifty times the card equipment price and forty times the electronic; for instance, the 026 is about fifty and the 711 and 721 are about forty times the rental price.

	Rental/mo.
026 Key Punch	$ 60.
526 Summary Key Punch	100.
407 Line Printer	800.
514 Reproducing Punch	125. for 100 cards/min.
	70-$120. for 50 cards/min.
525 Gang Summary Punch	85.
533 Reader from the 650	550.
537 Punch from the 650	700.
716 Printer	1,200.
714 Reader	1,500.
7500 (400 cards/min.) Reader	400.
7550 (200 cards/min.) Punch	550.

The machine on the 1400 series looks like a type 88 collator and it reads 800 cards per minute and punches 200. The number is not available and neither is the price. The 711 card reader, model 2, rents at $800 per month and purchases at $32,000. The 721 card punch, model 1, rents at $600 per month and sells for $25,000.

All machines read the long way except the 026 and the 526. This is, in general, not the way we like to read the cards or punch them because it complicates programming and means 80 read or punch stations as compared to 12 in the other direction. However, the 026 and probably the 526 are quite slow and operate only 20 columns a second, which is about 15 cards a minute, although columns which are not punched go through quite a bit faster.

Now, it might be possible to define the card handler from inside an IBM machine and buy just it because, in general, our computer has the intelligence necessary to run the machine and it is a shame to buy all the extra intelligence that normally goes with the card machine because they usually have to run by themselves.

Ken Olsen

KHO/jv

dec MEMO

DATE December 7, 1959

TO Stan, Andy, Wally, Jack Brown FROM Ken Olsen

United Aircraft has started their weather analysis program down at Hartford of which data processing is a key part. We should contact them and see if we can't supply the computing equipment for them. If any of you have contacts with someone down there, please let me know and we can organize our approach to them.

Ken Olsen

dec **MEMO**

DATE December 4, 1959

TO Jim Myers FROM Ken Olsen

I promised Mr. Pressman, of RCA and Pressman Associates, that we would supply schematic drawings of our key circuits for his new book which he expects to have come out next year. We were not mentioned in his last book because we were not helpful soon enough, but we want to be mentioned thoroughly in the next one. Will you gather for me a schematic of our 1105 and the 1201 package, of the type which we mail out as replacement schematics. Also gather a 201 and a Test Equipment Inverter Package, which I think is 103.

Ken Olsen

dec MEMO

DATE December 4, 1959

TO Jim Myers FROM Ken Olsen

Please prepare a model of a piece of test equipment with reject transistors and probably reject etchboard inside. It should be very good looking that we can send one to Professor Forrester and one to General Doriot. Also make a third one which I will send to Mr. Horace Ford. Flip-Flops are probably the best for this.

Also prepare two System Building Blocks of this same nature and seal in a plastic envelope and I will send those down to American Research for use in their lobby.

Ken Olsen

dec MEMO

DATE December 4, 1959

TO Ken Olsen FROM Ken Olsen

The Stromberg Time Company, Division of General Time Company, manufactures a card reader and they invited us to visit them and look it over. The man's name is Craig Reynolds and the company is in Thomaston, Connecituct.

Ken Olsen

CC: REMINDER FILE - 12/18/59

INTEROFFICE MEMORANDUM

DATE November 17, 1959

SUBJECT Tenative Pricing Schedule for Special Systems

TO
Harlan Anderson
John Fadiman
Stan Olsen
Maynard Sandler
Dick Best
Ben Gurley

FROM Kenneth H. Olsen

The price of a special system shall include the following components: DEC Catalog Items at catalog price and special building blocks priced as if they were catalog items. The engineering of the special units shall be charged under Engineering. These prices already include Selling, General and Administrative Expenses and should be added indirectly to the price.

Other components are charged at twice the cost to take care of Selling, General and Administrative Expenses. Engineering time is charged at $4,000 a month including Selling, General and Administrative Expenses.

Drafting, Shop-work and Technician time are charged at $1600.00 a man-month, which includes S, G & A.

We will assume that it costs $100.00 per chassis to wire a mounting panel in the assembly department and so with S, G & A we will charge $200.00 per mounting panel.

We should also add to this number, when selling, maintenance or installation costs may be high, particularly if, for example, someone has to go all the way to California. On the other hand if we are reasonably sure of selling a number of units we may plan on spreading the engineering and drafting costs over several units.

K. Olsen file

INTEROFFICE MEMORANDUM

DATE 17 November 1959

SUBJECT PRATT-WHITNEY MACHINE COMPANY

TO Kenneth H. Olsen FROM Kenneth H. Olsen

Bob Caesare called to give me two names of people to contact in Pratt-Whitney Machine Company who are working on digital control of jig bores. They are Lee Inscho and Mark Sluis. I told Bob that I would be down in Connecticut soon and would stop in to see them. He suggested that I also visit General Time in Thomastin, Conn.

August 24, 1959

DRAWINGS

All Members of the Drafting Room.

K.H. Olsen

It is considered important nowadays to simplify and streamline drafting procedures as much as possible. In our organization this is particularly important because we are continuously behind in our drafting and so I am asking each person doing drafting to look out for methods in which we can speed up our drafting procedure. We do not want to put any more detail or information on a drawing than is really necessary to convey all the information.

Above all, we do not make isometric drawings unless we are specifically requested to in cases where the unit is too difficult to visualize without it. I can't visualize any of these cases because most truly complicated drawings can only be drawn with normal mechanical drawings.

When items are called for that are catalog items or items already drawn we will simply call for them by number and not re-draw them or try to copy from the catalog.

In most organizations the drafting room has the best housekeeping of all departments but this is hardly so at DEC. We accumulate models, partially finished drawings, and catalogs in the catalog file for years. If we didn't move once in a while I don't think we would be able to find anything. From now on I want all models returned as soon as the drafting room is finished with them. All catalogs should immediately be returned to the catalog file. And any drawing which is interupted before it is completed should be assigned a number with an S in front of it and filed. When it is completed the S number can be removed. When one walks through the drafting room there should be no etched wire layout or tracings laying around. These are very valuable and have not been shown due respect.

dec MEMO

DATE June 30, 1960

TO Harlan Anderson FROM Kenneth H. Olsen

I got a letter today from Bob Slater saying that they are interested in our computer. They do, however, realize that our big limitation is in tape speed. There's a possibility we might rent the tape handlers from Univac which would make an interesting situation. John Hancock would then have IBM cards, Univac tapes and DEC computers. This might not be complete foolishness, because IBM makes the best card machines, Univac claims they make the best line printers, and we, of course, make the best computers. I didn't call Slater because I didn't know what to say, but we should call them first thing on Tuesday.

KHO

dec MEMO

DATE June 30, 1960

TO Harlan Anderson/Ben Gurley FROM Kenneth H. Olsen

I made an appointment for July 6 at Bolt, Beranek & Newman with Dan Geisler and Ed Fredkin to discuss the electroencephalographic experiments we'd like to do this summer. This might be a good chance for Andy and myself to go down. It might be necessary for Ben to go down to show the method for hooking in the analog-to-digital converter.

Ken Olsen

dec MEMO

DATE June 24, 1960

TO Stan Olsen FROM Kenneth H. Olsen

The colors for the new conference room should as follows: Leave the outside wall chalk white as in my office. The two side walls should be off-white, that is, they should be just slightly yellowish, but not quite cream. The short wall should be a very light yellow tending more toward blue than toward orange. It is very important that this is a pleasant and not a stark yellow.

Ken

dec MEMO

DATE June 24, 1960

TO Stan Olsen FROM Kenneth H. Olsen

I expect to be away on Friday and may not be back on Monday, and so you work out with Loren your special needs for die sets, etc., and purchase those things that you think are wise.

Ken

INTEROFFICE MEMORANDUM

DATE June 24, 1960

SUBJECT Carpentry Work

TO Stan Olsen

FROM Kenneth H. Olsen

The carpenters should make more shelves for old magazine copies in the library. The granite-board shelves we have should just be continued up almost to the ceiling. Up high we can keep the reasonably dead issues, but we'll need the space. They should then take the shelves down for the current magazines and put the blackboard in the area where the current magazines are. They should then take down the shelves where the blackboard is now so that we can install the new bookcases all the way across.

We may have to order more fence pickets so that they can enclose the small area where the cement mixer was and make a background for our lawn. Maybe we should buy enough pickets so that they can make a solid fence on the far end and a solid fence on the Building 12 end because they would look better. You use your judgment on this. If the carpenters go before we get more pickets, we can always install the pickets easily if they have the framework set up.

They should reverse the shelves on the stockroom on the second floor so that the shelves are on the inside of the stockroom.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE June 24, 1960

SUBJECT Chromocoating Boxes

TO Stan Olsen
Loren Prentice

FROM Kenneth H. Olsen

The 901 boxes that we've been assembling in the shop I do not think can be painted. They've been laying on the greasy floor and on greasy benches and handled by greasy hands for several days now, and I don't think the paint will stick to them. I think this is going to be a much worse situation than having chromocoat under the rivets. I suggest that we chromocoat the things over again. In the future, we may make a clean area in a different room and do our assembly there. This might be alongside the chromocoating benches.

We should also be careful with our test equipment cases and not chromocoat them until they're ready to be painted. Those cases that are stacked up in the air compressor room may need to be chromocoated again before they're painted.

Ken

digital equipment corporation
MAYNARD, MASSACHUSETTS

INTEROFFICE MEMORANDUM

DATE June 23, 1960

SUBJECT Visits

TO Harlan Anderson
Ben Gurley
Maynard Sandler
Alma Pontz
Bob Dill

FROM Kenneth H. Olsen

We're having several visits in the next week which should be attended by several of our people.

On Friday (tomorrow) about 10 o'clock Remington Rand is coming out to tell us about their punch card system, and I think Maynard Sandler, Alma Pontz and Bob Dill should attend along with as many others as feel it will be worthwhile.

On Monday, June 27, at about 2 o'clock Mr. Cramer from IBM will be here to give their side of the story. I think the same group should attend.

Mr. Reed from Remington Rand in Philadelphia will be here tomorrow at 11 o'clock approximately to find out about our PDP computer. I don't know whether they want to buy one or to find out what the competition is doing. Ben Gurley should be able to take care of him, and I don't think it's worth taking too many hours with him unless we can get some information also.

Next Wednesday, June 29, we will again be visited by Van Dyck Associates.

KHO

ep

dec MEMO

DATE June 22, 1960

TO Ted Johnson FROM Kenneth H. Olsen

Jim Ricketts who used to work at Lincoln Laboratory and who is now at AC Sparkplug in Milwaukee told us that AC is starting a facility at the Los Angeles Airport that's going to be largely in digital work. Milwaukee has been very pleased, according to Jim, with our equipment, and so we would do well in keeping after them as they outfit the new airport facility.

A company in Long Island is copying the Kennedy Connector. I think their name is Garde. We put one of their sockets in the milling machine and cut 1/16 of an inch off the top so that it will take our plug-in units. We feel that we can do this on a production basis or have Garde modify their mold for us. With this we then can make paper pin type mounting panels. These sockets cost significantly more, so the mounting panel would cost a little more. For this type work I don't think we will supply the power pre-wired.

Ken

KHO:ecp

dec MEMO

DATE June 21, 1960

TO H. Crouse, D. Best, J. Fadiman FROM Kenneth H. Olsen

Borg Equipment Division has very nice 10-turn dials. They are colorful and modern looking and would add very much to our special systems. I recommend that we look into them. They are represented by Richard Purinton in Lexington.

Kenneth H. Olsen

digital equipment corporation
engineering and manufacturing

MAYNARD, MASSACHUSETTS
TWINOAKS 7-8821

MEMORANDUM

June 17, 1960

SUBJECT: Engineering Staff Meeting

Our Engineering Staff has increased significantly in the last several weeks. In order to help get to know each other, we are going to have an Engineering Staff Dinner Meeting on Thursday, June 23. We will also have a chance to discuss the goals and ambitions of the company and to set some of our attitudes and policies on subjects that are of interest to everyone.

We will gather for the dinner at 6:00 at the Fairway Restaurant on Route 2A in Concord, Mass. After dinner we will have a discussion at the restaurant. Attendance at this meeting is not at all obligatory, but if you can make it, I am sure you will find it worthwhile. Please let my secretary know if you plan to attend.

Kenneth H. Olsen

KHO:ecp

digital | EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

ENGINEERING STAFF DINNER MEETING - June 23, 1960

Attending:

Anderson, Harlan
Arsenault, Mel
Bank, Dick
Best, Dick
Butler, Bill
Butterworth, Lee
Campbell, Arthur
Cudmore, James
Dinopoulos, John
Doane, Russ
Fadiman, Jon
Gadaire, Paul
Geralds, George
Gould, Fred
Gurley, Ben
Harwood, Ed
Hughes, Bob
Lampasona, Joseph
MacDonald, Bruce
Mangsen, Dick
Moulding, Jon
O'Brien, David
Olsen, Ken
Olsen, Stan
Prentice, Loren
Reed, Bob
Sanders, Bob
Sandler, Maynard
Sheehan, James
Smith, Jack
Swift, Al
Tracy, Louis
Weeton, Wally
White, Don

TOTAL 34

Unable to Attend:

Brown, Jack
Norton, Herb
Rydzewski, Thaddeus

TOTAL 3

dec MEMO

DATE June 7, 1960

TO Jack Atwood FROM Kenneth Olsen

The Post Office now flies all first class mail between certain cities. This means that it's a waste of money to pay for air mail, because you'll get the same service for first class.

Supposedly if we check with the local Postmaster, he can tell us which intercity routes are by air. From this we can develop a policy as to which cities we send air mail and which we send first class for our normal mailing.

If you could have Lou Yeager or someone do this, it would be a worthwhile project. If you can't, let me know and we can probably find someone else to do it.

KHO

ep

INTEROFFICE MEMORANDUM

DATE June 3, 1960

SUBJECT Telephone Move in My Office

TO Stan Olsen/Jim Myers FROM Kenneth H. Olsen

If I am not here when the telephone man comes to move the telephone in my office, I would like one of you two to take care of it. I would like the special amplifier box to stay where it is, and the microphone attachment can also be left where it is. The only thing that will need to be moved is the telephone set itself. I would like to have it on the louvered cabinet behind my desk which has the open section in it. This is where I now keep my dictating machine. I would like the telephone inside the open part of that cabinet, but this may not be possible, so if they leave it on the top, it will be good enough.

I will also need power distributed in my office. There should be a three-wire duplex outlet behind the water cooler, and a duplex outlet high on the post that holds the telephone amplifier. This latter outlet should power the telephone amplifier and clock. If it would not be too much trouble, they could put a clock-type outlet directly behind the clock. For putting in the power, they might work out a nicer way for powering the air-conditioning unit, and at the same time, put an air-conditioning outlet near one of Andy's windows.

KHO

ep

INTEROFFICE MEMORANDUM

DATE

June 3, 1960

SUBJECT

Fourth Floor Storage Area

TO

Following List of People

FROM

Kenneth Olsen

Ken Olsen	Ben Gurley
Harlan Anderson	Bob Hughes
Stan Olsen	Ed Harwood
Maynard Sandler	Loren Prentice
Jack Atwood	Wally Weeton
Dick Best	John Culkins
Jack Brown	Jim Myers
John Fadiman	

We are very fortunate to have a storage area on the fourth floor now, but because so many people are using this, we are going to have careful control of the area. We have assigned areas to each group and now each group will have to take the responsibility for keeping that area neat.

John Culkins will take the responsibility for supervising the storage. If there are any questions he will give you the answers or will find out the answers. We will not have a free-for-all in that area. Any variations from the floor plan will have to be checked through John. Everything will have to be neatly packed in boxes. We cannot have loose pieces stored in that area.

Lile

May 27, 1960

OVERTIME

Stanley Olsen

Loren Prentice

I wan to most strongly urge the following items in regard to overtime work. These need not be, and probably should not be announced company policy, but nevertheless should be strictly adhered to.

1. Overtime be restricted to three hours per day or three hours per night.
2. That they be restricted to three nights per week, that the overtime periods be announced the Friday preceeding the time the overtime is to be worked, except in cases of emergency.
3. That overtime on the basis of the above mentioned should not be continued consecutively for more than three weeks without a break of at least one week preceeding the next section of overtime.
4. That a supper time period be announced and that it be adhered to by all persons working on an overtime basis, and that this overtime suppertime period be paid for.

I believe most strongly that unless these things are done, that 1) the company will reap continually depreciating benefits from overtime, 2) that normal work will be hampered to a considerable degree, and 3) that employee dissatisfaction will reap a degree heretofore not encountered.

Loren Prentice

cc: K. Olsen
M. Sandler
R. Best

INTEROFFICE MEMORANDUM

DATE May 26, 1960

SUBJECT Test Specs for Systems

TO Bob Hughes

FROM Kenneth Olsen

You're the only one who is not in the middle of a system problem. As a result, you may be in a position to think a little more clearly than those who are on the verge of panic. I'd like to have you make up a test data sheet that we will use for all systems. This will have to be very general and will not have all the detail the present one has but it will list the points we want to check, such as, marginal checking, pulse amplitudes in and out of counters, you might even list a few classic timing problems.

The core tester we shipped to Philco never was marginal checked and we would have saved a trip or two down there if it was. When we come to the end of a job, we then can't think clearly as to what we should check for. If you start this and make a pass at it, maybe we will make a special test data sheet for each system later on. This, of course, should be done while the machine is being designed and not after it is built.

Kenneth H. Olsen

digital equipment corporation
MAYNARD, MASSACHUSETTS

dec MEMO

DATE May 25, 1960

TO Jack Atwood/Harlan Anderson FROM Kenneth Olsen

I think we should buy special sized envelopes to go with our Reader's Digest type PDP books. Our logic book will probably be that size also, and maybe when we get a PDP-3 it will too. There should be something nicely printed on it and should be big enough to take a thicker book than the present PDP.

Kenneth Olsen

dec MEMO

DATE May 25, 1960

TO Henry Crouse FROM Kenneth Olsen

Please find the price and delivery on the following Industrial Timer Corporation time delay timers. Model SF-5M five minute cycle. We need three, but I think the price discount comes at four so we would be interested in four. Two of the units would do our job but cost more. They are TD-5M and H-5M. We should find the price and delivery on those if some distributor happens to have those in stock.

Kenneth Olsen

dec MEMO

DATE May 25, 1960

TO Dick Best/Ben Gurley FROM Kenneth Olsen

Should we get a Q meter or something that we would rarely use.

Kenneth Olsen

dec MEMO

DATE May 25, 1960

TO Henry Crouse FROM Kenneth Olsen

Please find the price and delivery on a Millen grid dip meter. Millen Company is one of the local manufacturers on the South Shore, I think.

Kenneth Olsen

dec MEMO

DATE May 25, 1960

TO Stan and Andy FROM Ken Olsen

Margin gave us a price on a large 36" sign for the front. For wooden letters on two parallel channels it would cost $300, and for sheet metal letters into each mount it would cost $320. A small sign like the one on the corner reproduced rear of the corner would cost $132.50.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE May 20, 1960

SUBJECT

TO Dick Best

FROM Kenneth H. Olsen

I notice that we allow two one flip-flops to pass when the minimum input trigger pulse can go as high as 2.8 volts. All our literature says that our standard DC pulse is 2.5 volts. In fact, we allow a 2.7 volt pulse out and we allow the minimum input to it in to be 2.7 volts, which doesn't allow very much tolerance.

Should we change our literature to, say, 2.7 amplitude is standard. This won't solve the whole problem because we can't get a 2.7 volt pulse out with a 2.7 minimal trigger in and have a carry chain work.

Kenneth H. Olsen

cc: Ben Gurley
Bob Hughes

May 24, 1960

Harlan Anderson/Ben Gurley

Ken Olsen

Mr. Kurkjian from I.T.&T. called and would like to visit us next Wednesday, June 1, at 10 o'clock to discuss our computer. They are interested in using it, and he's talking about other means of cooperation. He used to work on the SAGE system and was one of the very pleasant people at IBM. He left IBM a year and a half ago and has been working on various I.T.&T. divisions, and is now back at I.T.&T. proper for about the last six weeks. Randy DeHart will be with Kurkjian.

KHO

# # #

ep

May 24, 1960

S. Olsen/H. Anderson/J. Brown

Ken Olsen

Bill Cramer from IBM in Natick called about some red tape on an order we placed for manuals. After he straightened that out, he invited us to visit a demonstration of their 357 Data Collection System. They're having open house in their Natick office Tuesday, Wednesday and Thursday of this week from 10:00 a.m. to 6:00 p.m. He'd like to see us if we come, and I told him we'd call him before we did. Wednesday afternoon after 2 would be best for him. Maybe he would be the man to work for Brown.

KHO

# # #

sp

INTEROFFICE MEMORANDUM

DATE May 24, 1960

SUBJECT Memory Test Literature

TO Jack Atwood
Harlan Anderson
Jon Fadiman
Wally Weston
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 CSS.

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

INTEROFFICE MEMORANDUM

DATE May 20, 1960

SUBJECT STORAGE AREA NEXT TO THE DRAFTING ROOM

TO Kenneth Olsen FROM Loren Prentice

1. FIRE PROTECTION

We have been surveyed by people from Liberty Mutual and fire extinguishers have been installed in this area as they have suggested.

2. DIVISION OF AREA AND RESPONSIBILITY OF INTERESTED PERSONS

First of these people, John Culkins, which we have built a small area to store the supplies he is now storing on this floor - 392 square feet. Office furniture and office supplies I assume is a responsibility of Jim Myers. An area has been set aside for this of 196 square feet. Production storage, Jack Smith and Maynard Sandler, 392 square feet. This is a storage of paper box materials, all the packaging materials used in production, rejects, supplies, and anything of this nature. His needs seem to run to paper stock of which he has considerable at various time of the year - Jack Atwood, Advertising. His area should have two by threes layed down, nailed on edge, and hardwood or plywood nailed down to raise the stock above the floor so that it will not become contaminated by oil. Aisles, walkways, etc., should be arranged to his satisfaction - 192 square feet. Sales - Most of their storage needs assume that this is Andy's responsibility and Jack Brown. Here again, some areas should be provided so that brochures could be stored and not become contaminated by oils from the floor - 192 square feet. 192 square feet storage for show booths and furniture that is sent to the shows, rugs, and this kind of equipment may need some protection other than being just stored in the area to prevent deteriation by oil and dust. In my own area, 392 square feet, are the stock cabinets, raw stock which is really a production item in most cases, template storage and tool storage. Tool storage can probably be in small metal racks of which we have a number available at the present time. Template storage can be on pins or nails and a plywood sheet nailed to the wood partition of the woodworking model shop. I hope I have not overlooked anyone who has problems of storage. It certainly seems to be enough space in this area to accomodate the needs of almost everyone here.

INTEROFFICE MEMORANDUM

DATE May 20, 1960

SUBJECT

TO Stanley Olsen

FROM Kenneth Olsen

Mr. Bob Blakely, of Product Planning, at Remington Rand, in Philadelphia, called today at five o'clock, May 19. They are interested in what's available and I suppose will want to do a little spying. He would like to have his assistant visit us, and I said sure, we would love to have him. He's coming next Wednesday, May 25, probably 11:00 or 11:30 to see what we do. I'm having an IBM artist visit me that day and may be tied up, so will you be sure to be here and take care of him; or if not, let me know.

Kenneth Olsen

dec MEMO

DATE May 19, 1960

TO Henry Crouse FROM Kenneth Olsen

Please find the price of Micro Switch, Models EX-AR50 and OP-AR50. One of the distributors in town stock Micro Switches and they would be the one to check first.

Also ask prices on switch MC82711H.

Kenneth Olsen

dec MEMO

DATE May 19, 1960

TO Henry Crouse FROM Kenneth Olsen

Please find the price and delivery of three Cramer Controls time delay relays, Model 412, range five minutes.

We might take someone else's equivalent to that, like Industrial Time Corporation. I think their equivalent is the H-5M unit.

Kenneth Olsen

INTEROFFICE MEMORANDUM

DATE May 19, 1960

SUBJECT

TO Henry Crouse

FROM Kenneth Olsen

We should have a timer which automatically rings a bell at 10:00 and 10:10, then at 3:00 and at 3:10. It might also sound the chime at 8:15 and 12:45, but these are not so important. Inter-Matic Time Company and Tork Time Company make timers of this type but it is a little difficult for me to find out from the catalog if they really would do this job. You might call their local representative and find out what they have to offer to do this job. Having a chime ring at 10:00 and then 10 minutes later may be difficult and maybe we will do that in two steps. We could have a simple timer like Tork Model 919 which would start the bell at 10:00 and then have an interval timer which would start off and ring a bell 10 minutes later. But they are probably used to this type of problem and could give you good advice on it.

Kenneth Olsen

cc: Stanley Olsen

dec MEMO

DATE May 19, 1960

TO Henry Crouse FROM Kenneth Olsen

We have to get some silica gel desiccators for various tool storage areas. These are units that absorb moisture and when they are loaded they change color and one puts them in an oven and they are ready to absorb moisture again. They should be rather expensive because people include them in units they sell. The kind we want I think are in cloth stacks because they cost less.

Kenneth Olsen

dec MEMO

DATE May 18, 1960

TO Stan Olsen FROM Ken Olsen

Subject: Maintenance Jobs

There are a number of maintenance jobs which are small but we haven't had done because we have been so busy. I think we better go ahead and do them or we may never get them done. One of them is to finish tiling my office floor, the next one is sweeping the new stock room and arranging somewhat the contents.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE May 18, 1960

SUBJECT New Wiring

TO Stan Olsen

FROM Ken Olsen

Here's a list of the wiring that should be done when we get the electrician again. We should be sure to request him to come now so that we'll get him soon.

Night power should be brought to the clock on the third floor. Night power should also be brought down to the test equipment headquarters for life test.

High current AC should be brought from the old systems area to the new systems area.

More outlets should be made for the night light next to the water cooler outside the lobby.

An outlet should be put in above my special telephone box so that wire will not dangle.

Two outlets should be put on the wall in my office below the air conditioner. There should be a pipe run six inches from the floor along that wall. I plan to put the water cooler in the corner where the cabinet is now located.

We should have a fluorescent light on the night circuit on the third floor. We may run one whole row of fluorescent lights on the east wall on night power in order to get some night power down into the test equipment headquarters. I wouldn't mind leaving a whole row of lights on in order to do this.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE: May 17, 1960

SUBJECT:

TO: Helen LeBlanc

FROM: Kenneth Olsen

When new staff members came, we used to be careful to be sure they had a desk, chair, tool box, and other supplies necessary to start work immediately. This is very important to make them feel like they are wanted and useful. Now that so many people are coming and no one keeps track of them, I think the Personnel Department will have to take the responsibility to be sure that we have a place when staff members come in.

I suggest that the Personnel Department warn the department that is going to get the new person a week in advance that they should be ready for him, and the day before they come the Personnel Department should check to be sure that there is an office with desk and chair, company notebook, pencils, and maybe Scotch tape and stapler, and tool box when appropriate.

Kenneth Olsen

dec MEMO

DATE May 17, 1960

TO Bob Hughes FROM Kenneth H. Olsen

A year ago we had a good stock of Simpson wide-vue meters, but now our meter supply is pretty much depreciated. If we like General Electric meters, we should stock those values which we use. These meters should be kept in the test equipment headquarters and there should be a log on these meters. Every time one is checked out it should be checked out through the man in test equipment headquarters. In this way, we can be sure that meters are used only on appropriate projects.

Kenneth H. Olsen

DIGITAL EQUIPMENT CORPORATION
Maynard, Massachusetts

SUBJECT: MODIFICATIONS TO DEC COST ACCOUNTING SYSTEM

To: All Project Leaders

From: Kenneth H. Olsen

Date: May 13, 1960

Approved: _____

The present DEC cost accounting system is more detailed and complete than most small manufacturing companies have, but it still does not give us the information which we need to make intelligent planning and evaluations.

Although the cost accounting system is sound and good, it is lacking details which are needed to make sound evaluations and judgment. For example, overhead is figured on such large groups that it is almost useless in figuring the cost of manufacture for specific operations. The Advertising Department is not included at all, and yet advertising is significantly part of the DEC budget. The modifications of the accounting system will be simply to break the company into many convenient accounting groups so that more precise cost accounting can be done.

Schedule

No specific schedule will be set now for filling in the detail of the accounting system because we are understaffed in the accounting area and we would like to feel our way in a more detailed system. However, we should immediately start one or two departments in this detailed system, like perhaps the Drafting Department and the Advertising Department, and then as we see the results we can take on other departments.

Accounting Groups

The capital equipment, space, electricity, telephone, and estimate of supervisory time and other expenses will be figured for each accounting group and applied as overhead. At the

present time, we have no idea what silk screening costs because the overhead is averaged with all the production, but we will have a fairly accurate picture of cost when silk screening is considered as a separate department.

The following is a proposed list of accounting groups:

1. Silk screening and plate preparation
2. Production assembly
3. Inspection
4. General engineering
5. System engineering
6. Drafting
7. Machine shop
8. Sheet metal shop
9. Advertising
10. House printing
11. Shipping and receiving
12. Personnel Department
13. Accounting Department.

Uses of Accounting System

Right now we cannot tell whether we are justified in having a sheet metal shop or a reproduction facility because of the grossness of our cost accounting. With a more detailed system, we can tell whether it is justified in buying more capital equipment for a sheet metal shop or whether we should drop the whole thing. We can tell whether printing should be done inside the house or outside.

We will now assign all advertising costs to the appropriate projects, whether they be Building Blocks, computers, or personnel. People responsible for each project or service will then be able to tell whether their operation is profitable or not. If our own Advertising or Drafting Departments are not the most economical way for a project to get its work done, these services will find themselves without work.

Any further detail to the accounting system will mean that we will have to be prepared to take care of the extra work in the Accounting Department and we will have to be more careful in filling out time slips; but for most people it should mean very little extra work, and they will be much better able to measure the results of their work.

Signed: Kenneth H. Olsen

Kenneth H. Olsen

dec MEMO

DATE May 13, 1960

TO Alma Pontz/Bob Dill/
Maynard Sandler

FROM Kenneth Olsen

I would like to set up a committee to add detail to our cost accounting system. I consider this very important, but I know that we will have to go slowly on it because we are short of help. If you put Andy or myself on the committee, it will probably be slowed down, so I would like to limit it to just those of you who are directly responsible for cost accounting; that is, Alma Pontz, Bob Dill, and Maynard Sandler. I have asked Maynard Sandler to be chairman of this committee and to be responsible for calling it and initiating the activities.

Kenneth Olsen

May 16, 1960

Stan Olsen

Jack Brown

Harvey Salz from I.T.T. Labs will arrive tomorrow morning (May 17) around 9 or 10 o'clock to discuss his applications for our equipment. He will contact you on arrival. I shall be back from my plant visit around 1 o'clock to join you.

# # #

JBB:ecp

dec MEMO

DATE May 16, 1960

TO Jack Atwood and Jim Myers FROM Kenneth Olsen

I would like to have you go over our stockroom and stationery supplies to make sure we finish the year with a good supply like the one we started with. Beside usual stationery supplies, we should also have Scotch tape dispensers, pencil sharpeners, clip boards, papers, typewriter ribbons, etc. Our rate of usage of Pendaflex folders is so high we should have a significant quantity of these on hand.

Kenneth Olsen

dec MEMO

DATE May 16, 1960

TO Jack Smith FROM Kenneth H. Olsen

We started this fiscal year with a good collection of small tools, and we should be sure to end up with the same this year. I have already put an order in for a tool box like we have given to the technicians, but we should order more of the kind we give to girls and we should replenish all our small tools. Please go over with me any questions you have on what small tools we should order because I ordered most of them last year.

Kenneth H. Olsen

dec MEMO

DATE May 13, 1960

TO Henry Crouse FROM Ken Olsen

Will you call Maynard Supply and see what their price will be this year on nonoscillating 8" fans like we bought last year. I think we paid only three or four dollars each for them. We probably should order about 30 of them.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE May 13, 1960

SUBJECT

TO Henry Crouse

FROM Ken Olsen

Here are some of the items we should get prices on for our first aid room. They won't get used very much, so we should try to keep them relatively inexpensive units. We should buy an autoclave or sterilizer. When you get in contact with some of these medical people, there might be a certain number of scissors and tweezers and things like that that a first aid room should have. You know the kind of things that a doctor pulls out of an autoclave.

We should have a white step-on waste can, and we should have a large white receptacle for the cafeteria area.

We should also have a privacy screen like they have in medical departments for our first aid room. When you talk with these sales people, I am sure they will give you other ideas.

Go ahead and order ten Luron dispensers and a generous supply of Luron soap. I am sure we can get powdered Ivory soap. Maybe we should order 12 dispensers and that would allow us to put both Ivory and Luron where it is desired.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE May 12, 1960

SUBJECT

TO Stan Olsen
Maynard Sandler
Jack Smith

FROM Ken Olsen

I called Emerson-Cummings to see what they recommended for an epoxy coating to put over our test equipment panels. This is apparently quite commonly done nowadays and should make our front panels practically scratchproof. They have three types of coatings - their Eccoat C-26 is a high temperature type that is cured at high temperature but is very solvent resistant and probably should resist trichlorethylene.

The Eccoat EC-200 takes medium temperature to cure and their Eccoat VE can be cured at low temperature but has a harder finish when cured with some heat. None of these is affected at all by alcohol.

In their laboratory they apply it with a 6 oz. Gemis gun. The gun should, of course, hold a small amount of liquid but also should be a low flow type gun that puts out little more than a mist. We can spray these on the trays that George lays the boards out on after they have been silk screened.

I have a sample of an epoxy dip for finished circuit boards. If we put a fine coat of this on our completed boards, it might be possible to replace some components but it might also eliminate the need for very detailed cleaning. If anybody would like to try this, I have samples on my desk. They are made by Hycoll.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE May 12, 1960

SUBJECT Answer to Tech Rep Questions

TO Jack Brown

FROM Ken Olsen

I can't see the need for telling the reps how to sell. They should be able to tell us that.

Logical Size of Plug-In Units

If plug-in units are made in small logical pieces, one can get by with a very small number of types, but one loses out on packing density and one has to do a lot more external wiring. All the power voltages have to come into each of the small blocks the same number of times they come into one big block.

If one makes very large logical blocks, there is very little external wiring and the physical size can be made smaller, but one needs many types because of the various combinations of the small logical elements.

Physical Size of Building Blocks

The Building Blocks contain optimum amount of logic from our experience in building systems. The physical size is such as to make this much logic easy to build, easy to maintain, and relatively inexpensive. For ground based equipment, it is very rare that this equipment takes too much space. Even old fashioned vacuum tube equipment like the IBM 704 computer is smaller than in-out equipment. Operators took much more space than the actual computer.

We can make the units smaller if there was a market for it, but there is a very small market and it is almost 100 per cent military. Because the military has an infinite number of different requirements, it is unlikely that one product line would cover very much of the military needs.

Phenolic Base Etched Board

Glass baseboards are very important where physical strength is needed, but they are very expensive and hard to fabricate. With

the aluminum handle protecting the DEC unit, there is no need for further strength in board. Phenolic boards without the aluminum frame tend to be a fire hazard, but with the aluminum frame it is very difficult to maintain a fire within a group of plug-in units. In addition, we are now going to fireproof phenolic boards.

Systems Capabilities

We have very good system capabilities and give fast delivery and have a very good reliability. There is no limit to the systems business available, but in general the profit margin is low and often negative. And no matter what our abilities, the situation will always be that we cannot take on all business that is around.

Reliability of Building Blocks

The fact that we took our computer to Boston twice and New York once and California once, plugged it in the wall and demonstrated the computer is a good argument for the reliability of our units. They have been in the field for two and one-half years now with very few failure rates, and those that did fail were usually failed while people were experimenting with them.

Module Checking

Module checking varies the bias on transistor inverters to test for low current gain and noise. Because DEC units tend to work even though they are hooked up grossly wrong, it is a good idea to marginal check a system after it is assembled to be sure that it is not operating on the brink of failure. Deterioration of transistors is so slow that marginal checking does not need to be done at short intervals but it is good to test periodically to see if any transistors have deteriorated.

Emitter Followers

Emitter followers have very little advantage over inverters with clamped load resistors, but they have one very serious disadvantage. If the output is grounded accidentally, the transistor will be destroyed. This happens on TX-0 and TX-2 quite regularly when the computers were being debugged.

Dynamic Logic

Dynamic logic is very complicated to use and one always has to be careful to synchronize the action with the clock. At

high speeds transmission time is significant and synchronization limits somewhat as to what can be done. We know of no computer manufacturer using dynamic logic now because of its difficulties.

Of all the questions asked Andy and myself on the list, these are the only ones that I think are worth answering.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE May 11, 1960

SUBJECT Burroughs Tape Deck

TO File - University of Michigan Tape Bid

FROM K. H. Olsen

We called Mr. Grove, the local Burroughs-ElectroData office. He is a very pleasant, helpful person who is part of a group of about forty people who do sales and service in the area. He told me that two people who have made systems like this that are compatible with ElectroData machines are Consolidated Electrodynamics, who made the Millisadic and the Microsadic, and Epsco.

The installation at Detroit Arsenal is an older type machine. They no longer make the 544 data reader, but the new ten speed unit is almost identical but with a little more freedom. The Burroughs tape is 3/4 inch wide with two sets of six interleaved tracks. There are four information bits in binary coded decimal code, one parity and an end of block marker. Their new tape deck has only one head, so just record six across.

The Boston office sells and services computers only and the Component Sales Department is the one who sells tape decks. He suggests we contact Mr. Edward Lyons, Manager of Component Sales, ElectroData Division, Burroughs Corporation, 460 Sierra Madre Villa, Pasadena, California.

K. H. Olsen

INTEROFFICE MEMORANDUM

DATE May 11, 1960

SUBJECT Notes on DARC

TO File

FROM K. H. Olsen

Dan Giesler has about finished with his thesis which he expects may have direct clinical use. He is writing experiments from human beings and has gotten response 28 of the 30 people he tried it on. The two failures may not be significant because some of the California ran roughly the same experiments with 100 per cent results. He looks at half microvolt signals and averages at least 2,000 times.

He said that the input to the amplifier does not have to be very high impedance and I think he said that half a megohm would be good enough. The input tubes to the 0 Offner amplifier are six _____ .

May 9, 1960

Sales Manual

Jack Brown

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 May 9, 1960

SUBJECT

TO Henry Crouse

FROM Ken Olsen

When you get quotations for me, it would be a good idea to file a copy before you give it to me because it may get lost if I get the original.

I suggest that certain catalog files, such as IBM, have two or three folders. We might break them down into computers, typewriters, and card equipment. When the folders are so big, we can't find what we want. Other folders that should be broken down are Sylvania, General Electric, maybe Westinghouse, and a few others.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE May 9, 1960

SUBJECT

TO Ben Gurley

FROM Ken Olsen

These prices were gotten in December, 1959, for various IBM card machines.

514 reproducing punch, 50 or 100 cards per minute - $70 to $125 per month.

026 Key Punch, 18 columns per second -

523 Gang Summary Punch - $85 per month.

526 Summary Punch is like the 026 Key Punch but has an output - $700 per month.

On the 650 computer they have a 533 which reads 100 cards per minute at $550 per month, or the 537 which reads 200 cards per minute at $700 per month.

The 716 Printer is $1,200 per month.

The 714 Reader is $1,500 per month.

The 7070 Reader is the 7500 which reads 400 cards per minute at $400 per month.

The Punch is 7550 at 200 cards per minute and rents at $550 per month.

The 1400 machine has an 800 card per minute reader and a 200 card per minute punch.

Ken Olsen

cc: IBM catalog file

INTEROFFICE MEMORANDUM

DATE December 2, 1959

SUBJECT

TO Ken Olsen

FROM Henry Crouse

1. 026 Key Punch

Rental	Alphanumeric	$60/mo.	+10% Tax
	Numeric	$55/mo.	+10% Tax
Purchase	Alphanumeric	$3,200	+$192 Tax
	Numeric	$3,000	+$180 Tax

4 month delivery

2. 711 Card Reader Model #2

Rental	$800/mo. plus tax
Purchase	$32,000 plus tax

3. 721 Card Punch Model 1

Rental	$600/mo. plus tax
Purchase	$25,000 plus tax

The 711 and 721 prices are taken as a part of a system. Mr. Cummings of the Framingham office gave me these figures over the telephone and will be out Monday or Tuesday of next week.

Henry Crouse

MEMO TO: DEC Telephone Operators

FROM: Kenneth H. Olsen

DATE: May 6, 1960

Our only contact with many people is through the telephone, and it is very important that we give a gracious and pleasant impression to everyone. We never under any circumstances want to give the impression that we may not want to speak to a person. We will never give the impression that our being in or out is dependent on who is calling.

If a person is tied up at a meeting, the operator will give the following answer: "Mr. Blank is in a meeting. Do you want me to interrupt him?" With this reply, the person will usually not want to interrupt him unless it is really important.

# # #

KHO:ecp

INTEROFFICE MEMORANDUM

DATE April 26, 1960

SUBJECT METAL TOOL PURCHASES

TO Kenneth H. Olsen

FROM Loren Prentice

Machine tool or metal working tool purchases should be made with the following in mind: 1) Proper situation as to growth of company, and when to purchase. 2) Most profitable return on investment. 3) This may be the only method by which our product can be made. 4) Versatility. The ability to meet more or other demands than are presently demanded. This list is broken into two groups. First, items needed for production immediately, and second, a forecast of the needs up to one year from the present date.

IMMEDIATE NEEDS

These will be listed in the order of their importance. A general description of each tool will be listed plus several brand names which have been investigated and which we hold quotations from at the present time. 1. A 12 guage x 52" power shear. This is large enough to cut 1/8th 24ST aluminum on a production basis without exceeding its capacity. Brand names and model numbers of these shears are as follows:

Pexto #12UH 3 H.P. F.O.B. Suttington, Connecticut. This price includes precision back guage 3 H.P. 3 phase motor and starter, 4 edge carbon steel blades. Weight is 3510 lbs. $2730.00

Famco #PH12-52 3 H.P. with the same equipment as above with automatic lubrication installed. F.O.B. Kenosha, Wisconsin. $5550.00

Wysong #1252 3 H.P. same equipment as Prexto. Model has a few additional features. A multi-jaw clutch totally enclosed gears running in a bath of oil. Weight 444 lbs. F.O.B. Greensboro, North Carolina. $3175.00

Niagara #1R4 Power Shears has same features as Pexto shears plus a better clutch and totally enclosed gears running in oil. F.O.B. Buffalo, N. Y. Weight 4800 lbs. $4340.00

2. We need a faster method of punching holes in sheet metal. A large part of all of the men's time is being used up in individual set-up of punches. Three methods are available to use in this field. Single operation punch with quick change, quick guaging features. These include machines made by Wales Strippit, Uni-Punch, and so forth. The first cost of the machine is low, but the tooling is expensive. Two turret punches where punches are set-up in a turret. Fifteen or eighteen punches are available. The most used sizes are left in the turret and not disturbed, and special sizes are inserted before the job is started. Very little time is lost in changing punches. Several different makes are available. Weidman probably being the most popular in this field. The main disadvantage in the past has been poor stripping, causes distortion of the sheets. This may have been corrected during the last few years. The third multiple punching using any of several systems probably is the most attractive. Whistler or Richards Brothers systems applied to our press brake for the present time, and later to a specially built press made for this purpose as our production increases. Any of the above systems requires a thorough study of the method and inventory of our work presently and future before any intelligent answer can be arrived at. While considerable effort has been spent in this direction, the study is not thorough enough yet to make an estimate of our needs at this time. Investment in this field would run from $2500 to $5000, and purchase should be made as soon as a study is complete.

3. Engine Lathe. We need an engine lathe from 10" to 15" swing, 24" to 30" between centers with quick change gears for screw thread cutting, collet attachment, 3 jaw Universal and 4 jaw independent chucks. In short, all tool room attachments except the taper attachment. This market has been thoroughly invaded by all the foreign countries, particularly England, Germany, and Belguim, and while foreign lathes seem to be a very good investment at the first thought, the problem of obtaining replacement parts and repair parts after a few years might become exceedingly difficult. Motors and motor starters for these lathes, even if they are purchased, should be bought in this country as practically all foreign make motors and starters cannot be repaired here.

Several possible choices of lathes will be listed, equipped as outlined above, each with three phase 220V electric motor and manual starter or magnetic starter with overload protection.

South Bend 10" Lathe. 27" between centers.
Approximately $2500.00

South Bend 14½" Lathe. 24" between centers.
Approximate price $3450.00

Sheldon 13". 34" between centers. Approximate price $2700.00

Delta 11" Metal Cutting Lathe. 24" between centers. $1855.00

Lebond Regal 13" x 32" Lathe. $4288.00

Clausing & Cole Chester 13" Swing. 24" between centers. $2911.00

4. Milling Machines. Because of the nature of our work and the fact that we already own one Bridgeport Miller, this was the only machine considered. The question here is what options or in what manner of machine do we want to purchase. As we are contemplating some fine layout work such as small gear boxes and gear trains for tape transport mechanisms tape readers, core handlers, etc., it seems that the best complement to our present equipment would be the master Miller with the smaller tooling, more sensitive feel, and higher speed. Base price of this unit is: $1430.00

Total price with the necessary vices, tooling, colets, etc.: $1933.00

As this is a turret type machine, we could at any time purchase the larger 1 H.P. head either in high speed or in the same speeds as our present model. This machine would be purchased as outlined above with the power feed installed at the factory. Upon receipt of the machine, larger head Model J head on the present machine would be

exchanged for the master head on this machine so that we would have a Model J Bridgeport Miller equipped with power feed and a master model equipped with hand feed only. An additional attachment which should be purchased is a set of 8 end measuring rods and dial indicators. These are needed for accurate layout of dies and the small gear boxes for tape drives mentioned above. This item is approximately: $ 475.00

5. Drill Press. We need a 17" to 20" column floor type slow speed drill press with #2 or #3 Morse taper spindle. Candidates for this are:

Delta 18" floor model, with 3/4 3 phase motor and starter. $ 280.95

Buffalo 18" Model. $ 399.00

Walker Turner --------

6. Tool Post Grinder. This is an attachment for use with the lathe necessary for making punches and dies. Must be equipped with both external and internal quills. Du-More tool post grinder is the most popular and probably should be considered for this item. The model will have to be decided upon after deciding on the type of lathe to purchase.
Approximate price: $350 - $450

LIST OF FUTURE REQUIREMENTS

No real digging has been done into the cost of these items. Most of these items should be purchased during the next fiscal year.

1. Do-All Band Saw. 16" or 20". This item should run from $1500 - $2400

2. Hand Screw Machine. We have 2 choices here. Either to equip a small 10" lathe with the necessary turret quick feed collet, etc. or buy a hand screw machine such as a Wade. A second hand one which would be totally adequate

could be purchased at the present time for a total of $1000.00

3. Heliack Welding Equipment. This in large degree depends on the demands which may be forced upon us for lightweight cabinets, consoles, and the like during the coming year. This equipment would cost from $900 - $1400

4. Horizontal or Universal Miller. Here again, almost an unlimited field. Nichols, Harding, Heald, ~~Anduan~~ AND VAN NORMAN being some of the most popular makes. Price could be anywhere from $2000 - $7000

5. Small Tools. Most of these might be attachments for the Bridgeport Millers boring and facing head, right angle attachments, shell mills and shell mills arbors and so forth.

6. Tapping Attachments. Our present tapping attachments are not adequate.

7. Die Filters. This is a low cost item probably something on the order of $ 150.00
The two most popular models are Oliver and the Butterfly.

8. Cooling Systems. We have purchased on cooling system and as we require more of the above listed equipment, at least one more and possibly two more systems will become needed.

INTEROFFICE MEMORANDUM

DATE April 26, 1960

SUBJECT **Logan, Crowell & Associates**

TO File

FROM Ken Olsen

Mr. Logan with Frederick Schaller visited Anderson and Olsen today to discuss their services. They recruit executives at the level $10,000 and above. Their usual time lag is approximately three months. They work by contract and the assumption is usually that they will definitely find the man. They spent part of their time defining the man and working out the specification. The cost is $250 in three payments for three months. This is subtracted from the main fee which is 15 per cent payable half when the man first joins the company and half after three months. Mr. Schaller is the local representative but all the work is done from Hartford. They concentrated on companies and individuals in the New England area.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE April 25, 1960

SUBJECT Power Supply for PDP-1 Display

TO Dick Best

FROM Kenneth Olsen

Here's a suggestion as to how we should make the final power supply for the PDP-1 display. Instead of two 749 panels we can have a single power supply box with four standard 110 volt solar transformers each with their own bridge rectifier and filter. With these in series we get almost 600 volts. If we make all the transformers or one of them the one amp size, we can put an isolation transformer across one of them with a separate bridge rectivier that would give us the -150 volts we need for the display. We can stack up electrolytic capacitors until we get enough filtering.

Kenneth Olsen

cc: Ben Gurley

dec MEMO

DATE April 25, 1960

TO Stan Olsen FROM Ken Olsen

Jordan Marsh has rectangular wash basins like we use for etching tanks. They cost $1.98 each and are 6" deep. If you need any more, I am sure that Henry Crouse can order them by telephone.

Ken Olsen

DEC MEMO

DATE April 21, 1960

TO Ben Gurley/Jack Brown FROM Ken Olsen

When visitors from LFE came a week or so ago, we promised to show them how to wire up systems with our Building Blocks and show them how to use our preprint tracing paper. Do you know if we owe them anything else, or have we filled our obligations to them?

Ken Olsen

dec MEMO

DATE April 21, 1960

TO Jack Brown FROM Ken Olsen

We have limited ability to make trips now but we can rather efficiently make telephone calls. On top of all the other obligations you have taken on, what do you think of the possibility of assigning a few mornings each week and spend the whole morning on the telephone. You might do this from my office on the third floor so you can be completely alone. You could donate one whole morning to calling everyone you know at IBM and see if there is anything going on there.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE April 21, 1960

SUBJECT

TO Jim Myers/Jack Brown

FROM Ken Olsen

Every week the Accounting Department makes up a confidential financial report of the company which is given to the officers. Because this is a regular thing, the production report is included in the same booklet. The financial report lists the new orders and lists the shipments, but there is one other piece of information which we would like to have from the Sales Department, and I suggest that you write up a very short report and give it to Bob Dill each week and he will include it in his Monday report.

The information which we would like to know is:

1. Which orders and which items are we late on

2. Which items does it look like we will be late on

3. Which items do we have orders for which we do not yet have designs for.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE April 21, 1960

SUBJECT

TO Jack Atwood

FROM Ken Olsen

One of our problems is giving everyone an idea as to what is going on in Advertising and what their obligations are as far as giving information to Advertising. I propose that from now on you include the following report in each Bi-Weekly:

1. A list of each publication you expect to get out next in the following six weeks. You should list the status, what's holding it up, when you expect to go to press, and when you expect to have them out.

2. List all mailings you plan for the following six weeks.

3. List all new product releases for the next six weeks.

This I think will give people the confidence as to what is going on and they will be able to make suggestions and fill their obligations to the program.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE April 21, 1960

SUBJECT

TO Stanley Olsen
Maynard Sandler
George Lord

FROM Kenneth H. Olsen

I would like to see us move all silk screening into the second floor as soon as possible. We can't let this disrupt production but we also cannot wait for a slump in production because I don't think we'll find that. I would like to use the present room downstairs for a new and elaborate copy camera and for a photographic studio. We'll make all silk screens on the first floor but do all screening on the second floor and in the machine shop. We should set up a screening setup permanently outside the tool crib. We should also set up an inspection bench there so that no sheet metal work will go to the inspection department on the second floor but all work will stay right within the third floor.

We have a lot of room on the second floor that we are not using very effectively and we're going to have to consider it carefully. I think we'll remove the bench near the sink and give the silk screening a double width area. There should be plenty of racks for drying etched boards.

Before we make final layouts, we should make a tentative layout of the dumb waiter so that all our other layouts will go around it. George Gerald's area is not being used well, particularly the section in which he has his desk. All inspection now over in the production benches should be able to be moved into his area. We can move the coat racks out into where we are now testing transistors because that's a big open area or alongside the wall outside your two offices, then we could make a double bench where we have a blank wall between George's area and the present coat rack. This will give us a lot more working space for inspection. There will be very little traffic by where the coat rack is now, and so we can have a bench facing that way.

We can start moving storage upstairs anytime. We should start saving nice boxes for sealing up our reject stockroom. On the west

side of the building we should be able to put all power supply assembly and still have room to make a system or two. This might be a good breakdown for having all plug-in units on one side and chassis type on the other.

Kenneth H. Olsen

digital equipment corporation
MAYNARD, MASSACHUSETTS

INTEROFFICE MEMORANDUM

DATE April 20, 1960

SUBJECT

TO Loren Prentice/Ben Gurley FROM Ken Olsen

I like the package we developed for the new photoelectric tape reader, and I think we should follow the same general design for our final packaging. I think the final package should contain photoelectric tape reader, paper tape punch, a reeler, and a tape feeder. Underneath the 7 inch panel that holds the tape reader, I think there should be another 7 or 5¼ inch panel that holds the reeler in tape feeder. This should be the same general design as used on the Bendix computer but we can probably make a neater looking one. This panel could also hold the switches. The reeler might be a low inertia reel with a low inertia torque motor or it might be servo controlled like the reeler on the Ferranti. The tape feeder should be like the one we used in TX-0, TX-2 and Whirlwind. The tape punch, which should be on the side of the cabinet, could be the separate Ferranti punch.

I think the cabinet should be welded back just like the console computer is with just a cutout on the side for the punch. Rubber feet should be about 3/4 inch or one inch high and mounted in the bottom so that air is blown out of one side of the bottom and sucked in the other.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE April 20, 1960

SUBJECT

TO Stan Olsen
Maynard Sandler
Jack Smith

FROM Kenneth H. Olsen

I checked the inside of the vacuum sweeper which we are using to collect the filings from the board grilling and was quite surprised to see the fine dust there. Beside the apparently large particles which we normally see, there is very fine dust which I am sure it is a good idea to collect and not blow around the room. I think we should right away connect the vacuum cleaner up to the other drill. These vacuum cleaners are relatively inexpensive from Sears Roebuck and we have several more around that we can use.

The paper bags inside are going to have to be dusted off regularly because this very fine dust plugs the pores and cuts down significantly on the vacuum. I suggest that someone take the machine apart and see if the dust would hurt the motor, and if it does not I think we should take the bags off and blow the fine dust outside. These vacuum cleaners work something like a cyclone but do not filter out the fine particles. The particles that escape past the motor would be exceedingly small and I can see no harm blowing them outside.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE April 18, 1960

SUBJECT

TO Bob Hughes/Dick Best FROM Ken Olsen

There is a danger in keeping our technicians in a pool because they tend not to take responsibility. Jack Smith, who is not our most capable technician, has turned out to be one of our most valuable people because he was given the opportunity to take responsibility and he took it up with enthusiasm. If we assume our technicians are too busy or not capable of taking on responsibility they never will.

I would like to have us outline responsibilities of the engineering service department and see if we can't find someone to take over the whole responsibility and do a good job. I'd like to move the janitor out of his cubbyhole and put test equipment headquarters in there. This would be a good time to lay out responsibilities. Here are my suggestions for the list but I'd like to have you add on so that we can give it to the man in a week or two.

1. Maintain, check, calibrate, and inspect periodically according to a fixed schedule and with good records all scopes, meters, and other test equipment.

2. Check and maintain all DEC digital test equipment and keep the units available on the shelf. All unchecked or reworked modified units should be kept in a separate shelf.

3. Pick up all unused test equipment on engineering benches.

4. Keep clean, neat, and in order all test equipment such as the transistor tester and the General Radio bridge which are permanently left on benches.

5. Maintain the engineering stock room. This should be kept very neat and all stocks maintained.

6. Maintain the audio announcing system for the company.

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

INTEROFFICE MEMORANDUM

DATE April 11, 1960

SUBJECT Miss Barbera Wertz

TO Helen LeBlanc

FROM Kenneth H. Olsen

We can't officially give people permission to work hours other than the official working hours of the day, but I think you should tell her that unofficially she can go right ahead and start fifteen minutes early and leave fifteen minutes early in the evening.

I think we ought to let her get married and let her start July 5.

As to her salary, I don't really know what we should pay her. Will you find out for me what an average person with a Bachelor's Degree is paid and what an average senior would get paid during a summer job. She is part-way in between these two. Do we have her grades from MIT? If we don't, we really should have them on record. It might affect somewhat what we pay her.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

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

TO Ben Gurley

FROM Ken Olsen

I suggest that we write a letter to all power supply manufacturers and request price and delivery on the following power supplies: 15 volts ±5%, 5% ripple, 48 to 63 cycles AC or 48 to 800 cycles AC, not adjustable. We are interested in compact, light weight but not miniaturized or necessarily militarized.

We should explain that we build systems that normally use a simple minded resonant transformer followed by silicon rectifiers. We are now periodically being asked to make systems that would operate on 50 cycles and other odd frequencies, and we would like to have a source of power supplies for this.

I suggest that we modify or put in production our +10 supply with a transformer that will tolerate this frequency range. If we regulate it with forward conducting silicon rectifiers or zener diodes, we should have a good general purpose 10 volt supply. I don't know what we do for our memory supply.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE April 7, 1960

SUBJECT Push Button Pulse Generators

TO Bob Hughes/Dick Best FROM Ken Olsen

When we build special systems they usually have several push button pulse generators inside, and using our present units it gets to be rather expensive. I propose that sometime we look at less expensive ways of doing this. One idea is to use a thyratron type transistor which when it fires would develop a low impedance pulse that would not need amplification. We could have several pulse generators in one plug-in unit, probably enough for any single system.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE April 7, 1960

SUBJECT

TO Jon Fadiman/Wally Weeton FROM Ken Olsen

In memory exercisers where people desire an indication as to which digit caused the failure, I propose that we use one of the two following systems:

1. Stop on error so that a standard indicator driver and an incandescent lamp would indicate in which digit the failure occurred. This would assume, of course, that the memory being tested had a memory buffer register which would hold information.

2. Use a thyratron type indicator tube such as Tung-Sol type 395A or Kip Electronics type KP-145A.

I have written a letter to Kip requesting newer information on their tubes and also price and delivery. If we use these thyratron type tubes we would have to have a reset button that we clear the register whenever we start over again.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE April 7, 1960

SUBJECT

TO Jack Atwood/Jack Brown

FROM Kenneth Olsen

We should have a sales report form, and I would like to have you two think about it and come up with your ideas. The trouble is that when one starts thinking about the possible uses of this, one develops too many ideas and it gets almost unwieldy. It probably should be a snap-out form that will give us a copy to be dropped in each customer file so that we know when visits have been there. One copy should go into a log for the individual that makes a sales call. One copy should also go to a master file in the home office so that anyone interested can see what activity is going on. Each contact with a customer should be entered in this.

We don't ever want to get to the point where people make contacts simply to fill the book but a system of this type can't help but give the individual a measure of how many people he is contacting.

Kenneth Olsen

INTEROFFICE MEMORANDUM

DATE April 7, 1960

SUBJECT

TO Loren Prentice

FROM Kenneth H. Olsen

I suggest that we have the drafting room prepare a drawing which will present all the standards for 19 inch panel. I suggest that we take the chart from the rear of Premier catalog #600 and use it for the basis, although the details will be different. I like their method of lettering different panel sizes starting with A for the 1-3/4 inch wide. We use a different location for holes for the A and B size panels. Their standard panels are 1/32 inch less than even multiples of 1-3/4 inches. I think our standard is a 1/16 less but this is the sort of things we will include in the chart. The same chart should include the standard hole layout for racks which is on the bottom of the last page of the Premier catalog.

We might photocopy that last page of the Premier catalog and modify the appropriate portions and then have it offset printed and distributed freely within the company.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE April 6, 1960

SUBJECT

TO Ken Olsen

FROM Ken Olsen

Julien Rubenstat, from Southern Plastics, called in regard to our inquiry on TV faceplates. Their company does compression molding and extruding. They extrude sheets for vacuum forming and suggested that this is the method we should use because of the low production we are interested in. One of his customers who he says is the best in New England is Plastic Turning Company, in Leominster, ask for Mr. Letart at KEystone 4-8326.

Ken Olsen

dec MEMO

DATE April 4, 1960

TO Henry Crouse FROM Ken Olsen

Please order the kit for the MECA system from AMP for $42.00 if they can give us delivery within a very short period.

Ken Olsen

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 March 29, 1960

SUBJECT

TO Henry Crouse

FROM Kenneth H. Olsen

Please check the price of the RCA 2N1213, 2N1214, 2N1215, and 2N1216. These are bi-stable switching type transistors that they call Thyristors.

Please also find the price on the lowest price bi-stable transistors by Solid State Products who are somewhere on the North Shore but have a representative in one of the nearby towns. I don't particularly care which kind they are but I would like to know what the lowest price is.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE March 29, 1960

SUBJECT

TO Ben Gurley and Dick Best FROM Ken Olsen

Raytheon is now advertising 16 inch, round, all metal cathode ray tubes for radar displays with P7 phosphors. These would be very convenient for us to use because escutcheon plates are available for 16 inch round tubes.

I found a blueprint of a Syntronic stator type yoke with very interesting characteristics. When this blueprint was made only one yoke was available but they claim they can make them any impedance we want. The vertical coil of this yoke is highest inductance which is 10.2 MHY. 278 ma. will deflect this yoke one radian with 12 K accelerating potential. A 9 inch square with 10 KV acceleration potential would need only 156 mils in one-half of this push/pull yoke. With a 250 volt supply, this yoke should deflect across a 9 inch square in 6.45 microseconds. Other factors such as relaxation in the iron core and LR time constant of the damping resistor would slow it down somewhat but this can give an idea as to how fast it can be accomplished.

I propose that we consider this as replacement for both the TX-0 oscilloscope and our inexpensive computer oscilloscope.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE March 29, 1960

SUBJECT

TO Stan Olsen

FROM Ken Olsen

I was a little surprised at the poor looking etched boards we had at the I.R.E. Show. We should make our etched boards and System Building Blocks larger so that they show the handle and in that way we won't have cocked etched boards.

Before we make any new pulse amplifiers we should relayout the old ones because some of the components look awfully close together, particularly those large diodes in the center.

Ken Olsen

INTEROFFICE MEMORANDUM

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 29, 1960

SUBJECT

TO Jon Fadiman and Wally Weeton FROM Ken Olsen

Chris Snyder stopped at our booth at the AR&D Stockholders' Meeting and at the I.R.E. Show to tell us that they had trouble with their plane tester. He knew of nothing specific except that people have trouble setting up the switches and tend to make mistakes. We asked him if he had any specific troubles with their machine and he said he didn't know but they were working on the back quite a bit, so I recommend you call and find out what the situation is and take care of them and be sure they are happy. The names of the two people are Ben Kane and Kirk Schlact.

Daystrom has one problem with their exerciser. When they change the mode switch, it generates a pulse which goes into the loop and starts the thing going. I should think we could figure out from our diagrams how to stop this and send somebody down to repair it or tell them quickly how to do it.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE March 29, 1960

SUBJECT

TO Ted Johnson/Jack Brown FROM Ken Olsen

Edget, Ingram, Houser & Greer (spelling ??) have an office in Nevada that is responsible for all the instrumentation in the atom bomb tests. Apparently they are large users of digital equipment and even though atom bombing has slowed down for a while, they may be still a good user.

Ken Olsen

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

dec MEMO

DATE March 18, 1960

TO Jim Myers FROM Ken Olsen

Please order the following patents. Hold onto this list until we get the list from our patent lawyer to be sure that they aren't duplicated.

2,928,894
2,928,896
2,929,050.

Ken Olsen

dec MEMO

DATE March 18, 1960

TO Jack Brown FROM Ken Olsen

During the Eastern Joint Computer Conference, one of the wheels from AMP, in Harrisburg, Pennsylvania, showed a lot of interest in our Test Equipment because they are getting involved in logic units using multi-aperture cores. He is also interested in the Memory Tester, but I am not sure what this is for. Will you schedule somebody down to visit them, or at least make a telephone call to find out what the interests are. Before the EJCC they didn't realize the application of test equipment at all and even now they probably don't really have the picture.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE March 18, 1960

SUBJECT Noncomputer Applications of PDP-1

TO Ben Gurley/Harlan Anderson

FROM Kenneth H. Olsen

Our first advertising of PDP-1 appeals to the people already in the computer business and they tend to mislead us as to where the market possibilities are for this machine. Maybe we shouldn't listen to hot programmers but should go out aggressively after the fields which we know are there and not being touched by other people. The examples which have come up without looking include machine tool positioning tape production, mailing list maintenance, format control, and I am sure there are a lot others.

We tend to lose interest in these because they always need something special but when you look at what Bolt, Beranek & Newman want, it's not going to be an off-the-shelf item either. When you consider what they're asking for, for the money, it might be an awful lot more work than what we do per dollar on memory testers.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE March 18, 1960

SUBJECT

TO Ben Gurley and Bi-Weekly

FROM K. H. Olsen

DARC

I called Dan Geisler at M.I.T. to get his opinions as to what an average response computer should be. He feels it is desirable to take 10,000 samples when one is working with human beings because the background signals are often 40 to 60 microvolts and the desired signals are often as low as 2 microvolts. When people are working with animals they can slip off the skulls and get signals that will look good after a 100 samples because they can get much closer to the cortex.

He felt that 256 points on the curve is very nice, but 128 might do and he suggested that one might even get by with 64 points. They use an Offner differential input amplifier with a gain of one to ten million. He uses a frequency response of 8 to 600 cycles but some people like to go lower and a few even like to go down to DC. As one gets closer to the source of the signals, the pulses are narrower and get down to about a millisecond in width which would need an amplifier response of about 5000 cycles.

On May 10 and 12 there is going to be a conference at M.I.T. on computers and biophysics. This is only for invited people and we would not normally be invited but Dan will see if he can get us on the list. We definitely should have some propaganda on our equipment then and it would be nice if we had a brochure written on DARC. It would be nice to have the computer installed nearby where people could come to visit it. This show conflicts with the shows in California and we can't have the computer in both places. If the computer is tied up with work at Maynard, we may not want to ship it to California anyway.

Ken Olsen

dec MEMO

DATE March 18, 1960

TO Ben Gurley and Harlan Anderson FROM Ken Olsen

William Briggs, from the Civil Engineering Department at M.I.T. called on Tuesday at about 3:30 p.m. and wanted to talk about PDP. He was particularly interested when he heard we had one here and wanted to come out and see it. Thursday afternoon was particularly convenient for him and I assured him that it would be very convenient for us. Now we have to make it convenient for us. He will be here about 3:30 p.m. I gather that they are just exploring the use of computers and working with maps and in the design of whatever civil engineers design. He is going to ask for me but we should tell the receptionist to steer him on to whoever is most qualified and available at that time.

dec MEMO

DATE March 18, 1960

TO Loren Prentice FROM Ken Olsen

We have about four or five lenses for the enlarger in the dark room but the lens boards are just laying about collecting dirt. Even t ough most lenses aren't worth very much it is still worth keeping them in good shape, and besides a couple of them belong to me. Will you suggest or have someone make a box for holding these lens boards.

INTEROFFICE MEMORANDUM

DATE March 16, 1960

SUBJECT Library Shelves

TO Kenneth H. Olsen

FROM Kenneth H. Olsen

Bailey Woodworking Company, in Framingham, TRinity 9-9846, makes custom library shelves but they are used to bidding against people whose standard line are specified for jobs. The trend is now toward birch shelves instead of the oak which has been used. Their standard modules are 7 feet tall, 3 feet wide, and about 10 inches deep. The price is about $30 per running foot.

Cardeau, Inc., at LOngwood 6-5821, carry solid maple shelves, 39, 61, and 82 inches high in 36 inch modules. These are stock items but they do not have a price list and do each job separately. They also have island units, single or double.

Kenneth H. Olsen

dec MEMO

DATE March 11, 1960

TO Ben Gurley FROM Ken Olsen

I propose that we have Jack Atwood set the instruction code and all the summaries in the back of the PDP-1 manual in type immediately. We'll then have a head start on our booklet. If you think it's a good idea, we could have Frank Hazel look over the instruction code first to give us any ideas he has and suggestions on the actual wording of the instructions.

Ken Olsen

dec MEMO

DATE March 9, 1960

TO Jack Atwood

FROM Ken Olsen

Frank Hazel, of Mitre Corporation, suggested that we try using Stu Bemis, who is the Lincoln photographer. He thinks he is very good at this type work and I would suppose his prices are probably less than most commercial photographers. Stu Bemis probably will contact us, but if he doesn't the Mitre phone number is CR 4-8750.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE March 9, 1960

SUBJECT

TO Dick Best

FROM Ken Olsen

We had a formal request from Lincoln Laboratory on the Dicon Tape Buffer. I am just sending the request back to them saying that we don't want to bid on it because I feel that we are in an unfair competitive disadvantage in dealing with Lincoln Laboratory. If we ever do build this device, I have another angle that I would like to consider. Instead of a 1000 word, six digit memory, we could build a 96 digit, 64 word memory. We would then need no input register and we could drive our digit drivers straight from their signals. We then need a 96 bit output register which could be one mounting panel full of our four digit buffer flip-flops. We'd drive it linear selection with a separate switch and driver for reading and for writing. We could then read and write completely independently. I wouldn't tell Lincoln Laboratory about this approach or they'd send it out to other people to get bids on it.

Ken Olsen

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 8, 1960

SUBJECT

TO Jim Myers

FROM Ken Olsen

From the latest brochure from McGraw Hill, I think we should order the following books if we don't have them in the library already:

SERVOMECHANISM FUNDAMENTALS

CONTROL ENGINEERING, RESISTANCE AND RESISTORS

DIGITAL COMPUTING SYSTEMS

ELECTRONIC DESIGNERS HANDBOOK

AMERICAN INSTITUTE OF PHYSICS HANDBOOK

PRINCIPLES OF CIRCUITS SENSE OF SYNTHESIS

ELECTRICAL ENGINEERING FUNDAMENTALS.

I am sure we have a number of these books, but you can easily find out.

Ken Olsen

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

will be three sheets wide and the inside will have a block diagram with pin connections and description of each unit of low speed line. There will be four on the first two sheets and two on the last with full descriptions. In the middle of the last sheet there will be six block diagrams across with one sentence descriptions underneath for those units which only need one sentence.

The 1000 Series will fold out to four sheets. The inside will contain four block diagrams and descriptions on each page. Twelve block diagrams with one sentence descriptions will be on one of the back pages. In the SBB brochures we will list all the power supplies including the new +10 and all the mounting panels including the 1906 but we will not make a point of the 1906 here. I understand that Dick Best and Bob Hughes are checking the validity of the present System Building Blocks and are gathering one sentence descriptions of all System Building Blocks that we need them for. When they give the list of units to be described, Jack Atwood will check to be sure we have block diagrams with pin connections for all the System Building Blocks we want to include.

The "DEC Makes" brochure will be four pages. The front page will have some interesting photographs of our equipment. The inside page will be a chart of all of our standard Building Block line with columns for the 500 KC, the 5 megacycle, and the 10 megacycle. Underneath the chart there will be some general rah-rah description of Building Blocks. The opposite side, or page three, will be a list with a one sentence description of all our other units. The bottom sentence should say something to the effect that there is also a lot of other more special units to be made so be sure to bring your problem to us because we may have just the unit for it.

Instead of describing our systems, we will have a picture on the front cover of the brochure which describes them, and then a very short paragraph opposite this front cover. Above are listed ten brochures and this will make a rather impressive looking back. Jack Atwood will go ahead and design the front covers for those which we haven't written as yet. We'll have to write them soon after the I.R.E. Show and get them printed. The only thing we really commit ourselves to in doing this is the brochure number and the fact that we will eventually write them.

Kenneth H. Olsen

dec MEMO

DATE March 7, 1960

TO Helen LeBlanc FROM Ken Olsen

I'm assuming that you are going to advertise and let all employees know that x-rays will be available, free, March 18. We want to be careful to let people know that the company is offering this but not insisting that people take it. We should let them know that the company is paying the fee.

Ken Olsen

dec MEMO

DATE March 7, 1960

TO Stan Olsen FROM Ken Olsen

Here's a copy of a Kelco Supply catalog that I think you should look over and see what first aid supplies we should have. On page 98 there is a cabinet for $59 which looks like what we need for the first aid department. Will you also look at the stretchers and see if we need one for emergency.

Ken Olsen

dec MEMO

DATE February 29, 1960

TO Harlan Anderson FROM Ken Olsen

We have a meeting on Thursday of this week, March 3, with Jay Forrester to discuss his project.

Ken Olsen

dec MEMO

DATE February 26, 1960

TO Bob Hughes/Dick Best FROM Ken Olsen

I propose that we produce a 10 megacycle inverter plug-in unit and make very conservative specifications on them. We could make rules such as only two inverters in series.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE February 26, 1960

SUBJECT

TO Bob Hughes/Jack Atwood FROM Ken Olsen

I propose that we ship out a quick sheet on our standard power supplies. If we make it look something like the sheet we have on the 730, we can probably do it rather quickly. It should include all the information on the 721, 740, and our new +10 supply. It should include the dimensions and the weights and the current capabilities. It should probably even tell what the hum level in some measure regulation.

I suggest that we have a picture of the 721 or some other one with a blank panel on the top, and then we can have a paragraph on each of the supplies. We might include the 730 and the 731 or 732 in the same sheet. If we describe the dimensions and the fact that the 730 has a meter, we will not need a picture of each unit.

Ken Olsen

BI-WEEKLY

Kenneth H. Olsen
February 26, 1960

Remington Rand Memory Job

Remington Rand asked us to bid on production quantities of magnetic core memories to be used in their new commercial computer. This job has many attractive features, such as high volume with very low sales. We felt that because we had particularly advanced circuitry we might make very good profit while charging the same price as other people. However, we decided to turn down the opportunity to bid because we would be concentrating on one customer and one product which would not be building up our reputation and line of proprietary products. We started the PDP computer and now we'll have to give it all the time, enthusiasm and capital that we have. If we do a good job on the computer, we will have a significant company reputation and a profitable proprietary line of computers.

We are also afraid of this memory job because it would tie too much of our business to one customer, and he might cancel at any time. Part of the contract would be giving all the rights to the design and production of the system to Remington Rand. There are many details in specs. and design problems which have not been worked out yet that would take many trips and much liaison.

Flip-Flop Design

I have been spending a little time with Al Swift on a new transformer design for the common input of high speed flip-flops. The present circuit draws too much pulse current so we are trying the high impedance primary with a higher primary voltage. This will also make it possible to standardize carry pulses to a narrower width.

dec MEMO

DATE February 24, 1960

TO Harlan Anderson/Jack Brown FROM Ken Olsen

We got a letter last week from the college that we sold equipment to asking for information as to how we use it. Were we able to take care of their needs?

Ken Olsen

dec MEMO

DATE February 24, 1960

TO Harlan Anderson/Jack Brown FROM Ken Olsen

On February 23, a letter came from John Seeland of IBM Federal Systems Division, in Omaha, Nebraska. They requested detailed information on our Test Equipment. I'd like to know what we did to follow up on this.

Ken Olsen

February 24, 1960

Catalog Production

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

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

M-1082

DATE February 23, 1960

SUBJECT Bus Schedule

TO Those Concerned

FROM Kenneth H. Olsen

We often have visitors coming to Maynard from Boston, and the attached bus schedule may be helpful when giving information regarding departure and arrival times.

The bus leaves Harvard Square at the corner of Massachusetts Avenue and Gardner Street.

Kenneth H. Olsen

Attachment

MIDDLESEX & BOSTON STREET RY. CO. • 1020 MAIN ST., WALTHAM, MASS. • Tel. TW 3-7330

MAYNARD — CONCORD — BEDFORD AIRPORT — HARVARD SQUARE

WEEK DAYS AND SATURDAYS

	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	A.M.
Maynard	*6.15	6.55	7.55	8.55	9.55	10.55	11.55	12.55	1.55	2.55	3.55	4.55	5.35	6.55	7.40	9.25		
West Concord	*6.30	7.10	8.10	9.10	10.10	11.10	12.10	1.10	2.10	3.10	4.10	5.10	5.45	7.10	7.50	9.40		
Concord	*6.40	7.20	8.20	9.20	10.20	11.20	12.20	1.20	2.20	3.20	4.20	5.20	5.50	7.20	8.00	9.50	11.25	1.05
Airport		7.32	8.32	9.32	10.32	11.32	12.32	1.32	2.32	3.32	4.32	5.32	To Waltham Via Lake Walden	7.32	To Waltham Via Lake Walden	10.02	11.37	To Waltham Via Lake Walden
Five Forks	6.50	c7.40	c8.40	c9.40	c10.40	c11.40	c12.40	c1.40	c2.40	c3.40	c4.40	c5.40		c7.40		10.10	11.45	
East Lexington	6.55	7.45	8.45	9.45	10.45	11.45	12.45	1.45	2.45	3.45	4.45	5.45		7.45		10.15	11.50	
Arlmont Village	7.00	7.50	8.50	9.50	10.50	11.50	12.50	1.50	2.50	3.50	4.50	5.50		7.50		10.20	11.55	
Harvard Square	7.15	8.05	9.05	10.05	11.05	12.05	1.05	2.05	3.05	4.05	5.05	6.05		8.05		10.35	12.10	

* Does not run Saturdays. c Connecting with bus for Lexington, Arlington, Belmont and Watertown

HARVARD SQUARE — BEDFORD AIRPORT — CONCORD — MAYNARD

WEEK DAYS AND SATURDAYS

	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.
	BUSES LEAVE HARVARD SQUARE																	
Waltham	6.15	7.15																
Harvard Square	Via Lake Walden	Via Lake Walden	7.20	8.25	9.25	10.25	11.25	12.25	1.25	2.25	3.25	4.25	*5.15	5.25	*5.45	6.25	8.15	10.35	12.15
Arlmont Village			7.35	8.40	9.40	10.40	11.40	12.40	1.40	2.40	3.40	4.40	5.30	5.40	6.00	6.40	8.30	10.50	12.30
East Lexington			7.40	8.45	9.45	10.45	11.45	12.45	1.45	2.45	3.45	4.45	5.35	5.45	6.05	6.45	8.35	10.55	12.35
Five Forks			c7.45	c8.50	c9.50	c10.50	c11.50	c12.50	c1.50	c2.50	c3.50	c4.50	5.40	c5.50	6.10	c6.50	c8.40	11.00	12.40
Airport			7.52	9.00	10.00	11.00	12.00	1.00	2.00	3.00	4.00	5.00		6.00		7.00	8.50	11.10	12.48
Concord	6.35	7.35	8.10	9.15	10.15	11.15	12.15	1.15	2.15	3.15	4.15	5.15		6.15		7.15	9.05	11.25	1.00
West Concord	6.45	7.45	8.20	9.25	10.25	11.25	12.25	1.25	2.25	3.25	4.25	5.25		6.25		7.25	9.15		
Maynard	6.55	7.55	8.30	9.40	10.40	11.40	12.40	1.40	2.40	3.40	4.40	5.40		6.40		7.40	9.25		

* Does not run Saturdays. c Connecting with bus for Lexington

Harvard Square - Bedford Airport - Concord - Maynard

SUNDAYS AND HOLIDAYS

	A.M.	A.M.	A.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	A.M.
Waltham	8.15											
Harvard Square	Via Lake Walden	9.00	10.30	12.00	1.30	3.00	4.30	5.45	7.15	8.15	10.35	12.15
Arlmont Village		9.15	10.45	12.15	1.45	3.15	4.45	6.00	7.30	8.30	10.50	12.30
East Lexington		9.20	10.50	12.20	1.50	3.20	4.50	6.05	7.35	8.35	10.55	12.35
Five Forks		9.25	10.55	12.25	1.55	3.25	4.55	6.10	7.40	8.40	11.00	12.40
Airport		9.35	11.05	12.35	2.05	3.35	5.05	6.20	7.50	8.50	11.10	12.48
Concord	8.35	9.50	11.20	12.50	2.20	3.50	5.20	6.35	8.05	9.05	11.25	1.00
West Concord	8.45	10.00	11.30	1.00	2.30	4.00	5.30	6.45		9.15		
Maynard	8.55	10.15	11.45	1.15	2.45	4.15	5.45	6.55		9.25		

Maynard - Concord - Bedford Airport - Harvard Square

SUNDAYS AND HOLIDAYS

	A.M.	A.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	A.M.
Maynard	9.00	10.30	12.00	1.30	3.00	4.30	6.00	6.55		9.25		
West Concord	9.15	10.45	12.15	1.45	3.15	4.45	6.15	7.10		9.40		
Concord	9.25	10.55	12.25	1.55	3.25	4.55	6.25	7.20	8.05	9.50	11.25	1.05
Airport	9.37	11.07	12.37	2.07	3.37	5.07	6.37	7.32	To Waltham Via Lake Walden	10.02	11.37	To Waltham Via Lake Walden
Five Forks	9.45	11.15	12.45	2.15	3.45	5.15	6.45	7.40		10.10	11.45	
East Lexington	9.50	11.20	12.50	2.20	3.50	5.20	6.50	7.45		10.15	11.50	
Arlmont	9.55	11.25	12.55	2.25	3.55	5.25	6.55	7.50		10.20	11.55	
Harvard	10.10	11.40	1.10	2.40	4.10	5.40	7.10	8.05		10.35	12.10	

Holiday schedule in effect the following holidays : May 30 - July 4 - Labor Day - Thanksgiving - Christmas

February 16, 1960

Ben Gurley/Dick Best/
Wally Weeton

Kenneth H. Olsen

I called Jim Shallerer about 4:30 p.m. today to get some more details on the 1024 six bit memories. They have eight bit stacks ready to be folded which they can deliver in about a week. Four bit stacks would take four or five weeks but would cost about $300 less per stack. The small cores in eight bit stacks cost $1,600 and drop to about $1,100 in quantities of 25. The following materials are available in small cores and are ready to be folded.

MC138	1 usec	500 mils
MC140	1 usec	440 mils
MC149	1.4 usec	350 mils

The following cores are available but are not at present stocked:

MC147	2.2 usec	285 mils.

The MC149 puts out 45 millivolts for one and 5 millivolts for zero.

I mentioned our automatic core tester but he said because their handler tests 12 cores per second, they are committed to using Burroughs equipment. He suggested we contact Turk Slack for further talk about testing.

Wally Weeton called RCA and got a whole new list of prices on 64 by 64 stacks which they hope will be competitive. Frank wants us to let him know if they are not competitive. Wally also got a price on the six digit 1024 word memory using 222M2 cores which are 50 by 80 mils. This core takes 200/400 mils drive and puts out 65 millivolts for one. Switching time is approximately 2.1 microseconds and strobed well with a 0.4 microsecond strobe. The cost of these cores is less than the small ones because these are easier to string. The price quoted was $1,050 and delivery of about five weeks. Wally thinks we can do better than the five weeks.

Ted Popp from Lincoln called and said that they have decided to order the core ray from us separately to get a head start. It will probably take him a few weeks to order the buffer.

Ken Olsen

dec MEMO

DATE February 16, 1960

TO Henry Crouse FROM Ken Olsen

Please check with a distributor or Alden Manufacturing and order one tube socket for cathode ray tube #5GDP1. The socket is a medium shell Dileptal type.

Ken Olsen

dec MEMO

DATE February 16, 1960

TO Maynard Sandler FROM Ken Olsen

We're not doing a good job of maintaining our tool room in the machine shop. In fact, I don't think it will work until we assign somebody that definitely has that responsibility. Would it be possible to assign one of your people that responsibility? I don't think it should take more than a few hours a week, but somebody is going to have to maintain it and complain when things are not put back in order. If we don't do something drastic, we're going to have no control whatsoever up there. The shop is largely a production responsibility and will be more so when we get a foreman, and so I think this is a natural thing to put under you and have one of your people take care of it. I would like to hear your reaction to this.

Ken Olsen

February 16, 1960

Harlan Anderson/Jack Atwood/
Ben Gurley

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 Maynard Sandler

FROM Ken Olsen

For a long time we have been looking for reject units that we can give away as samples to our friends, such as the Board of Directors. Dean Alden of Harvard Business School has sent a number of inquiries our way because of the unit which he has on his desk which he took from AR&D. This seems to be the only unit out now, and we should send more. This unit, by the way, was one of our first and it looks very poor. I propose that you make a production run of twenty Test Equipment units and twenty System Building Blocks and call them gifts for paperweights, charge it to Sales, use some reject boards in the stockroom, preferably from something that is obsolete and maybe that already has parts and lugs off. These can be almost any unit, but they should be good looking and should have enough parts in it that look like there is some sophistication. We should use completely reject transistors and not bother testing at all. Let me know what you think about this.

Ken Olsen

dec MEMO

DATE February 15, 1960

TO Jim Myers FROM Ken Olsen

This is a chore which I think you should do right away. Somebody is typing letters so faint they look like there is no ribbon at all. Will you check all the typewriters and be sure that we're typing decent letters and, if not, have the ribbons replaced. At the same time, be sure that all the secretaries know that all letters typed on company stationery must go to the Master Letter File. If people don't want a letter in the letter file, then they should not be typed on company stationery.

Ken Olsen

dec MEMO

DATE February 15, 1960

TO Calendar/George Gerelds/
Loren Prentice

FROM Ken Olsen

Phil Brager from Mitre Corporation is coming over with a couple of people on Wednesday noon to discuss transistor testing with us. We want to be very gracious and helpful to them, even though I'm not sure we can be very helpful on transistors.

Ken Olsen

February 12, 1960

John C. Conley

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

February 10, 1960

Oil Gear Company

File

Kenneth H. Olsen

Wes Broome, from Oil Gear Company, called on February 9 and wanted to know if we could solve a problem that they have. My first reaction is that it is a natural for analog, but they are having trouble doing it because of the problems in getting wide range tachometers. This is a very classical problem and people have been working on it for many years. It is where they are winding up paper or cloth or like material and want to wind it with constant tension. Oil Gear makes the prime mover for the winding but apparently needs something better for tension control. The normal tachometers do not give the wide range necessary nor the precision, apparently. I find this hard to believe, but we will continue to look into it with them. They would like to use a pulse type tachometer, i.e., one that puts out pulses during each revolution and so the speed is proportional to the number of pulses per unit of time.

The diameter is equal to the surface or width speed divided by the hub speed. I don't know how to do this simply, however, and I am sure they can't afford a digital multiplier like we would normally make.

Kenneth H. Olsen

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

INTEROFFICE MEMORANDUM

DATE February 10, 1963

SUBJECT Harvard Business Review

TO File

FROM Kenneth H. Olsen

Mr. E. D. Frawley, of the Harvard Business Review, and Mr. James Watson, who runs the company that maintains the mailing list for Harvard Business Review, visited on February 8 to discuss the use of a PDP for maintaining their list. They have about 60,000 subscribers of which 30,000 are changed each year. The magazine is mailed out every other month but the list is revised several times during the two month period. In addition, they have to exchange mailing lists with other magazines several times during the year and they would like very much to get statistical information on their list for the verification services and for their own use. They now have all their subscriptions on multigraph plates, which is very unwieldy and useless as far as getting statistical information. The obvious next step is to go to punch card systems, but the filing and sorting problem there is not particularly satisfactory. Two companies have punched cards which have the address of the subscriber in hectograph master form on the back of the card from which addresses are printed.

Our computer does seem to be a natural, but for this size operation it is not obvious as to the economy. It is just about a toss-up right now but can go one way or the other depending on how a thorough investigation goes.

They may need three tape units when revising their list. One for the old list, one for the revisions being injected and one to rewrite the revised list. If we could figure out a way of doing this with two tape units, it would cut the costs significantly.

Printing the labels is part of the problem and normal Anelex machines could be used, but one made somewhat special that uses sprocket holes on one inch centers is the one that feeds the normal automatic stick-on machines. Anelex probably could modify one of their machines to do this. I think our system is only economical if we can use the computer for the storage involved in running the Anelex.

A 22 or 24 digit column Anelex printer would do the job, but it might be better to have an 8-1/2 inch wide, 72 column printer so that they can do their billing and so they can deliver rather presentable outputs to people with whom they are interchanging lists. It might be possible to buy envelopes on perforated mounting strips that can be fed through an Anelex printer, or operations where you want to address envelopes without using a label. We have the wider paper and one could type two or three normal address labels in parallel.

Kenneth H. Olsen

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

INTEROFFICE MEMORANDUM

DATE February 8, 1960

SUBJECT Lauri Klemola - Applicant

TO Helen LeBlanc/Loren Prentice/ Ben Gurley/Dick Best

FROM Kenneth H. Olsen

We received a resume today from a Mr. Lauri Klemola who lives here in Maynard. He used to work in the Woolen Mill from 1926 until 1950, and then at Raytheon from 1950 to 1953, and now Melpar from 1953 to 1960. He is a coordinator/expeditor type and supposedly starts with preliminary schematics and develops parts lists and orders parts and follows up on procurement purchasing. He says he is thoroughly familiar with MIL specs and preferred parts.

Stan thinks he is someone like Mike Storm, but he might be a very convenient helper in the Engineering Department. I wrote him a letter saying we don't have openings now but suggested he stop in to get to know us. If he is that interested, we'll have a chance to look at him without being forced to say no. When he comes, I think Ben Gurley, Dick Best, and Loren Prentice should be sure to see him.

We need somebody in this area, but he has got to be someone who will not get in the way and not upset the other departments.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE February 7, 1960

SUBJECT Harvard Business Review

TO File

FROM Kenneth H. Olsen

Mr. Frawley, of Harvard Business Review, called today and wanted to know if our equipment could be used for magazine subscription filing. They now have 60,000 subscribers which is too many for their mechanical and rather obsolete equipment they have now but not big enough for the 7070 like the big magazines are getting. He expects to visit us about one o'clock on Tuesday, February 9.

We checked with several business form companies and they will come out and visit us and explain what address label forms they have. We would also like to know what kind of machinery is available for applying addresses to magazines.

I called Anelex and they say that this lot of forms available for addressing that have 10 feed holes on them are available adhered to 10 feed paper backing. They also say it's possible to make an edgewise printer with three or five wheels, but they feel this takes more storage; but I don't think it would if we are using a computer anyway. At 900 lines per minute printing lengthwise, it's going to take about five hours to print 60,000 addresses. An edgewise printer might take much too long for this.

Five lines of 24 characters takes 120 lines on magnetic tape, or 40 words of 18 bits in computer storage. If the memory held 15 addresses as a record, the record would be equal to 10 inches of magnetic tape. This means that one reel of tape would hold about 72,000 addresses.

The problems we have to face are how do you update, how do you sort, and how do you prepare new address lists. I think you may need three tape units, but you might get by with two.

Kenneth H. Olsen

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

INTEROFFICE MEMORANDUM

DATE February 5, 1960

SUBJECT

TO Dick Best/Ben Gurley/Bob Hughes FROM Ken Olsen

I propose we get together for an hour or two someday and tentatively design a line of low speed, low cost circuits for machine tool control and like applications. These circuits should be very inexpensive and we should get as many circuits on a package as possible. I think that our present packaging system is about as inexpensive and reliable as we can get, and I also think we should use the same power supply voltage and the same pulse characteristics that we use in our 4000 Series if at all possible. It would also be good to use the 2N410 transistor because of the experience we are developing in it.

I propose that we have two transistor flip-flops and diode capacitor gating. We might work out a system just like we had in the SABRE system, but we should have at least 4 or 5 volt pulses. If the pulses are like the 4000 Series in width, they will not drop so much across diodes. For the odd units like delays and clocks, we could use 4000 Series with slightly different output transformers, which might mean that all we need to design is a few flip-flop units and some diode capacitor units.

The flip-flop perhaps should not be clamped but simply go to -15 but allow wide circuit tolerances so that with loading it won't have to go all the way to -15. We may integrate the output like we did the SABRE.

The units I think we should have are the 3 digit shift register and a 3 digit counter and a 3 flip-flop buffer.

If we could get together and make a tentative design of these things, we'll be a lot better off when discussing problems that come up. We may all of a sudden want to bid or at least know whether it is worth while bidding on jobs to use these.

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

dec MEMO

DATE February 5, 1960

TO Jack Atwood FROM Ken Olsen

For our numbered permanent memoranda, I think we should have a special printed heading which probably should be called "Permanent Memorandum." The subheadings should be printed also, such as author, subject, date, and then a space for approved, and then abstract. Now, the first page I think should contain nothing more than this with the abstract, then the main text should be on pages after that. It might be wise to not print "Abstract" so that when we have only a paragraph or two for the whole memo it's not abstracting and this could all fit on one page.

Ken Olsen

dec MEMO

DATE February 5, 1960

TO Jack Atwood FROM Ken Olsen

We should have a standard form for requests for bid. I propose that they should have across the top in fairly large letters REQUEST FOR BID and under that should be the company's letterhead which can be either the standard letterhead or a simplified one, then there should be room for some standard comments like are on the request that we get in, i.e., reference number.

K. H. Olsen

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 4, 1960

SUBJECT Trip to Hodge Controls

TO Henry Crouse

FROM Kenneth H. Olsen

I visited Hodge Controls early February 3 morning and caught them rather by surprise. They claim to be moving from Greenwich to Cos Cob and used this as an excuse for the condition of their shop. Their shop was not dirty but it was cluttered and I think this probably puts some limit on their production capability. The people are apparently extremely capable in building delicate mechanical things, but I think they are lacking in organization. But they do seem to be doing a good job on the clutch brake, and I do think we will do well in buying from them. Hopefully, we will buy the units in fairly large quantities and thoroughly test each one and keep them in stock rather than be dependent on normal, low quantity deliveries.

Most of their units are made special. They are doing work for General Electric and Westinghouse and most of it has to tolerate high temperature. They are building the units in standard servo sizes and they can stack components like clutches and brakes and electric motors. They make their own electric motors and can make them DC, multiple phase, or single phase at any speed. They claim because they can keep the clearances small that they can make much more efficient motors than other people.

Each shaft has two fairly well separated bearings. They use ball bearings from New Hampshire and felt bearing seals to keep the powdered iron out. Powdered iron is normal powdered iron to be used in RF tuning slugs, but they sort it out to choose only one size particle. He claims that in 50 pounds of material they can only use 2 pounds.

They'd do a lot better if they had some standard sizes and I think they are working on that now. They are running through their size 15 and then they'll run through a batch of the bigger ones. He's all too eager to make special things. I'd be happier if he had stock items.

He was the founder of Electomic Company and did all the design work. Haddam Manufacturing Company bought in to help them on the financial problems, but they broke up and the corporation was dissolved. Hodge went on to do better engineering and now, without advertising, is selling to some of the old customers. Haddam is continuing the manufacture of their same old units. Hodge claims that Haddam is doing no engineering or improvement. I want to call Haddam to hear their side of the story.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE February 4, 1960

SUBJECT System Development Corporation Meeting, February 3, 1960

TO Sales File

FROM Kenneth H. Olsen

Ben Gurley and I met Robert von Buelow and his boss, Harry Harmon, at the Viking Hotel, in Newport. They found out that the hotel they were going to was a very undesirable place and they moved over to the Viking which is old, but rather pleasant.

They want to decide in two months or so on a computer. They have investigated several and now the number boils down to about four or five. The Philco S-2000, which has a memory cycle time of 2 microseconds or 5 microseconds, depending on how much you want to pay, or the IBM 7090, or the Control Data Corporation, or the Datamatic. They looked at RCA and concluded that it was much too slow, but I think they must have made a mistake.

The day before they visited Sam Alexander at Bureau of Standards. Sam, who of course has strong opinions on everything, had very strong opinions on their subject. He had just completed a study for Wright Air Development on what would be needed for a simulation facility and was all primed for SDC. He felt very strongly that they should build a computer themselves. This might be the first time I have ever agreed with Sam. However, they didn't talk over the problems of not having standard order codes and the resulting standard programs. The advantages that Sam pointed out were the ease of special orders and the ease of tying in external equipment.

It took us a while to get oriented with our words, but our understanding now is that von Buelow would like about six input registers wired for a simple-minded multiple sequence. Instead of a volatile memory to hold programmed counters, they could be simply toggle switches. Some other mechanical switch arrangement would set up the priority chain. I like this idea and I think we might use it for all our in/out operations in the standard machines. We have a tremendous advantage in that we could give this to von Buelow with very little extra cost.

They are considering several ways of working with us. If they buy the machine from someone else, they could buy this in/out register from us or the black box which ties it to 8000 inputs. This black box is a monster and I think we would probably sell the Building Blocks and let them wire it at SDC. They are interested in $30 flip-flops, but the $39 flip-flops don't sound too bad. For the number of units they will need we might do well in designing a special flip-flop package with two transistor flip-flops. They probably will only need one output load and a very inexpensive flip-flop buffer would probably sell anyway.

Their programmers like floating point very much. Before we get much further along with the PDP-3 we are going to have to figure out what it cost to subprogram this. Some people offer a floating point black box which appeals to von Buelow.

Some people also have a black box which does decimal to binary decoding. I think this does a single digit at a time, but apparently simplifies things quite a bit. If we work out this black box it might be useful in our machine tool control when we read a single decimal digit in, we can convert it to binary and automatically carry out the conversion as we fill in the buffer register. This means you have to read in the least significant digit first, I think.

We gave him an estimate of our cost for 16,000 words of memory and it totaled three-quarters of a million which they felt was low. I think we may have to consider lowering the price of our memory and perhaps increase the price of the computer. Von Buelow's cost estimate on core memories varies from $.44 to $1.20 per bit. We have to check on these prices because if they do go down to $.44 we are charging too much at $.50 a bit.

We got off to a slow start but after a while we stirred their interest and if we are enthusiastic about doing the job, I'm sure we can do a better job than they can get done any place else. Von Buelow is going to ask us specifically to give an informal proposal on the points discussed.

I talked a little bit about my ideas of simple computers tied in parallel so that several people can use small computers or one person can use a very powerful machine. This caught the interest of the senior man because he liked the idea of starting small and keeping the maintenance down. They have had a lot of experience with the high cost of programming and so they appreciated the availability of a computer for program debugging.

They are a nonprofit organization, which means they collect profit off their normal projects and accumulate it for things like this which are for the public's good. They hope to get part of the machine given to them because of their nonprofit status. This would put other companies in a favorable competitive advantage. They won't have enough money to buy the machine all in one year but would have to spread the money over two or three years, but it has to be a purchase and not a lease. It's to their advantage to capitalize as many things as possible.

Newport is about 85 miles from Maynard and is good road down to Fall River where it becomes very tedious city driving.

Kenneth H. Olsen

cc: H. E. Anderson

dec MEMO

DATE February 2, 1960

TO Dick Best/Ben Gurley/
Bob Hughes/Jon Fadiman

FROM Ken Olsen

In looking over the cathode ray tubes, I discovered that Sylvania has an equivalent to the Tektronix 541 cathode ray tube which has a rather interesting and, maybe someday, useful characteristic. It takes ±170 volts to deflect this full scale horizontally but only ±14 volts for the vertical deflection. This means that we can drive the vertical plates directly from a 15 volt transistor decoder and get full scale deflection.

It's too bad we can't do the same on the horizontal, but these little tricks are useful to know.

Ken Olsen

dec MEMO

DATE February 1, 1960

TO Loren Prentice FROM Ken Olsen

Please have one of your people tighten the screws or rescrew the legs on the two tables in my office.

Ken 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

dec MEMO

DATE February 1, 1960

TO Stan Olsen FROM Ken Olsen

We now have the engineers' and technicians' time charted quite well. Will you go over this, particularly Loren Prentice, and see if we can't more realistically assign the time. Some percentage of Loren Prentice's time definitely goes into production but it is not so in the accounting.

Ken Olsen

dec MEMO

DATE February 1, 1960

TO Jim Myers FROM Ken Olsen

It is probably about time for us to go through and microfilm all our records again. Will you go ahead and arrange to have this done. Have we filed the last microfilms in the bank vault? If we have not, will you take them home until we do arrange to put them in the bank so that if we have a fire here we'll have them put away somewhere.

Ken Olsen

dec MEMO

DATE February 1, 1960

TO Jim Myers FROM Ken Olsen

The numbering system on the tools in the tool crib is in very poor shape. Will you put a concentrated effort in getting the tools returned or having a checkout slip or removing a tool from our records altogether. There are too many blank openings on the shelves with neither a slip nor a tool. The people are just utterly careless about tools, like our sets of drills and sets of chisels, and we just have to have those tools available when we need them. Will you also see the machinist and Loren Prentice and assign numbers to all the new tools which they have built or bought and then add them to our memo on numbered tools.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE January 27, 1960

SUBJECT

TO Jack Atwood

FROM Ken Olsen

I'm not happy with the Building Block Mounting Panel literature. I think the wording is rather awkward, but in addition it is going to be awfully hard to lay it out so that it makes sense. Here is one possibility: Let's make two Product Bulletins. The one on the 1906 banana jack panel should be on a separate sheet and in this way we can make a decent pitch on it. We can also give very good close-ups and not detract from the others.

On the main piece of literature, I think the pitch should be that mounting panels are available in four sizes - 20, 25, 33, and 43 units. I would simply list the accessories without pictures. We need very little text on each of the units. I think that we should have one photograph of all four units. They could be even stacked one on top of the other. In a tabular form underneath, we should list them in order of size and probably put the name "20 Unit Mounting Panel Model _____" rather than "Model _____ - 20 Unit Mounting Panel." In the same tabular form we could list the cover plate, but we have to decide what is the front. We say back for the side that in other places we call front. I think we should just say, "Cover plate fits over the front of the 1901 and 1903." Under the unit extender we could simply say, "The unit extender Model 1954 provides access to a Building Block while it is in operation in the system."

The chart on the front and back wiring is awfully hard to understand. Let's include that information in a sentence with each unit.

I don't like the word "accommodates." It implies a certain amount of personification and I think we should just say "holds so many units."

Let's not call any of the units "special." The text on the tabular form might go something like this:

"25 unit mounting panel, Model 1903, holds 20 standard DEC System Building Blocks and takes 5¼ inches of vertical space in the standard 19 inch rack. The depth with units installed is ___ inches. The center-to-center distance between units is 3/4 inch to allow free flow of air between units. Model 1903A has the end pieces reversed so that the wiring is on the back side of the panel."

The rest of the units can use exactly the same wording modified to fit the unit. There is no need to make each one sound original.

I don't know how we mention the fact that they need some ventilation. We should mention it but do it as briefly as possible. Maybe under the 1901 we could put a single sentence like this, "There should be at least a small amount of forced ventilation with most units when mounted in this density."

The heading for the sheet can be very simple and may not need any prose. It might just be "Four Sizes of Mounting Panels Available for DEC System Building Blocks."

Ken Olsen

INTEROFFICE MEMORANDUM

DATE January 27, 1960

SUBJECT Electomic Mechanisms, Inc.

TO Catalog File

FROM Kenneth H. Olsen

I called Electomic Mechanisms today and it sounded like they are actively in business. They now have four sizes of units.

Size	Torque	Clutch	Brake	Brake/ Clutch Combination
18	8-9 lb. inches	$105	$90	$210
15	5 lb. inches	90	75	180
11	2 lb. inches	85	71	170
9	1 lb. inch	85	71	170

These are now standard servo mounts and they have changed the design, they claim, so there should be no bearing problem and no clearance problems internally. They feel that it is reasonable to drive a capstan directly from the shaft of a brake/clutch combination.

They claim that when driven with a series resistance equal to four times the internal resistance their actuation time is about 250 microseconds.

He recommended, if we're driving in both directions and braking, that one clutch be put opposite the capstan.

Their representatives are Dagon and Potter.

Kenneth H. Olsen

dec MEMO

DATE January 22, 1960

TO Andy

FROM Ken Olsen

Reminder File - 2/5/60

If we haven't heard from Edmund Wild of GE about his DDA problem, we should probably give him a call and see how he is doing.

Ken

dec MEMO

DATE January 22, 1960

TO Henry Crouse FROM Ken Olsen

I saw an ad for a shelf to mount on a 19 inch rack. This shelf slides into the rack so that the rack is completely flush. This seems like just the sort of thing we need for our systems rather than the shelves we are now making. I think the name of the company is Western Devices. It's the company that makes racks something like Premier racks but they're on the West Coast and Western is the first word in their title. Will you look through the catalogs and see if they happen to have it listed there and, if not, call their local representative or send a letter to them asking for their price and delivery.

Ken Olsen

January 22, 1960

Harlan Anderson/Dick Best/
Ben Gurley/Stan Olsen

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

INTEROFFICE MEMORANDUM

DATE January 21, 1960

SUBJECT

TO Loren Prentice

FROM Kenneth H. Olsen

The white paint we use on the front of our phenolic test equipment panels is marginal in its toughness. There is epoxy paint available which has to be mixed with a catalyst just before use and then the whole thing cured in an oven, which seems to be significantly tougher. We experimented with this at one time but were not really successful partly because of the extra steps involved. If you could look into this, it might be well worth while because it will make our equipment look attractive for much longer periods of time and might also make it possible to silk screen the front panels of the computer. This project will take some experimenting and, if you feel it worth while to start, use George Gerelds freely. He can do all the work but I think you will have to supervise it carefully.

I remember now why they bought the extra Delta sander. The idea was to set the Sears Roebuck disc sander up for sanding wood and completely outlaw the use of the Delta belt sander or the Delta disc sander for wood but always have them set up for metal sanding.

Kenneth H. Olsen

dec MEMO

DATE January 20, 1960

TO Jim Myers FROM Ken Olsen

Please order the following books: Volumes 1, 2, and 3 of INGENIOUS MECHANISMS FOR DESIGNERS AND INVENTORS by Franklin, Jones, and Holbrook Horton. The price of the set is $16.00.

Ken Olsen

dec MEMO

DATE January 20, 1960

TO George Gerelds FROM Kenneth H. Olsen

Often when we make mounting panels with indicator lamps in them we don't need to make them as compact as we have been doing, and we might get by with less expensive indicator lamps and holders. Will you check over the standard size bayonet type lamps and see if there are some that could be different from our indicator lamp drivers and then find a good looking, but simple and inexpensive holder. They cost very little so you can buy samples rather freely. You might check with Dick Best to see what maximum current we can allow from indicator drivers. We can put 15 volts across a 24 or 28 volt lamp, like we are doing now, or we can put a resistor in series with a lower voltage lamp to be sure that we potted at less than rate of voltage.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE January 18, 1960

SUBJECT Oil Gear Company's Requirements

TO Dick Best

FROM Kenneth H. Olsen

Here are the requirements of Oil Gear Company as I remember them. You should modify these or add to them if you understand differently.

1. Data zero offset. I think we automatically supply this anyway.

2. No loss of position when power fails. I think the obvious way to do this is with a battery bank. I think the tolerance on our -15 supply is such that we can allow the variations between charging and discharging the porosity storage battery.

3. Manual positioning. I think the way to do this is to set the number of the new position in dials and then let the machine advance there whenever a job lever is pushed. It may be necessary to read in the velocity also.

4. They also need an emergency off position.

5. The expected motion rates are 300 inches per minute per slew and 100 inches per minute for machining.

6. Binary coding decimal coding is necessary because people insist on thinking in decimal.

7. They have to be able to select velocities but they may have some small number of velocities which they can preset with pots, and for each operation the code simply selects one of the pot-set velocities.

I have an idea which I haven't thought out but has some interesting possibilities. With each point we should specify the new position and the velocity at which the operation should be started and the velocity at which the table should be at when it

is set to the new position. For point-to-point work, one would specify zero velocity at the new point, but if one didn't want to stop when he got to the new point he would specify some velocity there. Because of the small number of possible velocities, this would not gurt in the coding but it might make the servomechanism complicated.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE January 18, 1960

SUBJECT

TO Jack Atwood

FROM Kenneth H. Olsen

The student I.R.E. group does not keep an address file, but I'm thinking of writing a letter to the faculty supervisor and the president, whose name is Horace Lipton, and suggest this possibility. There is a letter shop, however, that has a number of lists and if you call M.I.T. and ask for the Letter Shop they could tell you if they have these lists.

Each company has rather elaborate brochures which they have on file in the library there. We probably ought to generate something for this, although it doesn't have to be very gaudy. In addition, they have a notebook file which people have photographs and miscellaneous collections. Our notebook cover would show up very well in comparison. We probably ought to put these notebooks in several of the local schools.

The M.I.T. phone number is UNiversity 4-6900 and the Letter Shop extension is 178. I think Miss Koek is in charge and her extension is 179.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE January 18, 1960

SUBJECT M.I.T. Interviews

TO Helen LeBlanc

FROM Kenneth H. Olsen

I only interviewed two people at M.I.T. One thing I learned is that we are going to have to change our approach a little bit and turn out better recruiting literature.

The one student that was interesting was a girl, whose name is Barbera Wertz, who would normally graduate next September or February but wants to take two terms or so off to work to get a better idea as to what the industry is like. She had a handicap in coming from a small girls' school into the middle of M.I.T. and the strain might be significant on her, and they do at times recommend people taking a break in the middle of their course work because of this. She plans to go back to school in September and then finish next June.

She has many of the qualifications that we are looking for. She is looking for a job where she can contact and solve customers' problems, which is just the sort of work we have a tough time keeping engineers happy in. She may also do well in writing, which we probably will start right off in because we are perpetually behind and kids in school are quite used to writing.

There are several questions I forgot to ask her, but it would be well if you did. She has no references filled out and I am not sure if she has any valid ones, but we should really have a few. I don't know what the relationship is of the person in "In case of accident notify." It would be worth finding out. It would be worth knowing, although I didn't have the nerve to ask, if she has any immediate plans to get married. I have no idea what you pay a person in these circumstances, but she might be willing to fill in the blank if you encourage her to do so.

I also interviewed someone named Edward Aron who doesn't seem particularly inspired. He has worked on computer devices at C.R.C. and is taking the computer course, but I think we had better wait for somebody who has really more inspiration.

Kenneth H. Olsen

BI-WEEKLY REPORT

Kenneth H. Olsen
January 14, 1960

Oil Gear Company

We have always talked about working in the machine tool control field but have never had any worth-while contacts. Oil Gear Company came to us a few weeks ago and told us about a digital control they need to go with their prime movers which many machine tool companies use. One of their customers would like to have a unit working by the Machine Tool Show in September, which means we would have to have a unit working very soon. Dick Best and I have been working with them but there are many details to be worked out. It looks like an interesting field that may eventually be very profitable. We may sell a small console which will run between $15,000 and $30,000 that might be used in a number of machines. The system keeps track of the position of the cutter or work by counting pulses that come from the lead screw. A variation of this system would be to drive with a stepping motor and count the steps. This would work well for small machine tools such as jig bores.

Lincoln Laboratory Tape Buffer

Lincoln is building a special processing device, the output of which has to be put on magnetic tapes so that it can be processed by CG-24 or an IBM 709. They have 96 bit words which have to be buffered and put out as 6 bit words to feed the tape. We propose a 1000 word, 6 digit memory which would use our standard circuitry. Because they have extra time, we would use our low speed circuitry and probably low speed transistors in the switch position. We may use one symmetrical transistor where we now use two fast unsymmetrical transistors.

Wes Clark's Job

Lincoln has another special emergency job which is an honest-to-goodness computer but very small. The memory is 256 words in 10 digits. The program counter is stored in register 0 and there are only three registers in the machine - BMB, the AC, and MAR. It needs no terminal equipment.

Anelex Printer Buffer

Still another memory problem that we will have to face in the next year is the buffer needed to drive the Anelex line printer.

There are about 64 type positions on the Anelex print wheel and 72 or 180 columns, depending on the machine used. This memory will take the core per type position or a 64 by 78 or a 64 by 180 position memory. Some people would make the storage less and use a patch-board to define the spacing and format of the page, but I'd rather have this under program control. This memory could be linear selection because of the large number of digits and small number of words.

ARC Computer

There has been a lot of discussion of DEC building Average Response Computers. The party line on ARC has been that we as a company expect to make ARC's when there is a market for them. We are unusually well set up for it and appreciate the need. Right now there is little agreement as to what is necessary and until we get some consistent opinions, I would not like to build one on speculation. We would build one any time to a customer's order. We will gain a lot of experience on this problem when we sell the PDP-1 to Dr. Weinstein.

My guess as to the characteristics of a final ARC are as follows: 256 sample points which define the memory as 256 words. An analog decoder good to 6 binary bits, which I think is enough because of the nature of the signal being measured and also because of the precision obtained as a result of averaging. 500 to 1000 averages are probably necessary, which means that if you do the process in the simple-minded way the number of digits would be the sum of the precision of the measurement, or 6 bits, plus the binary value of the number of averages, or 10, which would mean a 16 digit memory.

The other problem is what do people want for an output. A display oscilloscope is very nice to watch. A pen recorder makes a very nice record. A punched tape makes computer analysis very nice later. An analog magnetic tape makes a good record of the experiment. Making a system adaptable to all this and still complete freedom as far as the rate of which responses are taken and the rate at which samples are taken after each response leaves a number of things up in the air as to what the design should be.

Remington Rand Memory

Jack Brown dug up a need at Remington Rand for production quantities of memories for their new commercial computer. This

memory is so close to what we are now building for PDP that it is a natural for us to bid. A contract with them may mean legal obligations that are implied or explicit that we may not like. We're going ahead with a bid for things not under our control. They want two memories in five months and then production quantities after that depending on how the machine sells. The memories are identical except that they will contain one, two, or four 4000 word modules. We are going to bid this the price of the frame and common circuitry without modules and the price of the modules separately.

John Hancock Mutual Life Insurance

Andy and I visited John Hancock to see what their need for computers was. They have been unusually successful in the application of computers to their business, where they have 15 million policies which they have to review regularly and for a good number of them they have to bill once a month. They have not as yet put the whole problem on the computer, but they have put enough on it that although their business expands 15 per cent each year, they have not had to expand space or personnel for several years; but they are looking forward to putting all their work on a computer. They are looking at the LARC and the STRETCH because of the size of their problem. We think they should have a bank of 36 digit PDP-1's. Storage is a big part of their problem. They have 600 decimal digits of information for each of the 15 million policies. They would like to review all this once a day. One magnetic tape has only 8 million decimal digits of information, so to hold all this information they would need 120 reels of magnetic tape.

DEC Magnetic Tape Handlers

Tom Stockebrand is finally having success with his high speed magnetic tape unit. In fact, his problem now is making it slow enough so the TX-2 can receive the information. A variation of this would probably be what John Hancock needs. Other applications will come up later where we don't need to be compatible with IBM. I think we should run the machine as fast as we can but drive it from a capstan which is clutched by a standard magnetic clutch and use vacuum columns with simple switching. Simple induction motors will drive the reels directly. We may buy parts enough to run some experiments on a system like this so that if it looks promising we can decide whether we want to invest a man in it or not.

Linear Selection Memory

I have an idea that eventually linear selection memories will be the most economical for large size memories because of the ease in which the cores are wound and because of their large signals and lack of temperature variation. As the memory gets smaller, the advantages of LSM increase. We've worked on this since the start of the company but they take a little more experimenting than we have been able to invest. One approach we have is to use two silicon diodes back to back in series with each word line. We use in the coincident voltage switch. The two diodes back to back allow current to be switched in both directions.

The second approach is to use a coincident voltage switch with a single diode in series with a pulse transformer for each word. Reading is done with a pulse and writing is done with the overshoot that follows the pulse so that only a unit directional switch is necessary.

ITT Computer

Earl Pugh from ITT called on Thursday, January 14, and said that he has been put in charge of a computer that they want built in three or four months which will be 5 or 6 microsecond memory cycle and 24 digits. He would like to buy our plug-in units and our memory. He claims we will get a purchase order in about a week or two. I asked him to come up and visit us so that we can tell him about all the rest of our plug-in units.

January 14, 1960

Customer Order Shipping List

Sales/Engineering/
Pat Reguera/Harlan Anderson

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

dec MEMO

DATE January 13, 1960

TO Bob Hughes FROM Kenneth H. Olsen

Patents can be relatively inexpensive if we write them up so that the patent lawyer can understand them readily and write his text quickly and easily. Dick Best thinks we should apply for a patent on your idea of the cross coupled output stages in the flip-flop. If you can write this up, I think it would be a pretty good idea to send it to the patent lawyer and let him give us an estimate as to whether he thinks it is worth while to patent and an estimate as to how much it would cost. What he needs is a description of how it works and a detailed explanation as to why it is better than what has been previously done.

Ken Olsen

dec MEMO

DATE January 13, 1960

TO Dick Best FROM Kenneth H. Olsen

The January 8 ELECTRONICS magazine had a high speed, low precision analog digital converter, on page 58, that you might be interested in looking at.

Ken Olsen

dec MEMO

DATE January 12, 1960

TO Bob Hughes

FROM Kenneth H. Olsen

Clare Relay now sells their mercury relay coils and sells separately to be mounted in etched boards. They say that they will do the mounting if people will send the etched board to them. I think we should immediately contact the Clare people and maybe send one of our boards along and then stock as a standard DEC plug-in unit 3, 4, 5 mercury relays in one unit. Page 21 of new CONTROL ENGINEERING, that is, January 1960, has a picture of this.

Ken Olsen

cc: Dick Best
Ben Gurley

dec MEMO

DATE January 12, 1960

TO Ben Gurley FROM Kenneth H. Olsen

Have you looked into the Tally Register Corporation, of 5300 14th Avenue N.W., Seattle 7, Washington, for their high speed tape punch which they say is now ready for delivery and punches 60 characters per second. They have an ad on page 42 of the November 1959 AUTOMATIC CONTROL magazine.

Ken Olsen

dec MEMO

DATE January 12, 1960

TO Jim Myers FROM Kenneth Olsen

We have a file of all instruction books that come with tools and machines that we buy, but I haven't looked at it for a long time. It may be kept up, but perhaps it would be a good idea for you to check on it if you don't normally do so. It would be a good idea to go over this with Loren Prentice so that all of his people know about it so when they need instruction books or parts lists for any of the machines, when new machines and tools come in, they will be sure that all the books get sent there. There should be a rubber stamp on all these books that says INSTRUCTION BOOK FILE so that they will all end up back there after they are used.

Ken Olsen

INTEROFFICE MEMORANDUM

DATE January 12, 1960

SUBJECT

TO Loren Prentice

FROM Kenneth H. Olsen

Ben Gurley would like to use taper pins in the computer. Various other times we have felt the need but terminal blocks to accept these are either very unreliable looking or they are expensive.

We may have to make these ourselves in order to make it at all a reasonable price.

Gries Reproducer Company has die casting receptacle blocks for Dictaphone Company. I think they mold them into a block of plastic, but we might find other ways of using them. It might be worth a letter to Gries asking if they will sell these units separately to other people.

Another possibility would be to take a standard eyelet and set it in a 5/16 phenolic board over etched wiring that would be used to connect holes together. After the eyelet is set a tapered punch would be forced into the hole to leave it in tapered shape. It might be necessary to drill these holes with a tapered drill in order to make the system work, but this sure would be an inexpensive unit and would allow us to readily tie different numbers of units together.

See page 150 of January 1960 ELECTRICAL MANUFACTURING magazine for pictures of the dictaphone taper pin receptacle.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE January 12, 1960

SUBJECT

TO Henry Crouse

FROM Kenneth H. Olsen

I'm not real happy with the series 170 terminal strips by Cinch-Jones Company that we are using in our various power supplies and other equipment. Kulka Electric Manufacturing Company has a series which is much nicer called the 409TT. Will you call Charles Segal at BE 2-4334 and find out the price of strips with the same number of terminals as we use on the Jones 170 series.

Continental Connector also makes terminal strips which are like the ones we want. Their numbers are MT miniature terminal board which come in eight terminals and four terminal sizes. Their numbers are MTB-8TM and MTB-4TM. You might do well in getting a price on that.

There are several Continental connectors that I would like to have the prices on. Their numbers are as follows: 1900104-16S plug with 104 contacts, 1900104-16S receptacle, hood for plug above, plug and socket contacts should take AMP 53 taper pins. 1900152-16S and 1900152-16P with hood and contacts to accept AMP 53 taper pins.

I probably don't have these numbers correct but they can understand them and will tell us what we should request or at least could give us an approximate price.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE January 12, 1960

SUBJECT

TO George Gerelds

FROM Kenneth H. Olsen

We need to design a standard audio amplifier for computers. This should be mounted in the 5-1/4 inch panel and I think we should silk screen it and give it a model number. We might even want to make a production run of five or so. They will cost very little and we then have them on the shelf. This should have a volume control built in. It also should have a rotary switch with maybe five inputs that you can hook up to different indicators. Let's leave space where we can add a tone control later, but let's not put it on the panel now. There needs to be no power switch, so to start with there will be just two knobs in the front. We could put a 4 by 6 or 5 by 7 oval speaker in or a four or five inch round speaker. Allied Radio's catalog, on page 457, has a grill cover that goes on a 5 by 7 oval speaker which might simplify the mechanics of the front panel. I can think of three general approaches to the circuitry, they are:

1. A single power transistor, like the Motorola one we use in various places, driving a 40 ohm voice coil speaker with no transformers and practically no circuitry. This one may need something like a 2N224 emitter follower driving its base.

2. The last two stages from a standard radio receiver, like on page 55 of the third edition General Electric Transistor Manual. We should probably use 2N224's because we stock those. I think all three transistors could be the same. We could drop approximately three volts in a resistor in series with -15 and bypass it with an electrolytic capacitor to get rid of the hum. This might also help if we have thermal runaway in that it will limit the current in the transistors.

3. A reasonably high quality amplifier using Motorola power transistors that we might want to use for other purposes later.

I think No. 2 is the best possibility. We could buy stock parts, build it up and assume that it will work. The one in the G.E. manual grounds the minus terminal and we will have to rearrange things so that we ground the positive terminal, but other than that it is pretty straightforward. We could vary some of the components and maybe use the ones suggested in the Philco transistor manual under the 2N224. The back of the audio amplifier could have an a Jones terminal strip, one for ground, one for -15 and six for the inputs. The inputs all should perhaps have resistors in series with them so that the selection switch should be of the shorting type to eliminate pickup.

Ken Olsen

KO/jv

cc: R. L. Best
B. M. Gurley

INTEROFFICE MEMORANDUM

DATE January 12, 1960

SUBJECT

TO George Gerelds and Bob Hughes

FROM Kenneth H. Olsen

We have to set up a system with which we can regularly check all our own DEC Test Equipment. I'm not sure whether it should be brought down to Quality Control on a periodic basis or if it should be done in the Engineering Department, but the important thing is that it should be done periodically. Probably a sticker with date and any comments on limitations of the equipment should be put on each time it is checked.

We must be particularly careful that when people find defective equipment they don't put it back in test equipment headquarters but send it to whoever will be responsible for fixing it. George may appreciate having a stock of defective units to use as a backlog to fill in work for his people.

Kenneth H. Olsen

KHO/jv

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

January 7, 1960

Harlan Anderson

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

dec MEMO

DATE January 7, 1960

TO Dick Best

FROM Kenneth Olsen

While looking at the waveforms on the memory, I noticed that there is a tremendous amount of gain on the first stage of the sense amplifier. My first reaction of this would be that the sense amplifier is terribly dependent on transistor gain and, as a result, give instability with time. Is this a danger, and should we consider getting the gain with two stages, each of which is degenerative?

Kenneth H. Olsen

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

dec MEMO

DATE January 7, 1960

TO Dick Best FROM Kenneth H. Olsen

Last year several people went to the Solid State Conference in Philadelphia. We should decide right away who will go this year so that we can get reservations in the right hotel. Perhaps we should have a short meeting of engineers who do design work and make a decision as to whether it's worth anybody going or whether we all should go. Those who go, I think should fly down the morning of the conference and fly back the evening it ends because this cuts the cost significantly.

Kenneth H. Olsen

KHO/jv

January 7, 1960

Remington Rand UNIVAC
510 Memory Bid Request

Harlan Anderson, Sales Department, and Engineering Department

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 MAR and MBR 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

January 7, 1960

Buffer Memories

Sales Department/Harlan Anderson/Ted Johnson

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

January 7, 1960

Buffer for Anelex Line Printer

Harlan Anderson/Dick Best/
Ben Gurley

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

January 7, 1960

Bob Hughes

Kenneth H. Olsen

I'm becoming quite concerned about the delays which result after something appears to be released to production. It seems that we schedule the release of plug-in units so that there is exactly enough time to meet the schedule, but we practically never release a unit which doesn't have to come back for rework. I'd like to have you propose a system or schedule for new products, maybe in the next bi-weekly, that will make our scheduling safer. We may, for instance, release things ten days before they are absolutely needed to allow for some rework. We might also, if we looked over our experiences, draw some conclusions as to what things we overlooked, such as, transistor parameter or lines left out of the etched wiring which we might catch by careful checking and drafting.

I don't know enough about what has been going on in this area so you shouldn't consider any of this a criticism, but I am sure that we are going to have to develop our scheduling techniques as we get closer to a steady rate of new systems.

Do you know if Lincoln Laboratory is frightfully unhappy about this delay in the slow speed pulse amplifier which they needed to run their 3 digit shift registers? This is one group which we wanted to impress so much and which Norm Daggett was trying to sell our equipment to. If we should do something special now and as an interim to make another visit to make them happy, we should do this for sure.

Kenneth H. Olsen

KHO/jv

DEC MEMO

DATE January 5, 1960

TO Harlan Anderson FROM Kenneth Olsen

Andy, I promised John Harris at Lincoln Laboratory that I'd call him today (Monday, January 4) but I couldn't get him in the afternoon. Would you give him a ring just to tell him that I didn't forget and that I'll call him on Wednesday. His extension is 280 and the number is VOlunteer 2-3370.

Kenneth H. Olsen

INTEROFFICE MEMORANDUM

DATE January 5, 1960

SUBJECT Copy for January REFLECTOR

TO Harlan Anderson/Jack Atwood FROM Kenneth H. Olsen

The first paragraph fell a little flat with me, probably because I had to read the first sentence a few times to understand it. I think of "do it yourself" as what people do when they buy Building Blocks, not when they design their own circuits; so we are encouraging "do it yourself" to a limited extent, and so I think we shouldn't use the words. I don't think we should compare buying our equipment with developing from scratch because I think we should assume the difference in cost is just overwhelming and not worth stating.

The second paragraph is very interesting and I think we should make that the first paragraph. A last sentence should read, "Well under $100,000 for the basic 18 digit machine." Now, as a second paragraph I would propose replacement for the first one and the second paragraph could say something to the effect that, "PDP is fast and inexpensive because the assembly time is very small because we use DEC System Building Blocks. Anybody can assemble complex systems like this quickly and easily when they use DEC Building Blocks."

The third paragraph can follow. The fourth one is a little weak because it is generating a good deal of interest when really it is doing more than that. We might go something like this, "The DEC 1500 Series Memory Testers are fast becoming the standards of the industry. This unit is a complete integrated system for testing coincident current magnetic core memory planes and stacks under simulated computer conditions. It contains the current sources and switches for testing 4096 cores simultaneously with completely adjustable timing cycles and logic to make the so-called 'worst' patterns. DEC is now coming out with a new model that will also test linear selection memories and check several digits simultaneously while testing ordinary coincident current memories."

Another paragraph might mention the new calibrated sense amplifier for single core testing and memory testing.

Kenneth H. Olsen

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