AND ID YOU RECEIVE ALL RIGHT ?

27TH SEPT 1967
MSG NO R-4657

TO KEN OLSEN

FROM ROD BELDEN

THANK YOU FOR YOUR TIME AND ADVICE DURING MY VISIT. I APPRECIATED THE VOTE OF CONFIDENCE TAKEN AT THE MONDAY MEETING. WE WILL CONTINUE TO BALANCE ALL ALLOWANCES WITH COSTS AND WILL SUBMIT REVISED PLAN THROUGH PETE KAUFMAN IN OCTOBER.

EUROPEAN REGIONAL MEETING OCTOBER 18-19 .... GUEST SPEAKER FOR FINAL DINNER OCTOBER 19 IS DR. PONTE, LEADING FRENCH SCIENTIST AND FORMER HEAD OF CSF. I UNDERSTAND THAT A. DE VITRY WILL JOIN US FOR THE EVENING OF OCTOBER 19TH ALSO. DECUS IN MRONING OF OCTOBER 20TH.

FOLLOWING TWO EUROPEAN REGION MANAGERS MEETINGS ARE MONDAY NOV. 6 AND DEC 4.

REGARDS, ROD

digital INTEROFFICE MEMORANDUM

DATE: September 26, 1967

SUBJECT: ELECTRONIC MEMORIES, INC.

TO: Ken Olsen
Harry Mann
Win Hindle
Stan Olsen
Nick Mazzarese
Pete Kaufmann
Ted Johnson

FROM: Henry Crouse

Mr. Ed Farris, the Sales Manager of Electronic Memories, Inc., offered the following information.

Electronic Memories, Inc. has acquired several companies.

Zehntel, a producer of industrial controls and small A/D converters. Sales of one million.

Anadex of Palo Alto, producer of industrial controls, complimentary to Zehntel with the same general customers. Sales of one and a half million.

Wems, producer of welded modules, hybrid circuitry, two way radios. Sales of eight million, five hundred employees.

Janus Research, no sales, but product will be IBM compatible disc packs. Selling to OEM and direct-users. Will be available to the market place in February or March.

Electronic Memories, Inc. has projected sales of twelve million dollars ending December.

The Sales Manager said Electronic Memories, Inc. "does not wish to compete with computer manufacturers", however, with the recently acquired companies will produce small systems and sub assemblies. Zehntel's highest price system has been $2,200. They will seek special systems not a standard product line.

Another company was mentioned in discussion, General Automation in Los Angeles. They were started by former employees of DCI, an associate company of Varian Associates. General Automation is planning a computer equivalent of the PDP-8.

Henry

ams

Copy to Mike Ford
the file

digital INTEROFFICE MEMORANDUM

DATE: September 25, 1967

SUBJECT: Friday's Discussion

TO: Ken Olsen FROM: Clark Crocker

Friday you asked what the cheapest "bare-bones" computer might be which could be used for Data Acquisition.

I believe a machine along the lines of a PDP-8S with a faster memory-cycle time and a 16-bit word structure would answer. A small memory of a few hundred words would be minimum if you could save money by reducing the memory size.

The computer should be capable of making on-line computations at the rate of 150/second to meet the requirements of the fastest data storage device, the incremental tape.

Typical computations are:

1. Units Conversion
2. Limits Comparison
3. Linearizing Thermocouple Data
4. Calculation of Flow From Differential Pressure Measurements
5. Converting Absolute Pressure to Gauge
6. Multiplying Strain Gauge Outputs by Various Gauge Factors

The bare-bones computer must have enough memory to perform these calculations at a rate determined by the output device and must have enough memory to do the calculations and to provide flexible control of the input devices.

I would like to talk to Terradyne about this. With a little more information and effort this computer could be outlined in detail.

Clark

jeg

Ken Olsen.

digital INTEROFFICE MEMORANDUM

DATE: September 22, 1967

SUBJECT: Manufacturing Costs vs. List Price

TO: Operations Committee

FROM: Harry S. Mann

CC: Ed Simeone

Based on our discussion at the all-day session of the Operations Committee, I have asked Ed Simeone to implement a program to provide cost vs. selling price data on all major items of our equipment. We plan to use the price lists as a base of deciding on what individual items we should report. In other words, if an item appears on a price list, presumably we would like to know how the costs of manufacturing on that particular item compare with the list price.

It may be that we will have some problems in doing our cost analysis and Ed will undoubtedly be contacting you for advice and counsel concerning some of the items so listed. We believe that we are very close to being able to implement such a report which would probably be done on a quarterly basis.

I might add at this point that I am pleased with the progress that we are making in our cost accounting efforts. We have always accumulated a lot of raw data but were never successful in being able to accumulate this data and summarize it in useable fashion. A great deal of work in this area has been accomplished with the help of the manufacturing people over the past six months. The step requested at the Operations Committee meeting represents a further extension of the use of this kind of information.

HSM/ml

digital INTEROFFICE MEMORANDUM

DATE: September 22, 1967

SUBJECT: AGA

TO: John Leng FROM: Jack Shields

cc: Ken Olsen
Ted Johnson
Bill Newell

At the present time we seem to have the AGA situation well in hand even though there are a number of small details which still must be resolved.

I do think, however, that special credit for a job well done should be given to all of the people who participated in this endeavor. The resulting information and solutions to ASR-35 problems, DECtape compatibility problems and ASR-33 difficulties have also helped the company in general. Therefore, I would like to ask Bill Newell to personally thank the people in the European organization who worked so hard in this program. The names that come to my mind are Sven-Olof Martin, Andrew Allison, Ray Jones, Gill Spittle and, of course, Bill Newell.

On the domestic side, I think Frank Eagan and Walter MacKenzie deserve a "well done" also.

Let's keep the situation under control at AGA and be sure that we all learn and take advantage of the experience gained while solving these problems so they don't occur in the future.

JJS:ned

digital INTEROFFICE MEMORANDUM

DATE: September 21, 1967

SUBJECT: Charges for John Holzer

TO: Ken Olsen

FROM: Harry S. Mann

I need your help in straightening out the charge to be made for John Holzer's salary, etc. He was not considered as part of the administrative group when we did budgeting, nor do I believe he should have been. As far as I know, John was hired by you to be a staff man for you. Therefore, you should have provided for him in your budgets.

Clayton Rix tells me that you apparently did not provide for him and, therefore, refuse to sign the transfer to your Center. I do not think that it is fair to continue to charge him to 644 since there was no budget there and since neither Stan Olsen nor I have anything to say concerning his expenditures or his supervision.

Would you please help us to resolve this problem.

HSM/ml

copies to Operations Committee 10/27

INTEROFFICE MEMORANDUM

DATE September 19, 1967.

SUBJECT PERIPHERALS

TO Ken Olsen

FROM Denny Doyle

In view of the current interest in the "peripherals" question, I did some more investigation in my own shop after my visit to Maynard. I found out several things that reflects the seriousness of the situation.

1. Our salesmen are "second-guessing" the plant by quoting excessively long delivery terms - 6 & 8 months on 3 month items.

2. Their"second-guessing" appears justified because indeed we aren't getting better than 6 month delivery on many of these items.

3. I am suspicious that we are "window-dressing" our books, in that the subsidiaries seem to be able to get peripherals shipped in the last month of their quarters, but not so in the last month of a domestic quarter. This practice obviously puts extreme transients into the system.

4. Some of our orders are taking 3 and 4 weeks just to get on the board at Maynard - others are amazingly fast - 3 or 4 days.

Denny

DJD/es

digital INTEROFFICE MEMORANDUM

DATE: September 18, 1967

SUBJECT: Swedish Subsidiary

TO: Ken Olsen

FROM: Harry S. Mann

Swedish corporate law requires we have three directors if one is to be other than Swedish. Since, by general practice, you are a member of the Board of all of our subsidiaries, I felt you should be on this one together with two Swedes to be selected there.

I have asked that either you or I have an opportunity to meet the proposed Swedes prior to their appointment.

The duties of the directors are completely perfunctory just as they are in Australia, etc. The local attorney and public accountants will prepare necessary documents from time to time for your signature.

HSM/ml

digital INTEROFFICE MEMORANDUM

DATE: September 18, 1967

SUBJECT: SUMMARY OF FOXBORO PROBLEMS

TO: Ken Olsen, Mike Ford
Nick Mazzarese, Dick Best
Don White

FROM: Jack Shields

There are a number of items which have come up in the meetings with Foxboro. I would like to itemize the problems that we have run into so far and work up a program for investigation and finalize the solutions.

1. Problem: General feeling at Foxboro that many DEC modules are not electrically interchangeable.

   Action: We feel this is a generalization of an overall problem of not clearly investigating difficulties on the test floor at Foxboro. We will attempt to come up with an answer on this problem by a clear investigation of each reported fault of this type as they occur on the Foxboro test floor.

   Personnel assigned: Eagan/White

2. Problem: G209 appears to randomly multiple select.

   Action: DEC has a module and photographs provided by Foxboro which have been given to Dick Best. Dick will investigate this problem.

3. Problem: Possible timing problem on MB bits returning from furthest physical memory in a 32K memory system when attempting to increment the MB.

   Proposed solution: Mike Ford assign a Product Line Engineer to investigate this problem.

4. Problem: Intermittent shorting of voltage lines on certain modules to mounting screws on fan housing.

   Solution: Module modification; Dick Best; PDP-8 Mechanical ECO; Mike Ford.

5. Problem: Foxboro is unable to determine proper margin voltage for systems, and map out a program of preventive maintenance for further reliability and to determine whether or not possible system deterioration has taken place.

   Solution: Jack Shields will write up a procedure and general philosophy covering the area in question.

6. Problem: A question in the mind of Paul Dubroff about probable timing difficulties in the DM01 data break multiplexer and data break interface.

   Comments: The problem is rather vague and will involve some analysis on the part of DEC Engineering and further discussion with Paul Dubroff.

   First approach: Shields/White further investigate problem with Paul.

   Second: Turn investigation over to Product Line Engineering if this looks like a real problem.

7. Problem: General question about engineering data and test specs on "S" series modules and such generalities as tolerance of margins in systems and proper timing specs, etc.

   Comments: I believe these questions to be part of the noise level created by a shotgun approach to a number of problems. Jack Shields would like to hold these reports back and work with Foxboro to convince them that this sort of information is unnecessary and would not be valuable to them even if it were available.

8. Problem: Intermittent failures on the 32K stack. Traced to defective G209. Unable to determine by scope exactly what the problem is with the module.

   Action: Dick Best/Eagan will try to duplicate fault in plant for further analysis.

   Comment: Field Service has a general weak feeling about the overall capabilities of the G209 modules and would recommend a full investigation of this module in PDP-8 memory systems.

Jack Shields would like to have a meeting once a week to review status of these problems and in that period add and delete from this report.

JJS:ned

digital INTEROFFICE MEMORANDUM

DATE: September 13, 1967

SUBJECT: Australian And Remote Areas---Questionnaire

TO: Ken Olsen
cc: Ted Johnson

FROM: Ron Smart

→ 1. (GSA has no effect.)

2. Not everyone needs these badly enough to feel they can afford these peripherals, in general less than half could afford them initially. Special applications packages (including software) would help sell more package deals involving peripherals.

3. Great, if it outperform paper tape and is cheaper. Better still if it performslike cheap dectape (lower performance of course) i.e. hands off program compiling.

4. Very useful-often asked for-should have wide carriage more than 80 columns. Speed need not be terribly high e.g. 50 to 100 lpm is o.k.

5. We could easily push on peripheral sales, simply by saying this is our policy to the salesmen (he rates himself on processor sales). Most customers know about these things but don't feel any sales pressure from us to buy them. We tend in selling the initial system to concentrate on low cost--i.e. peripherals only if they are absolutely necessary. This emphasis could easily be moved, and should, especially when we have a great peripheral and know how great it is against the competition.

jk

digital INTEROFFICE MEMORANDUM

DATE: September 13, 1967

SUBJECT: MARKETING QUESTIONNAIRE

TO: Ken Olsen FROM: Roger Handy

1. GSA: In the Northeast I see no appreciable loss of business because we are not GSA accredited. It certainly is not worth the expense for small system sales. I doubt that large system sales would be enhanced by GSA accreditation either. In general, the proposal effort for these large systems is exhausting - much greater than our present sales staff can handle.

2. It has long been a contention of mine that DECtapes should be "off-the-shelf" items. DECtapes are high demand, saleable commodities. Long lead times for delivery has discouraged many DECtape sales. High-speed paper tape equipment and discs fall into this category also. The fact that more PCO1's haven't been added to systems in the field is simply due to poor salesmanship. Convenient packaging for table top models would help greatly! If funding is not a problem and the application is not a special-purpose process control application, there is no reason why either DECtape or high-speed readers should not be sold with new systems. Displays are not as easy to move. The big market is for an inexpensive display which has alphanumeric and line drawing capabilities. The need for the sophistication of a 340 constitutes a market which is insignificant compared to the market potential of inexpensive displays to satisfy the inquiry station demands of the vast field of data communications.

3. I see virtually no need for an inexpensive magnetic tape cartridge for reading in system programs.

4. A line printer which would sell for $6,000 and print 64 character set, 80 to 120 columns at 100 lines per minute would be very attractive.

5. Marketing support of peripherals by product is necessary to encourage men in the field to concentrate on peripheral sales. This means vastly improved deliveries; convincing that DEC is really serious about peripherals; plus advertising emphasis on specified peripherals.

RH:mr

digital INTEROFFICE MEMORANDUM

DATE: September 13, 1967

SUBJECT: MARKETING QUESTIONNAIRE FROM: Tom Quinn - Chicago

THE FOLLOWING SUMMARIZES OUR FEELINGS ON THE ISSUES PRESENTED:

1. LACK OF GSA LISTINGS HAS NOT BEEN OF CONSEQUENCE IN THIS AREA. WE SELDOM RECEIVE INQUIRIES FROM AGENCIES WHERE GSA LISTING IS A REAL OR IMPLIED PREREQUISITE. AS SUCH WE CANNOT QUANTIFY BUSINESS LOST FOR LACK OF SAME. HOWEVER, IT MAY BE THAT DEC IS SIMPLY OVERLOOKED IN THE INQUIRY-BID PROCESS BECAUSE OF OUR NOT BEING LISTED.

2. ADD-ON SALES OF HIGH SPEED P/T READERS ARE INFLUENCED BY THE NATURE OF THE APPLICATION AND THE PROABILITY OF FUNDS IN THE FOLLOWING BUDGETING PERIOD FOR THE PURCHASE OF DECTAPE OR DISC. HISTORICALLY, OUR INSTALLATIONS HAVE HAD ONE OR TWO PROGRAMMERS AND THE SOFTWARE SYSTEMS HAVE BEEN SUBJECT TO VERY FEW CHANGES. THEY HAVE SUFFERED THE PAINS OF 10 CPS DURING THE ONE OR TWO MONTHS REQUIRED TO DEVELOP THE SYSTEMS. BY THE TIME THE NEXT BUDGETING PERIOD ROLLED AROUND, OTHER FACTORS WERE INTRODUCED, SUCH AS MASS STORAGE FOR DATA, AND THE ADVANTAGES OF DECTAPE OR DISC TO ACCOMPLISH BOTH ENDS PREVAILED. WHERE FUNDING WOULD NOT PERMIT DECTAPE WE GENERALLY HAVE SOLD HIGH SPEED P/T EQUIPMENT. HAD HIGH SPEED READERS BEEN A PROCESSOR OPTION TO THE PDP-8 AND THEREFORE LESS EXPENSIVE, WE PROBABLY WOULD HAVE SOLD MORE. IN TURN WE MIGHT CONSIDER MAKING THIS A PRE-WIRED OPTION FOR NEW MACHINES OF THIS CLASS.

3. WE FEEL THAT AN INEXPENSIVE MAG TAPE CARTRIDGE SYSTEM WOULD HAVE TO BE PRICED AT THE LEVEL OF HIGH SPEED PAPER TAPE TO BE EFFECTIVE AT ALL. WE WORRY ABOUT THE RELIABILITY OF SUCH A SYSTEM.

4. A $6000 LINE PRINTER THAT WOULD PRINT 72 CHARACTER LINES AT 100 LINES PER MINUTE WOULD BE EXTREMELY USEFUL. WE HAVE AN OEM

   WHICH WOULD CONSUME OVER 20 PRINTERS ON PDP-8 SYSTEMS ANNUALLY.

5. SO MANY OF OUR PERIPHERALS ARE DESIGNED TO COVER A WIDE RANGE OF APPLICATIONS. SINCE WE ARE APPLICATION DIRECTED IN OUR MARKETING, PEOPLE BUY ONLY WHAT THEY NEED. FOR EXAMPLE, VERY FEW PDP-8 CUSTOMERS CAN AFFORD OR NEED A $30K LINE PRINTER. IN ADDITION, OUR LITERATURE ON MANY PERIPHERALS IS NOT SUFFICIENT AS A SALES TOOL. LETS HAVE MORE PICTURES!. WITH RESPECT TO CUSTOMER AWARENESS OF THE AVAILABLE PERIPHERLS WE FEEL THE PRICE LIST DOES A GOOD JOB. HOWEVER, A SYSTEM WHICH CAN AUTOMATICALLY SEND LITERATURE TO EXISTING CUSTOMERS ON NEW PRODUCTS WOULD BE VERY USEFUL. FOR EXAMPLE, A MASS MAILING OF THE RECENT A/D AND DISC INFO. TO PDP-8 AND 8/S CUSTOMERS WOULD HAVE BEEN HELPFUL. IT'S IMPORTANT THAT OUR EXISTING CUSTOMERS RECEIVE THIS INFORMATION AS SOON AS POSSIBLE IN THE EVENT THEY ARE PREPARING BUDGETS OR SUBMITTING GRANT REQUESTS. WE DO NOT HAVE THE CAPACITY TO DO THIS JOB IN THE FIELD.

6. WE FEEL THAT THE PRODUCT LINE PEOPLE HAVE ALL IMPROVED IMMEASURABLY IN HANDLING OUR REQUESTS. FOR THIS REASON RANKING WOULD BE ARBITRARY AT THIS TIME AND OF NO GREAT USE. WE WOULD LIKE TO SAY THAT THE MODULE PRODUCT LINE CONTINUES TO BE EXCEPTIONALLY GOOD IN MEETING ALL OF OUR REQUESTS.

digital INTEROFFICE MEMORANDUM

DATE: September 13, 1967

SUBJECT: MARKETING QUESTIONNAIRE

TO: Ken Olsen FROM: Ken Larsen

1. GSA - Some government agencies have complained that not being listed on GSA makes it difficult for them to buy from us.

Losses where GSA was a factor (Significance not clear):

U.S. Naval Postgraduates School	PDP-7 vs. SDS-930
Stanford Linear Accelerator Center	PDP-7 vs. IBM-1800
(IBM 1800 delivery slipped - order cancelled and SDS-925 purchased)	
NASA Ames	PDP-10 vs. SEL-840 MP
NASA Ames	PDP-9 vs. SEL 840
LRL Livermore	PDP-10 vs. Sigma 7

2. (a) Improve delivery, literature, advertising, etc. Consider kits for people who have operating funds and limited capital equipment funds. Modify "hard-line" on: Customer install = Cancelled warranty.

(b) Improve delivery, literature, advertising, etc. Consider "package deals". DECtape has been an easy product to sell in the West. Disc is a good product - much interest so far. Larger, faster Disc needed.

(c) Devices to make Disc, DECtape and PCO 1's easier to use would help such as, push-button boot-strap loaders, i.e. push-button "Load from paper-tape" "Load from DECtape, "Load from Disc".

3. Packard Instruments (Pulse-height Analyzers) uses the automobile stereo tape cartridge instead of paper tape. This feature has been most useful for them. This would be attractive to educational users as an easy-to-use device on which to store programs, lesson materials, etc. Cartridge tape would help satisfy people who do not want anything to do with paper tape.

4. Assuming the width to be at least teletype width, the $6,000 price would be most attractive. The Kleinschmidt printer and DIAN printer receive much interest, but, we don't offer them or service them.

The cheap (rebuilt 407) 150 L.P.M. printer offered with the IBM 1130 has locked us out of applications that require printers on PDP-8's and PDP-9's for us to compete.

5. Sales people are generally encouraged to sell "basic machines", i.e, PDP-9 with many peripherals takes 2 of our slots and delivery is significantly extended.

mr

digital INTEROFFICE MEMORANDUM

DATE: September 11, 1967

SUBJECT: METAL SHOPS

TO: H. Crouse

FROM: P. Kaufmann

cc: J. Trebendis
K. Olsen

As you know I have assigned John Trebendis as temporary Manager of Metal Shops. At the same time we are pursuing the acquisition of a Metal Shop Manager. You can be of assistance to both John and I during this interlude phase as follows:

1. Assist in looking for a Metal Shops Manager to report to me and ultimately report to the Peripheral Manufacturing Manager.

2. While John is taking care of the short range housekeeping, personnel morale and production problems, would appreciate your taking a long range view of our Metal Shop by answering the following questions:

   a. What peripherals do we guess we will be building over the next five years?

   b. What machines do we need and when during the next five years so that we might do the greatest bulk of our production sheet metal and machining work inside the house?

   c. What manpower will we require?

   d. What is the best way to proceed, by acquisition of another company or evaluation and purchase of equipment in house.

   e. What are the space/location needs?

   f. What inspection/QC controls should be established?

Would appreciate your taking the necessary guesses to come up with a plan and schedule which we might look at. Please feel free to use all available internal resources in the shop.

Pete

jb

dec INTEROFFICE MEMORANDUM

DATE 9-11-67

SUBJECT Regional Sales Manager's Questionaire

TO Ted Johnson FROM Tony Liveris

The following are the answers to the above questionaire:

1. I personally have not lost any business for lack of GSA listings because I have been concentrating my sales in the industrial market. A GSA listing would be helpful during this fiscal year because I plan to concentrate more in these market areas.

2. In regard to high speed paper tape readers, I always try to sell options when selling basic computers. However, the customer's decision to purchase a paper tape reader is dependent upon... Will the added convenience of having one justify the cost? Naturally, if paper tape readers were cheaper we could sell more.

More DEC Tape, displays and discs could be sold if the sales force pushed these items. I automatically send literature on new equipment (ex: disc) to my present computer customers.

3. Answer to Item 3 is the same as Item 2.

4. What is a $6,000 line printer? How many columns and what character set?

5. When I sell a computer I generally go over the entire price list with the customer. If we aren't selling more of the peripherals we now have to offer, possibly our sales men are not making the customer aware of them. (ex: You might note peripherals I sold to UCC-FASBAC and to Dow Chemical-PDP 9)

In regard to evaluation of the different product lines, my experience has been that generally the following departments respond EQUALLY WELL whenever I have asked for assistance:

Module Department
PDP-8/S Group
PDP-8 Group
Biomedical Group
Typeset Group
Field Service Group

Digital Test Systems - For the most part I have very little market for these products in my district, hence I'm not listing them in this evaluation.

Tony

Tony Liveris

INTEROFFICE MEMORANDUM

DATE September 11, 1967

SUBJECT Field Sales Inputs to Marketing People, Your Memo of 9/5/67 and Questionnaire for Regional Sales Managers

TO Ted Johnson

FROM Jim McEwen

In response to Ken Olsen's questionnaire I'll try and go down the questions one by one as follows:

1. I only know of one instance where not being on the GSA schedule is hurting us, and that is with the Army here in Huntsville who would like us to be GSA listed under calculators for the PDP-8/S. They cannot buy a computer without going through Washington, D.C., but would and could buy 8/S's off GSA schedule under calculators. Myself, I see no advantage to being listed on GSA.

2. Bring the price down on our present high speed reader, or introduce a newer reader in the $1,000.00 bracket which would read 100 - 200 cps. - As far as new computer sales go, again a lower priced high speed reader is required. In regard to DECtape, the transports are priced in the right ballpark, but the control unit is too expensive for most customers. I don't know of a single customer who has the full 8 transports on a system. If we could come up with a simple control for 2 transports in the $1,000.00 to $2,000.00 range we would sell more DECtape systems. Displays should be selling fairly well at their current price, however, I feel that it would be worth our while to investigate the new Tektronix 11" storage scope as an addition to our display line. The disc we now offer for the 8 and 8/S seems entirely adequate. Most of our new 8 customers have and are now buying it, and the older customers are getting ready to start ordering them as options. We do need, however, a smaller 1/2 million word or 1/4 million word disc for the PDP-9, something in the $15,000.00 - $20,000.00 price range. Our current thinking of a 1,000,000 word disc at $35,000.00 to $40,000.00 is to expensive for most users, and more disc than they need.

3. I feel this would be an excellent selling point, since the reading of paper tape into our systems, even with high speed reader is probably the biggest single complaint we listen to.

4. A $6,000.00 high speed line printer in the right configuration would definately be a big help. Almost every customer wants a line printer, but can't justify the present expense. By the right configuration, I mean the 120 to 132 column type printer, 100 to 300 lpm.

Ted Johnson 9/11/67

5. Refer to previous answers to high speed reader and punch and displays. As far as the A/D is concerned, there are two things we lack at present on our A/D. First of all delivery is presently quoted as 6 months according to latest delivery estimator on any A/D we manufacture, and most customers don't want to hold up delivery of their system for a single A/D convertor unless necessary. Secondly, here we are offering 18 bit and 36 bit computer systems, and only a 12 bit A/D. We need a larger and faster A/D converter at least 14 bits plus sign.

PRODUCT LINE EVALUATION

1. LINC-8, PDP-8, PDP-10, PDP-9, PDP-8/S, Modules.

2. PDP-8, Modules, PDP-10, PDP-8/S, LINC-8, PDP-9.

3. LINC-8, PDP-8, PDP-8/S, PDP-9, PDP-10, Modules.

4. PDP-8, LINC-8, PDP-8/S, PDP-10, Modules,PDP-9.

NEGATIVE COMMENTS

I feel that all product lines tend to feel that we (as DEC) know more about what the customer needs than the customer himself. If we would look into why the customer needs "a special" on various occasions, we might find completely new markets opening up for us. We tend to overlook the fact that most of our customers know their fields and applications better than we do, and I feel we could learn something from them.

Regards,

Jim McEwen

Jim McEwen

JMc/wc

digital INTEROFFICE MEMORANDUM

DATE: September 10, 1967

SUBJECT: Answers to Regional Manager's Questionnaire

TO: Ken Olsen

FROM: Dave Denniston
Mid-Atlantic Regional Office

CC: Ted Johnson

1. I'm sure some GSA catalog users buy Sears-style, without first discussing it with the manufacturer, this is a little difficult to answer. Some of our customers have mentioned, however, that it would be easier for them to obtain our products if we were listed, because they wouldn't have to "carefully word" a "competitive" RFQ for "DEC or Equal".

   However, I do not feel we are losing very much. I think we are, indeed, selling to the most desirable Government accounts, without the added cost of a GSA catalog and the rather severe terms of sale required, and we should not consider listing at this time.

2. Our options, especially on both PDP-8 and PDP-8/S, are longer lead-time items than the basic computers. Even though deliveries are improving, the minimum lead-time is now from three months (for a Paper Tape Reader) to six months (for an ADC). This means that when we sell a machine for fast delivery, it just costs the customer a bit more to have these options "added on" later. For a high-speed reader, on an 8/S for example, the worst of the programming effort is often completed by the time a reader could be installed. Several of our customers have bought their own readers, etc., because of delivery.

   DEC has never really promoted options--in advertisements, brochures or internal sales documents. We should do more promotion to current users of our machines (direct mail), bring the options into our ads (we've sold several PDP-8/S-disc systems thanks to VRC's PDP-8/S-drum ad) and make options more obvious in publications. (The options you mention are certainly not prominent in the Small Computer Handbook--in fact, they're downright hard to locate when you're looking for them!)

   One other thing we could do would be to promote table-top versions of these options, especially the reader, to cut down enclosure costs, (also enclosure lead-time present lead for a DEC cabinet in three months).

Finally, we are, in New York, adapting a hi-speed reader for use in a small, portable cabinet. This will be used for installations by Field Service, but we expect it will also sell a few "reader add-ons".

Unless we make the reader a standard option, I question our ability to sell this on most new orders, because of our OEM customers. Our OEM's seem more inclined to basic machines, with a few DECtapes, and now an interest in our disc.

3. The idea of an inexpensive mag-tape cartridge seems good. Would this be price competitive with hi-speed paper tape? Would it have WRITE capabilities? (If not, program correction and distribution of new programs might be difficult).

4. A $6,000 line printer would certainly be welcome. Potter has sold one or two of their new chain printers, with DEC-compatable control, in our area and would like very much to sell more to PDP-8 users. Our present printers are too costly in the eyes of our customers, and our story doesn't seem to be too clear when we first describe the ease of interfacing with Flip Chips and then the customers compare our price with Potter's (with control about $14,000) or Analex's (without control). I'm sure we could sell many more printers in this lower price range.

5. I think this has been covered in my answer to your second question, but I'd like to emphasize that if we really want to actively promote option sales, that message is not coming through to the customers or salesmen.

I think, Ken, that one other important question should have been asked about the services of the product lines:

"Who provides the best organized Sales Notebook, that anticipates to the highest degree possible, your customer's questions?" I'll answer this one right away:

1. PDP-9
2. PDP-8
3. Modules
4. LINC-8
5. Digital Test Systems
6. PDP-8/S
7. PDP-10

The Sales Notebooks have changed a lot since Jim Burley's original, hand-written and duplicated notes on the PDP-8, but I'm not sure it has been for the best. Are we placing the value of a pretty cover, colored page headings and quantity of sheets issued, above concise, informative, and organized material? Only PDP-8 and PDP-9 notebook pages are all numbered so that my secretary could put them in my books (what a waste of sales time!). Seldom does new information mention what previous information is obsoleted, and memos seem to get printed on Product Line letterhead even though they may only have one or two peices of significant information buried in the text. It almost seems that everybody's doing it just because it seems to be the right thing to do.

As for your other questions:

1. "Who gives the best answers.....?"

    1. Modules
    2. LINC-8
    3. PDP-10
    4. PDP-8
    5. Digital Test
    6. PDP-9
    7. PDP-8/S

2. "Who has the least delay in fixing problems?" (also, #4--"Who fixes technical problems most promptly?"--most problems are technical). (I haven't included PDP-10 because it is a bit too early in the product's life).

    1. LINC-8
    2. Modules
    3. PDP-9
    4. PDP-9
    5. PDP-8/S
    6. Digital Test

3. "Who is the most sensitive to customer's needs and feelings (and ego)?"

    1. LINC-8
    2. Modules
    3. PDP-9
    4. PDP-8/S
    5. PDP-8
    6. Digital Test

As for my negative comments, I sometimes feel that the role of Marketing Manager has become such that there is hesitation to become involved with the "insignificant details", the more detailed technical problems, and the mundane aspects of coordinating the field with the product line's interests. Marketing people are happy to visit in the field with big, important customers, but don't always want to become involved with assistance in coordinating the lesser details. In many cases I honestly feel we have better "know-how" here within the region, and I have made it clear that inter-district cooperation is certainly desirable. Too often a salesman is redirected to a variety of people to help him answer several questions. This bogs down WATS and makes the salesman far less efficient, and makes them wonder about marketing people. Also, it is often the case that a salesman is unable to reach <u>any</u> marketing people connected with a specific product. If all significant questions were documented <u>and</u> organized there should be fewer questions.

Finally, more care must be taken in organizing pricing information for new products. The new A-D line is an example of many salesmen wasting time trying to figure out what we actually have to sell. A few block diagrams would certainly have helped. The discount status of several new products (A-D, disc, PC01, PC02, PC03) is not available in writing. One could make assumptions from reading our standard discount agreement forms, but then the implication would be:

1. We discount our cabinets.

2. We don't discount the new disc.

3. We aren't quite sure what to do about discounting an A121 module purchased with an A-D system that is installed with a discounted computer. (It appears that Al Alexanian has set the policy on this one, in lieu of any other.)

KW SEP 11 REC'D

digital INTEROFFICE MEMORANDUM

DATE: September 8, 1967

SUBJECT: Field Sales Inputs to Marketing People

TO: Ted Johnson FROM: Ray Lindsay

The following is my answers and/or opinions on the questions presented to me.

1. DEC, not being on the GSA schedule, has not caused me to lose any orders to date. It does make it more inconvenient, however, with some of the red tape that you have to go through which otherwise would be prevented if we were on the schedule. In my own area, I guess it is not worth the effort and cost at the present time, unless the cost is low.

2. & 5. I would like to combine these two questions, as I feel that in my area many of my customers have purchased peripherals on the different types of computers that we have sold. I think there are only two customers that I have that don't have peripheral equipment.

If there are any problems of salesmen not selling peripheral equipment, it may stem from the fact that many marketing people at the plant stress the importance of selling basic systems, which gives better delivery and less problems at the plant. I think this is a very important point that should be discussed.

I believe all of my customers are made aware at the very beginning that we do have peripherals available, for either immediate use or expansion in the future if they don't have the money at the present time. The reason a lot of people do not buy high speed readers and punches is because they are not doing a lot of assembly work or debugging. Our small computers were oriented to operate with a minimum program, that would not have to be continually changing.

3. The first question that enters my mind about an inexpensive magnetic tape cartridge system for reading in programs is, how expensive would it be. The next question is, do we provide the cartridge with the programs on them and do we update them. Can the customer read and write on these cartridges to update

them? I think there are a lot of technicalities here that would have to be looked into very thoroughly before we even consider such a move.

4. Normally, customers would like to have more than 60 characters across on their print outs. If someone is offering, or we are offering, a $6,000 printer that will do this, I am afraid it would not be reliable. If it is less than 60 characters across, for most of my applications it would not be useful.

My evaluation of our different product lines is that in general most everyone concerned back at the plant does try to cooperate with the salesmen and the customers. It does take a little tact, however, to get some of the people back there to be responsive to your needs. I would say that if I had to pick out one unit that does a little better job than the others, it would be the Linc-8 Group.

I sometimes find it very difficult to get technical questions answered at the engineering level of the PDP-8 Group. In these cases where I do have a problem, which is not too often, it does seem as though a few people consider my request unimportant.

digital INTEROFFICE MEMORANDUM

DATE: September 7, 1967

SUBJECT: Project Review Philosophy

TO: Operations Committee FROM: Nick Mazzarese

It is the basic responsibility of every manager or supervisor to review on a regular basis the projects reporting to them both for feasibility and timeliness. This serves the first level of monitoring for those projects which the company is undertaking. There are three other types of monitoring and these are associated with some of the various committees of the company.

1. Operations Committee

The Operations Committee's responsibility is to review new projects, to evaluate their content, and to determine the likelihood of their success, and, if appropriate, to approve them. Particular attention is paid to the project strategy (i.e., reasonableness of time, allocation of resources, etc.). This is prior to the start of any project.

2. Engineering Committee and Marketing Committee

Acting as advisers to the Operations Committee, the Engineering and Marketing Committees may review some new projects to add their input as to whether the marketing and/or engineering are feasible and well thought out.

3. Schedule Review Committee

Ongoing projects will be reviewed on a regular basis by the Schedule Review Committee to determine whether they are on schedule and within their budgets.

4. Design Review

A design review is made by members of the engineering departments selected by the designer. Their function is to make an in-depth technical study of a design and evaluate its feasibility, and to suggest better alternatives. This is usually made at several points in a project including completion of the prototype and completion of the logical implementation of the system. Included as a part of these reviews is the task of determining whether the product is in fact producible.

5. Marketing Design Review

Marketing plans are presented to members of the marketing staff of the company to determine whether all factors have been considered in the marketing strategy of the new product. This is usually performed after the marketing strategy is fairly well documented but before it is fully implemented.

Finally, the Operations Committee has a responsibility for terminating those projects which, for any number of reasons including input from the committees detailed above, do not appear to be worth continuing.

cmp

digital INTEROFFICE MEMORANDUM

DATE: September 7, 1967

SUBJECT: ANELEX CORPORATION

TO: Ken Olsen ✓
Win Hindle

FROM: Henry Crouse

We pressed Anelex for a statement of their intentions with regard to Mohawk Data Sciences. Mr. Roth offered the enclosed.

ams

Enclosure

ANELEX CORPORATION

EXECUTIVE OFFICE

150 CAUSEWAY STREET
BOSTON, MASSACHUSETTS 02114

September 6, 1967

Mr. William Burns, Buyer
Digital Equipment Corporation
146 Main Street
Maynard, Massachusetts 01754

Dear Bill:

As I mentioned to you on the telephone yesterday, Anelex Corporation will be merging with Mohawk Data Sciences Corp. some time in October, if the current agreement entered into between the two companies is approved by the respective stockholders. Both managements strongly endorse the merger and stockholder approval is anticipated.

I want to assure you that Anelex Corporation will continue to be vitally interested in serving your needs and the merger will provide greater opportunity to do so. MDS is a peripheral equipment manufacturer, like ourselves, and sells its line of Data Recorders to the user, primarily on a rental basis. Anelex, on the other hand, caters primarily to the OEM market.

The merged companies will have assets in excess of $30 million and considerable financial stability, as evidenced by a current ratio of 2 to 1, and a very favorable debt-to-equity position. The combination will offer a stronger base of operation and provide a greater source of income for continued development of new products that should be of interest to you.

I wish to thank you for your business and I look forward to being of further service to you.

Sincerely yours,

Herbert Roth, Jr.
President

HRJr:amw

digital INTEROFFICE MEMORANDUM

DATE: September 6, 1967

SUBJECT: EXTRACT FROM ADAMS QUARTERLY - COMPUTERS

TO: Operations Committee
Ron Smart

FROM: Ted Johnson

I have extracted all of the computers listed in the Adams Quarterly that fall in the range of 0 - 36 bits, 1965 (first installation year) on.

Machines listed as alphanumeric, which include the IBM 360 Series as listed, are omitted. Except for the PDP-10, these machines do not generally compete with PDP computers.

This gives a quick overview of the competitive machines. Cycle times are noted.

Recent machines not included are the Interdata Model 3, HP-2116A, CDC 3150, DMI 6201. The Adams booklet used was done at the beginning of this calendar year (1967).

In using the Adams monthly rental to compute purchase price, it would appear that they use 1/40th of purchase price to compute a fictional rental rate for our computers. I don't have much confidence in the accuracy of the prices shown. Several gross errors are noted (see PDP-5).

mr

enc.

	1965	1966	1967	1968
8 bit		BIT 480, 2μ		
12 bit	PDP-8, 1.4μ SDS 92, 1.75μ	LINC-8, 1.5μ Scientific Control 650, 2μ PDP-8/S, 8μ		
16 bit	DMI 620, 1.8μ DDP-116, 1.7μ IBM 1130, 3.6μ SEL 810A, 1.75μ	CDC 1700, 1.1μ IBM 1800, 2μ SDS Sigma 2, .9μ	ASI Advance 6130, .9μ EAI 640, 1.65μ DDP 416, .96μ DDP 516, .96μ	
18 bit	Elliott 903, 6μ Elliott MCS 920B .6μ Honeywell H21, H 22, 6μ SEREL 505, 14μ Toshiba Tosbac 5200, 18μ Toshiba Tosbac 5300, 6μ	PDP-9, 1μ Hughes H-3118M, 1.8μ Hughes HM-4118, 1μ Mitsubishi 3100/10/30/50, 1.75μ		
24 bit	ASI Advance 6000, 1.9μ CDC 3100, 1.75μ CDC 3300, 1.25μ GE 435, 2.7μ GE/PAC 40501, 5.1μ GE/PAC 4060, 1.7μ DDP-224, 1.9μ Hughes H-3324, 1.8μ Raytheon 520, 1μ Scientific Control 660/2, 670/2, 2μ Scientific Control 660/5, 5μ SEL 840A, 840MP, 1.75μ EELM KDF-7, 6μ	GE/PAC 4020, 1.6μ GE/PAC 40511, 3.4μ DDP 124, 1.75μ Scientific Control 655, 1.75μ SDS 940, 1.75μ ICT 1901, 6μ ICT 1906, 1μ ICT 1907, 1μ SEA 1500 (French), 4.8 μ	CDC 3500, .8μ Scientific Control 6700, 1.75μ Telefunken TR86, 9μ Zuse Z26, 1.75μ Toshiba Tosbac 7000/60, 1.6μ	Datasaab D22, 1.6μ

	1965	1966	1967	1968
24 bit cont'd	ICT 1902, 6μ ICT 1903, 2μ ICT 1904, 2μ ICT 1909, 6μ Bull GE Gamma M40, 4μ Toshiba Tosbac 5400/10, 5.8μ Toshiba Tosbac 5400/20, 3.9μ Philips PR 8000, .7μ	Toshiba Tosbac 5400/30, 2.7μ		
27 bit	Electrologica EL X 8, 2.5μ	Electrologica EL X 2, X 4, 5μ		
30 bit	Univac 491,492, 4.8μ	Univac 494, .75μ		
32 bit	CDC LGP-21, 51,000μ EAI 8400, 1.75μ Philco 102, 1.5μ Hitachi Hitac 5020, 2μ	SDS Sigma 7, .85μ GEC S.7(Sigma 7) CAE 10070(Sigma 7) Hitachi Hitac 5020E, 1.5μ	Collins C-8500, 2μ SDS Sigma 5, .85μ	
36 bit	GE 625, 2μ GE 635,645, 1μ Univac 1108 11, .75μ	Standard Computer IC 6000/19,29,39, 4μ Fujitsu Facom 230/50, 2.2μ	PDP-10, 1μ	

COMPANY CONFIDENTIAL

digital INTEROFFICE MEMORANDUM

DATE: September 5, 1967

SUBJECT: Real Estate Status

TO: K. Olsen ✓
P. Kaufmann
H. Mann

FROM: D. Knoll

Our "ghost" did some checking on further alternatives last week and has the following report:

1. Upper 495 in Littleton at 119

   80 acres of which 11 are "waste" controlled by Robert Gardner - Gardner Associates. He will give our ghost an idea of the price next week.

2. Upper 495 in Westford near 119

   360 acres controlled by Ryan Elliot. Elliot has made a comprehensive survey of all 495 property which will be reviewed on Thursday. In general, property is going at $1000 - $1500 per acre according to Elliot.

3. Lower 495 - Milford Interchange

   Available industrial property (approximately 200 acres) has been bought for capital gains by a trust administered by a Boston law firm. They have begun registry proceedings and it may be 1 - 2 years before the property is on the market. Our ghost will be notified as soon as the property is available for sale.

Dave

sm

dec INTEROFFICE MEMORANDUM

DATE September 1, 1967

SUBJECT Suggested brief visit to European Region Sales Meeting, DECUS meeting, Reading Plant.

TO KEN OLSEN

FROM Rod Belden

Ken,

It has been over a year since you last visited the European Region. Since then the European region has: reached a booking rate of $ 1 million per month; added new district and area managers; and opened a new plant which is now scheduled at 1 shippment (computer or peripheral) per day.

With this successful growth, the European group (over 100 strong) has also a healthy attitude of corporate participation and cohesion.

If you could attend a half day each of the regional sales meeting, the DECUS meeting, and then visit the Reading plant - in two days you would get a feel for our new staff, new customers and small plant.

I expect to be in Maynard during the week of September 11th and hope I will have an opportunity to see you for a few minutes then.

Best regards,

Rod

Rod

Suggested Itinerary

October

18 (Wed.) Fly Boston to Amsterdam

19 (Thurs.) Visit a customer or installation (Phillips...OEM)

Afternoon at regional sales meeting (agenda attached)

Dinner with sales meeting; followed possibly by managerial review of European 5 year plans

20 (Fri.) Attend DECUS meeting (1 hour), fly with R. Belden to Reading

Visit Reading offices and plant

Return to Maynard

EUROPEAN REGIONAL SALES MEETING.

Agenda Planning Outline

	Wednesday, October 18th.	Thursday, October 19th.
Morning 8:30 - 12:30	**PRODUCT PRESENTATIONS** Two parts for each product group: 1) News & Support (Maynard Staff) 2) European Applications (Local staff) - K & M Series Modules - PDP-10 - PDP-9 - 8 Family - Peripherals	**MARKETING DISCUSSIONS** - Getting the customer's point of view (T. Johnson) - Seminars pay off. (D. Doyle) - Cashing in on year-end sales. (D. Doyle) - Sales situations - a role play (T. Dalzell) - Expanding our European Markets (J. Leng) - Competition in Europe (J.C. Peterschmitt)
Afternoon 1:30 - 5:30	**WORK SESSIONS** Two sessions of 2 hours each, with 2 topics to chose from in each session. A1-Logic Design with K & M Modules A2-Software workshop. B1-Interfacing to the PDP-10 B2-OEM Sales & account management (sales, service, terms & conditions, top management.)	**MANAGEMENT TALKS** A series of talks given by attending company management on topics such as: - Problems of International Growth - More creative Marketing - We need more/less communication - Products on the drawing boards. - DEC has a 5 year plan - 10 years of DEC - Better use of Maynard Marketing Support - Etc.
Evening	**BUFFET DINNER** Evening open for informal meetings and discussion with Maynard personnel Area Managers' Meeting: (J. Leng, T. Johnson, G. Finch, G. Shingles, P. Herke, J.C. Peterschmitt K. Reistedt, B. Csonth, H. Reiter, L. Coppola)	**FINAL DINNER** "DEC 10 year birthday party". Guest speaker - Possibly an economist, scientist, industrialist, etc., who could challenge us with markets, applications ideas, the future... Any suggestions?

RB, 1st Sept., 1967
(preliminary)

digital INTEROFFICE MEMORANDUM

DATE: 1 Sep 67

SUBJECT: Core Stringing

TO: KHO cc Pete

FROM: T. Stockebrand

Conclusion

We should not do our own coremanufacturing. We should consider doing core stringing if 1) we semi-automate the process and 2) if testing is an integral part of the stringing operation. We have the people in house to do all parts of the job (Machin e design, St. Amour; testing and system design, Lou Illingsworth; stack and product Development, Tom Hughes. I'll be glad to cook up some test gear and link it to the Production testing PDP-8.)

Proposition

We will use about 140 million cores in 1968. These can be bought for 0.25¢ each (100 million, 30 mil $250K) or, tested to broader specs, 0.2¢ each (A saving of $50K !). Saunders or EMI charge $1700 for Cores, Wiring, and testing a PDP9 stack (2 1/2 D, 144K cores, no diodes, no hardaeware). This is 1.2¢ per bit (the same as a pDP-8I stack, incidentally) of which 0.6¢ is core according to Saunders and 0.6¢ labor. This breaks down to $360 for stringing 2,000 cores per hour, $250 testing and repairing and 150 for soldering. Joe St.Amour thinks a semiautomatic one-line-at-a-time set up would allow one girl to go 10,000 cores per hour (I think faster) and test them as each line is installed for repairs on the spot. This would result in labor of about $200 or a cost of .15 per bit.

The Machinery to do this--a small prototype followed by first semiautomatic version should be less than 20 K and the testing gear should be around 20K. For a one year writeoff of this first machine at 10 stacks per month (1/3 of our requirements) the cost would be 0.2¢ per bit. The time for first production might be six months.

Summary	Now	Possible	
Cores	.6	.25	
Capital	--	.2	
Labor	.6	.15	
	1.2¢	.6¢	or, at 1/3 of needs $110K savings

digital INTEROFFICE MEMORANDUM

DATE: 1 Sep67

SUBJECT: Core Stringing page 2

TO: FROM:

STRATEGY

An importatn part of strategy would be to get a core tester on a machine early, place an order immediatly to the low price Vendor, then make partial releases and test cores over time (with good complete histograms) to see if the quality is as low as the price or whetehe r we can ifn fact use them.

Notes

I discussed the powder question with the iperations VP of Indiana General, Mr. Norman Bender. His remparks are summarized here: He is certain that you should go to Chicago (with me!) and sit down for half a day with their President, Mr. John Boumeester and discuss thorougly the ins and outs of core making. They would be reluctant to license us to make cores since the market is overloaded abut since we would be making cores strictly for ourselves, then they would be willing. The royalty is 5% on the sales price of the core and there is no know-how agreement. If there were know-how, the roulaty would be higher than 5%. I was absolutely unable to get cost figures on powder except that in connection with a thoro discussion of the problem by them with us face-to-face.

They feel completley certain that when we discover the p rice of cores we will not want to bother making them (see above, also note theat core prices are down by a factor of two in the last two years or so). They are also sure that making cores is a more subtle business than we think it is and have "seen many core makers come and go" and would want to acquaitn us with all that before we proceeded.

Core Prise Data , this rouhd:

All costs in pennies per core at large volume 20 and 50 mil prices are if combined with 30 mil orders

Size	Univac	EMI	Indiana Gen.
50 Mil	.494	.433	.440
30 Mil	.423	.378	/.250
20 Mil	.916	.496	.550

K. Olsen

digital INTEROFFICE MEMORANDUM

DATE: August 31, 1967

SUBJECT: PDP 9 Problem Follow-up

TO: See Distribution FROM: D. Knoll

Today we held a follow-up meeting on the PDP 9 problems outlined in my memo of 8/29. Status is as below:

1. Problem: B213 is nonsymetrical and sensitive to glitches. (D. Vonada)
   Action: Dennis O'Connor has a 10 resistor change which will be tried in a couple of machines by Friday. D. Sogge is looking into the desirability of a new module. His recommendations will follow evaluation of the 10 resistor change.

2. Problem: EAE margins take excessive time (D. Vonada)
   Action: Solved with the B113 (ECO 113)

3. Problem: Memory strobe and clear timing changes (D. Vonada)
   Action: Ralph Dieter is collecting data on timing variation with temperature. This problem is related to the B213 problem.

4. Problem: S202 sensitive to noise (D. Best)
   Action: Solved A Phase in ECO's have now been issued changing DEC 3639's to DEC 3639C's on all S flip-flops (S202, S203, S205). Prephase in troublesome S202's will also get the change. Equivalent R series modules had equivalent changes issued in June.

5. Problem: R302 high failure rate (D. Vonada)
   Action: Ralph Dieter is collecting specifics. D. Best will get with Ralph to see if this relates to the 3639 problem.

6. Problem: API modifications (D. Vonada)
Action: Solved the hardware has been proven and the diagnostic has been accepted.

7. Problem: Availability of prereleased memory and DM09 cables (J. Smith)
Action: Cables will be available Friday.

8. Problem: Unreleased options may create additional changes. Memory protect is the most critical. (D. Vonada)
Action: Don Vonada will expedite the releases. E. Harwood will provide Don a checked out computer by 9/15 for use in options and diagnostic checkout.

9. Problem: G219 module change implementation (E. Harwood)
Action: Change in question was a phase in. The last 30 boards have been scrapped. New revision modules will be available by 9/8 which will be used to replace the top 3 boards in each PDP 9.

10. Problem: B169 change implementation (D. Vonada)
Action: The specific change will be implemented with the next lot of modules. One lot of modules was produced with permission after the change had been issued because tooling hadn't been made four months after the change was issued. D. Knoll will look into this problem.

11. Problem: DEC 1008 XSTR - loose leads (B. Hughes)
Action: Bob has previously looked at this problem along with Motorola. The conclusion was that the problems are in production handling. Bob has (C. Kendrick) relayed this to production who are using transistor pads and have eliminated the crimping of these leads with pliers.

12. Problem: Diagnostics (M. Horovitz)
Action: The basic exerciser, API, Basic and TC02 diagnostics were accepted yesterday. Marvin will, by 9/6, provide a list of all remaining 9 diagnostics with the hardware requirements for testing. Don will return the list with dates when hardware will be ready. Marvin will holler in the future whenever diagnostic acceptance is being delayed by lack of hardware. The computer mentioned in 8 above will expedite diagnostic acceptance as well as hardware testing.

13. Problem: Diagnostics for A/D equipment (D. Knoll)
Action: Dave will schedule a meeting next week with Clark Crocker, J. Smith, J. Shields, Marvin Horovitz, and D. Vonada to determine what the acceptance criteria is and what it should be for A/D options.

14. Problem: SCR control on the punch is arcing (E. Harwood)
Action: Solved, the fix has been implemented.

15. Problem: 709 Power supply workmanship (J. Smith)
Action: From now on all units will have protective screens. Star washers should be used under the tabs on capacitors. D. Vonada will issue the change.

16. Problem: Problems aren't being found on the "line" but in basic test. (E. Harwood)
Action: Ed will implement the two additional "2/3" stations on the line. All tests now run in Basic test will be pushed back to these stations. Schedule is as follows:

	To Ed	Checked Out	On line	
1st machine	8/31	9/9	9/13	(2/3 station)
2nd machine	9/1	9/12	9/14	(2/3 station)
3rd machine	9/6	9/15	9/15	(optimum and diagnostic test)

17. Problem: M. Horovitz suggests that some margins be run on additional programs (ISZ, JMS etc) (B. Dill)

Action: Bud Dill will run selected margins (to spotlight timing problems) on the next 10 machines. This will take about 3 hours extra per machine. The decision to continue these tests will be based on results on these 10 machines.

These problems will be reviewed again, Wednesday 9/8 at 1 P.M.

jb

x Don Vonada
x E. Harwood
x J. Smith
x B. Dill
x M. Ford
x M.Horovitz
x J. Jones
x J. Shields
x D. Zereski
x D. Best
x L. Seligman
D. Sogge
B. Long
R. Dieter

cc: Operations Committee

x Attendees

Ken Olsen

digital INTEROFFICE MEMORANDUM

DATE: August 31, 1967

SUBJECT: Budget Procedure

TO: Operations Committee FROM: Harry S. Mann

Attached is a flow chart showing the various steps and their interrelations in preparing the budget. This chart was designed with the preparation of the annual budget in mind. When quarterly reviews are made, a number of these steps are by-passed simply because it is not necessary to do that amount of detail. Nonetheless, the concept and general flow will be applicable to quarterly reviews.

You will note that on the right-hand side of the sheet, there is a branch in the procedure which is exclusively for manufacturing aspects of budget preparation. This particular area is one which is new to our budgeting procedure and will be used for the first time next year or possibly on a trial basis at one of the quarterly reviews before then.

This part of the procedure has been urged by several of the group managers in the past because of their feeling that the cost of goods sold portion of our budget was large and was not given attention to the same degree as other aspects of the budgeting. You will note from the chart that in order to do this phase of the job, it will be necessary for the product line managers to supply additional information as part of the budgeting sequence, as suggested in the third box in the left-hand column.

The general concept of the budget procedure is that the product line managers are responsible for the budgets for their product lines and all other steps involved in the system are subordinate to this responsibility. For this reason, the first meaningful operation in the budget sequence is shown in the third box with the product line managers preparing their budgets as they see them. The preparation requires not only filling out the top schedule as has been done in the past, but also supplying adequate backup information so that the manufacturing people can develop meaningful cost figures as well as other service groups such as programming, technical writing, sales, etc. The information generated by the product line managers is then handled by the manager of budgeting in Accounting, with the various other groups that need to analyze the data. If there is any lack of information or disagreement with the budgets as envisioned by the product line managers, meetings are built into the system to evaluate and resolve these differences.

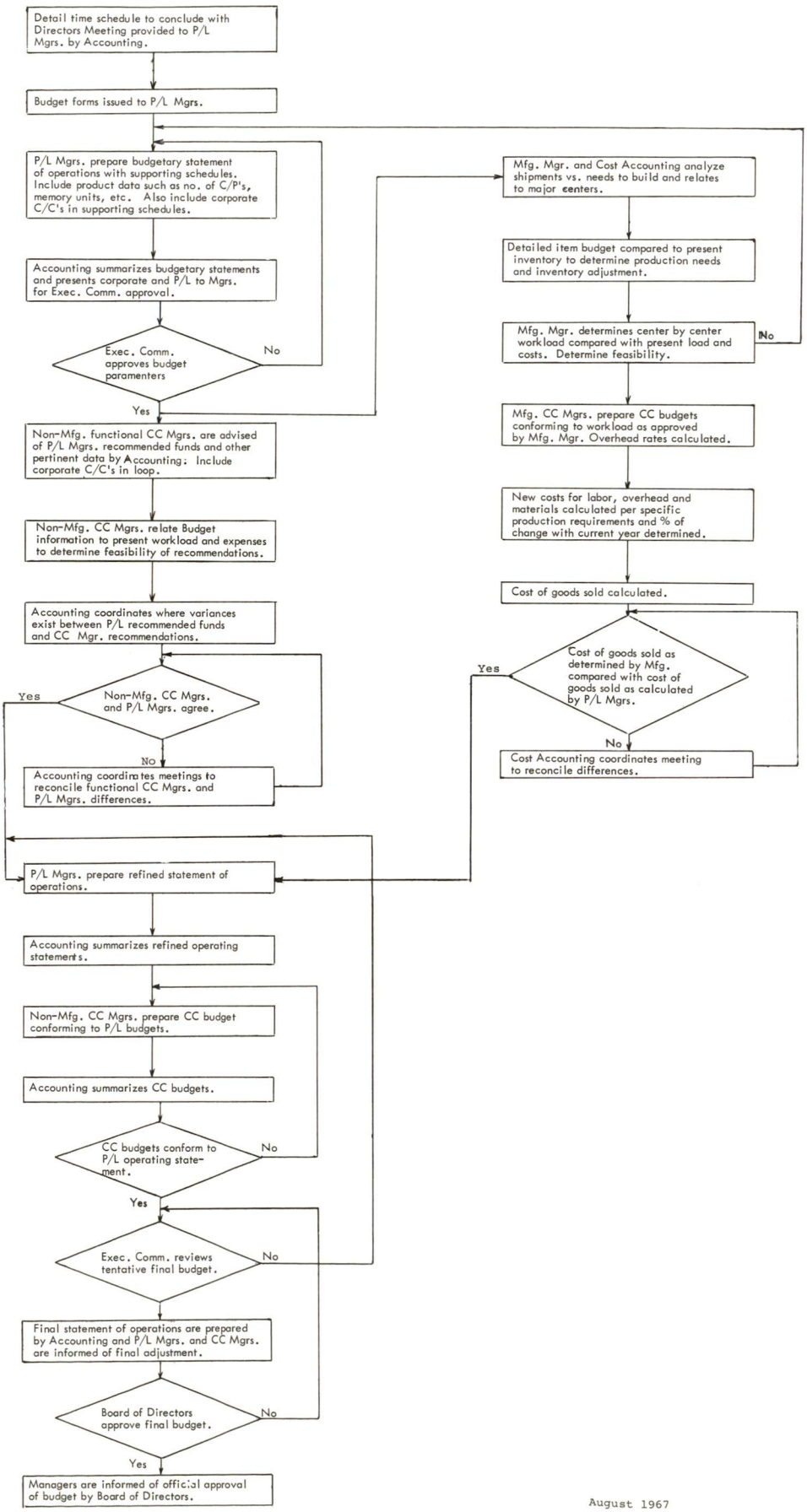
The final part of the budget procedure then is the drawing together of the various pieces to conform with the product line managers' budget as submitted or modified with a final approval being required of the Operations Committee and, as far as the full year budget is concerned, by the Board of Directors.

It is our intention to document in more detail the various steps represented by this flow chart so that there is in fact a budget manual available for reference.

HSM/ml

Encl.

DIGITAL EQUIPMENT CORPORATION
BUDGET PROCEDURE FLOWCHART



August 1967

THE BIG DISC

Steve Lambert

August 30, 1967

Scope:

The basic design goal of the large disc is to provide all DEC computer systems with an acceptable access time, fast data transfer rate, and high storage capacity at a low cost. This objective may be accomplished through a four-step program within a time period of twelve to eighteen months, and at a cost of between fifty and one hundred thousand dollars. The final objective of this program is to produce the large disc at an estimated cost between three and four thousand dollars and maintain control over component parts.

Development Philosophy

The four-step program entails the following:

Step 1 - Simultaneous design of mechanical components and electrical/magnetic control circuits. Within this phase of development, the major specifications such as record head, disc surface, recording format, and timing are established. The product of step 1 is an operational disc connected through a test logic interface to a computer.

The logic interface to a PDP-8 for our existing disc has been defined and is operational with programming support. It appears that the large disc should be tested utilizing a PDP-8.

Step 2 - With the basic disc developed, the next consideration is to integrate the large disc manufacturing with the existing DF32 production line, where minimum personnel training is desirable. The disc production personnel are presently trained to checkout both the disc mechanics and the electrical interface to a PDP-8, thus, it seems most economical and expedient to provide a PDP-8I interface to the large disc first. The integration of the large disc and a PDP-8I interface into the disc production line terminates step 2.

Step 3 - The conversion of the large disc oriented for a PDP-8I to a large disc on the PDP-9 and PDP-10 involves new interface logic yet retaining the basic control logic functions. Both the PDP-9 and PDP-10 require reformating of the control tracks utilizing a black box recorder as existing in the present systems.

The PDP-8I is a single matrix, serial access, word address format. The PDP-9 disc is a dual matrix, two bit parallel access, serial nine bit collection, word address system. The PDP-9 interface is considered step 3 of the development program. The timing and control logic design would be the same as that used in step 2. Cabling connections to the mechanical disc unit will be different than the PDP-8I or the PDP-10, however, the disc mechanics and head connections shall remain the same. Both step 3 and step 4 could be run concurrently with step 2.

Step 4 - The PDP-10 interface suggests a four matrix connection to the large disc where the access is four bit parallel and the data collection is nine bits serial. The control logic used in step 2 would be utilized for the PDP-10 interface, although word address format is adhered to, the word length actually comprises a block or sector on the disc.

PDP-8I DISC SPECIFICATIONS

Mounting Configuration:

19" rack mountable on slides

Disc:

Outside diameter - 16"
Inside diameter - 1.5"
Motor speed - 1800 RPM
Number of data tracks - 128
Number of control tracks - 4 + 4 spares
Outside record track - 15.5"
Track density per inch - 40
Inside track diameter - 8.7"
Track width - .015"
Track centers - .025"
Inside track circumference - 27.3"
Inside diameter velocity - 820 ips
Outside diameter velocity - 1,460 ips

Format:

Computer word length - 12 bits
Bits per disc word - 12 + parity + blank = 14 - single (8x16) matrix
Disc words per track - 4,096
Total bits per track - 57,344
Bit density - 2,100 flux reversals per inch - inside diameter
Bit density - 1,180 flux reversals per inch - outside diameter
Data bits per surface - 6,491,456
Total words per surface - 524,288
Bit to bit rate - 710 nanoseconds
Computer word transfer rate maximum - 20 microseconds

General Information:

Recording format - NRZI with phase adjusted time tracks
Operating environment - 60 degrees F. to 100 degrees F. maximum
70 degrees to 80 degrees F. recommended
Relative humidity - 30-70%

AC Power Requirements:

Single phase - 60 cycle, 115 volts at 3 amps
Single phase - 50 cycle, 115 volts, 4 amps (1500 RPM)

System Cooling:

Approximately 500 watts dissipation

Expansion Capability:

Up to three (3) or more expander discs connected to a master disc and control

PDP-9 DISC SPECIFICATIONS

Mounting Configuration:

19" rack mountable on slides

Disc:

Outside diameter - 16"
Inside diameter - 1.5"
Motor speed - 1800 RPM
Number of data tracks - 128
Number of control tracks - 4 + 4 spares
Outside record tracks - 15.5"
Track density per inch - 40
Inside track diameter - 8.7"
Track width - .015"
Track centers - .025"
Inside track circumference - 27.3"
Inside diameter velocity - 820 ips
Outside diameter velocity - 1,460 ips

Format:

Computer word length - 18 bits
Data retrievel - 2 bits parallel, 9 bits serial - 2 (8x8) matrices
Computer words per disc word - 32
Disc track word length - 288 + parity + blank = 290
Disc words per track - 256
Total bits per track - 74,200
Bit density - 2,700 flux reversals per inch - inside diameter
Bit density - 1,520 flux reversals per inch - outside diameter
Total bits per surface - 9,500,000
Total words per surface - 499,788
Bit to bit rate - 450 nanoseconds
Computer word transfer rate - 4.05 microseconds

General Information:

Recording format NRZI with phase adjusted time tracks
Operating environment - 60 degrees F. to 100 degrees F. maximum
70 - 80 degrees F. recommended
Relative humidity - 30-70%

AC Power Requirements:

Single phase, 60 cycle, 115 volts at 3 amps
Single phase - 50 cycle, 115 volts, 4 amps (1500 RPM)

System Cooling:

Approximately 500 watts dissipation

Expansion Capability:

Up to three (3) or more expander discs connected to a master disc and control

PDP-10 DISC SPECIFICATIONS

Mounting Configuration:

19" rack mountable on slides

Disc:

Outside diameter - 16"
Inside diameter - 1.5"
Motor speed - 1800 RPM
Number of data tracks - 128
Number of control tracks - 4 + 4 spares
Outside record track - 15.5"
Track density per inch - 40
Inside track diameter - 8.7"
Track width - .015"
Track centers - .025"
Inside track circumference - 27.3"
Inside diameter velocity - 820 ips
Outside diameter velocity - 1,460 ips

Format:

Computer word length - 36 bits
Data retrieval - 4 bits parallel, 9 bits serial - 4 (4x8) matrices
Computer words per disc word - 32
Disc track word length - 288 + parity + blank = 290
Disc words per track - 256
Total bits per track - 74,200
Bit density - 2,700 flux reversals per inch - inside diameter
Bit density - 1,520 flux reversals per inch - outside diameter
Total bits per surface - 9,500,000
Total computer words per surface - 249,894
Bit to bit rate - 450 nanoseconds
Computer word transfer rate - 4.05 microseconds

General Information:

Recording format - NRZI with phase adjusted time tracks
Operating environment - 60 degrees F. to 100 degrees F. maximum
70 to 80 degrees F. recommended
Relative humidity - 30-70%

AC Power Requirements:

Single phase, 60 cycle, 115 volts at 3 amps
Single phase, 50 cycle, 115 volts, 4 amps (1500 RPM)

System Cooling:

Approximately 500 watts dissipation

Expansion Capability:

Up to three (3) or more expander discs connected to a master disc and control

ESTIMATED MANUFACTURING COST OF DF512

128 Heads @ $15.00/head approximately	$1,920.00
Disc	250.00
Motor	150.00
Mounting Plate Disc and Motor	100.00
Shock Mounts, Slides, Covers, etc.	250.00
Mechanical Assembly	250.00
Diode Matrix Board	50.00
Readers Writers Timing and Format Cont.	
* G and B Series Modules	600.00
	$3,570.00

* The use of B Series Modules as used in the PDP-10, rather than L or M Series, appears to be the most economical route for expedient module delivery.

DIGITAL EQUIPMENT CORPORATION

DISCRETE PROJECT AUTHORIZATION

Product Code	Discrete Project No.
9 8	

Project Title Disc Module - DF512

Project Manager Steve Lambert Date 8-16-67

Complete Description of Project DF512 - 16" disc, fixed heads, rack mount 19 1/2" cab, 1800 RPM, word address (word may equal sector) serial transfer (250-600 nsec bit rate), 6,491,456 data bits (512K PDP-8 words) optional interface to PDP-9 and PDP-10 following operational testing on PDP-8

Estimated Completion Date April, 1968 Estimated Total Expense $53,000

If this is a continuing project, put a "C" under the completion date and show the average quarterly expense.

Estimated Cost of Capital Equipment to be Purchased for This Project (these costs are not to be included in Total Expense above). * $14,000

Project Expenses to be Charged to the Following Product Lines:

PRODUCT LINE	% OF COST	MANAGER'S APPROV.
PDP-8		
PDP-8I		
PDP-8/S		
PDP-9		
PDP-10		
LINC-8		

Expenses for This Project Will be Spent by Fiscal Quarters As Follows:

FISCAL QUARTER AND YEAR	EXPENSE	CAPITAL PURCHASE
QUARTER: 1 YEAR: 67	13,300	4,800
QUARTER: 2 YEAR: 67	19,500	6,500
QUARTER: 3 YEAR: 68	18,200	3,700
QUARTER: 4 YEAR: 68	2,000	
QUARTER: YEAR:		
QUARTER: YEAR:		

Project Managers should complete this form and obtain appropriate Group Manager's signature before presenting to the Accounting Department for project number. Projects should be authorized for only important (over $10,000) pieces of work where the cost cannot be ascertained in a less expensive manner or where a large amount of our labor is used to construct a capital asset.

* Approval of this project does not constitute approval of purchasing capital equipment. A capital

9/15 gave original to → Harry Mann

digital INTEROFFICE MEMORANDUM

DATE: August 30, 1967

SUBJECT: "Digital" Sign on Building 12

TO: Jim Jordan

FROM: Alan Kotok

cc: Al Hanson
K.H. Olsen

Since I discussed this matter with you several weeks ago, the third light bulb has burned out, hence the sign is now not illuminated at all. Maybe this is a good thing.

That sign is somewhat of a disgrace, but if we must have that sign, couldn't we illuminate it with fluorescent lights? And if we must have incandescent lights, couldn't we keep them in working order. They are rarely all working.

mlc

digital INTEROFFICE MEMORANDUM

DATE: August 29, 1967

SUBJECT: GUNNER von FEILITZEN's LETTER OF AUGUST 11th.

TO: Ken Olsen FROM: Jack Shields

cc: Ted Johnson

I would like to clarify some of the points made in Gunner's letter as I think he has been given some erroneous information.

1. The ASR-35 Teleprinters have been modified and to my knowledge they are presently working.

2. The ASR-33 Teleprinters are failing with AGA's statistical program, as do all ASR-33 Teleprinters. Walter MacKenzie is presently investigating a modification to solve this problem.

3. The DECtape compatibility problem is outstanding.

4. For the past four weeks, we have had Andrew Allison living with the problems at AGA so we can try to resolve the outstanding hardware problems, as well as the communication difficulties.

5. Our service staff in Sweden at this time is Sven-Olof Martin, Ron Clarke and Jerry Fraser (two days a week from Norway).

   We have also hired two senior engineers to further compliment the Swedish service staff.

6. We are still having quite a bit of difficulty getting AGA to tell us what the problems are so we can resolve them. A recent example of this is that there was an 8/S down for five days (which they had been working on) before they notified us. von Feilitzen knew about the problem before we did.

7. Mr. Svedberg (AGA Field Service Manager) visited the West Coast in July. Prior to his visit, I had talked with Jim McPherson and our West Coast field organization about the AGA installation in Oakland and AGA's concern about service. We arranged for two of our people to meet with Svedberg to (a) demonstrate our interest and concern, and (b) map out a program for providing service in Oakland.

I don't know how Gunner was given the impression that we could not promise rapid service since this question was never raised in California. The only things Svedberg asked were a few technical questions which Berkeley Scientific could not answer, and what the power requirements, etc. were for installation.

I hope that Bill Newell's attention to these problems and periodic meetings with von Feilitzen will help him realize he is being protected from the real problems and that DEC is doing all that it can toward making this a successful venture.

JJS:ned

R. Olsen

digital INTEROFFICE MEMORANDUM

DATE: August 29, 1967

SUBJECT: PDP 9 Problem Meeting

TO: SEE DISTRIBUTION LIST FROM: D. Knoll

A meeting was held Monday morning to discuss PDP 9 production. The basic problem was stated as 9's aren't shipping fast enough. A list of specific problems was then generated and responsibilities for investigation and solution were assigned as listed below:

Problem	Responsibility
1. B213 - Nonsymetrical and sensitive to glitches.	D. Vonada
2. EAE Margins - Takes an excess amount of time to achieve the specified margins. B113 may be the answer.	D. Vonada
3. Memory strobe and clear timing changes with temperature.	D. Vonada
4. S202 too sensitive to noise.	D. Best
5. R302 high failure rate (R. Dieter to gather specific data)	D. Vonada
6. API Problem - latest modification has not yet been proven (hardware and diagnostic)	D. Vonada
7. New Memory and DM09 cables - Currently pre-release status) Problem is to get them built.	J. Smith
8. Unreleased memory options may create additional changes. Memory protect seems to be the most critical. D. Vonada will expedite the release.	D. Vonada
9. G219 modules with "hot" cans. A previous change whose implementation needs to be expedited.	E. Harwood

		Responsibility
10.	B169 - Investigate implementation of previous changes.	D. Vonada
11.	DEC 1008 XSTR - reports of leads becoming loose in the can. Jack Shields will provide some rejects to Bob Hughes.	B. Hughes
12.	Diagnostics - Marvin Horovitz and D. Vonada will generate a schedule of hardware and diagnostic availability. Critical diagnostics are memory protect, external memory control and address, basic exercisers and the API.	M. Horovitz
13.	Diagnostic programs for A/D equipment. It seems to be presently not possible to have one generalized diagnostic for A/D options. Roger Gagne and Don Zereski are working on this problem for future products. Don't know how serious this problem is on the 9. No action taken.	
14.	SCR control on the punch arcing. ?whether previous fix has gone in.	E. Harwood
15.	709 power supply poor workmanship (?) Are protective screens being installed?	J. Smith

Conclusions

Some of these problems have recent solutions which haven't been implemented. Each problem will be investigated and solved by the person assigned. Don Vonada will seek help as necessary from any of the meeting attendees and from Dick Sogge who returns Wednesday, August 30.

Those assigned to problems above will meet again Wednesday, August 30 at 1 P. M. in P. Kaufmann's office to report progress. At this time I would appreciate a brief written note on each problem, its solution, and when the solution was/will be implemented. I will combine these into notes which will be sent to those receiving this memo.

D. C. Knoll

jb

DISTRIBUTION LIST

x Don Vonada
x E. Harwood
x J. Smith
x B. Dill
x M. Ford
x M.Horovitz
x J. Jones
x J. Shields
x D. Zereski
x D. Best
x L. Seligman
D. Sogge
B. Long
R. Dieter

cc: Operations Committee

x Attendees

dec INTEROFFICE MEMORANDUM

DATE August 25, 1967

SUBJECT

TO Ken Olsen
c.c. Tom Giannetti

FROM Dave Denniston

Vince Grande at Airborne indicated that Dick Close may be contacting you shortly with regard to our future plans for I.C. machines. Our only comments have been that we have never been known to sit around and let the world catch up with us. Please let us know of any significant conversations you may have, since Vince Grande especially enjoys "salesmen sandwiches".

cb

Ken Olsen

Copies to Ken Olsen
Bob Savell

digital INTEROFFICE MEMORANDUM

DATE: August 25, 1967

SUBJECT: Joss Typewriter (IBM Selectric)

TO: Win Hindle FROM: Don Busiek

I talked to Rand's technician, one Art Lucero, today about the reliability of Joss typewriters. He personally doesn't keep MTBF data, but reckons a heavily used typewriter breaks down about once a week. His troubles are varied with the exception of dropping spaces and typing out wrong characters. Since these problems are likely to be intermittent, and therefore difficult to fix, he may have several calls before he actually finds the correct fix.

The typewriters are under contract with IBM for which IBM does what they call an 09 or cleaning and oiling three times a year. Rand usually calls in the IBM technician about once per week to fix problems they cannot fix. Art thinks that approximately half (or 15) of the typewriters are used heavily.

DB:ac

digital INTEROFFICE MEMORANDUM

DATE: August 25, 1967

SUBJECT: DEC in the educational field
RE: Your memo of August 22

TO: Ken Olsen

FROM: Joan Fine

I am working for Mike Ford on educational applications of DEC Computers (primarily the 8 and 8/S as single units and as satellites). I have been fielding inquiries from salesmen and educators as to applications and federal grants, organizing a Decus educational subgroup, and developing contacts with primary educators in universities and government. I am currently writing an educational applications section of a flyer for the advertising department. I have developed a central file on education which includes such categories as educational research being conducted at universities, competition, proceedings from computers-in-education workshops and meetings, communications with users, curriculum planning and details on federal grants. I have been assisting the sales department at meetings with perspective customers from the field of education by bridging the communications gap between computer people and educators; I am a former teacher and speak the language of both.

I plan to continue to coordinate and implement a marketing strategy in education, and to this end will communicate regularly with Bob Collings, Bill Landis, and Howie Painter. I have meetings scheduled with educators to keep up with developments in the field. I plan to work closely with sales, especially in this hand-holding stage of the market. Finally, I plan to accumulate and generate ideas on what DEC can supply the educational market (elementary, secondary, colleges and universities) and how best to present it.

Joan Fine

digital INTEROFFICE MEMORANDUM

DATE: August 24, 1967

SUBJECT: Automatic Wire-Wrap Checker

TO: Ken Olsen

FROM: Ed Harwood

cc: P. Kaufmann
B. Collings

We conducted a one month study to determine the percentage of wire errors to be expected and the probable causes. The computers we studied were the PDP-9 and PDP-8S.

Results showed the PDP-9's had an average of 55 errors and the 8S an average of 10. Approximately 10% of the errors in the 9 and 50% of the errors in the 8S were repetitive which meant we could eliminate them. These errors were due for the most part to mistakes in block schematics, errors by card punch operator and errors in the program. Although the repetitive errors can be eliminated; they must, however, be expected during the first 6 - 9 months of the new computer production run.

Once the repetitive errors are eliminated, we are left with a .25% error rate on the 9's and 8S's.

Two of the reasons for these errors are card reader misreads and bent pins which cannot be wired and are later repaired by hand. Although the hand wraps are a different color and are easily checked, we do not know if any wires were omitted during repair.

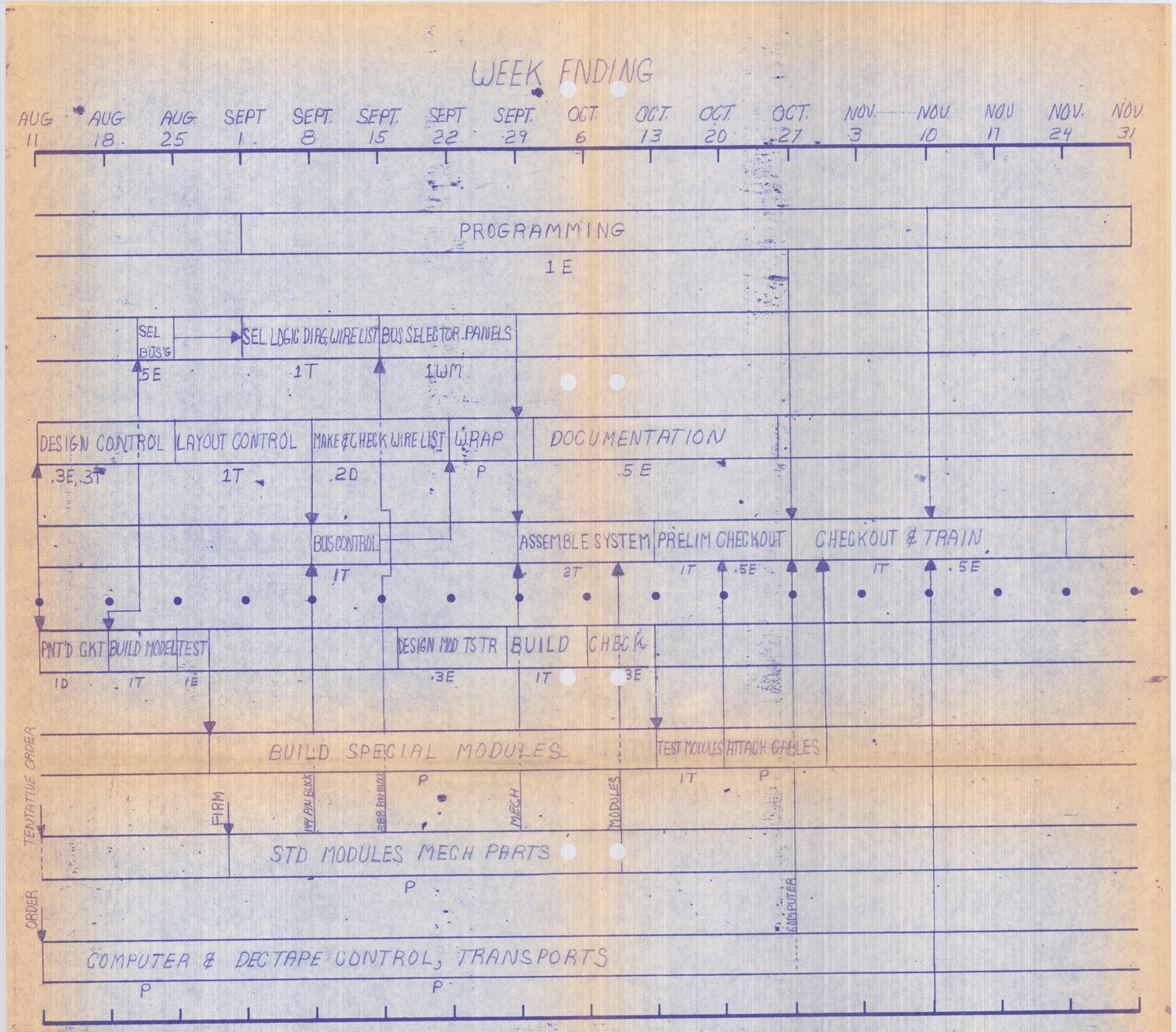
Once the panels come back we do a considerable amount of twisted pair wiring and routine modifications. These also are done in different colors but here again the missing wires are not easily detected.

We have compared the costs between no checking (find trouble on check-out floor) light board check, and auto-check and found the no-check the most expensive. Although the light board test provides the greatest return on investment, it would require six girls on two shifts for just the 8I. The auto-check would need only one girl and would be utilized only 44% of capacity so it could also handle the PDP-10.

The PDP-8I will be using new blocks, new pins, smaller wire and a new wire-wrap program, therefore the initial error rate will be at least double that of the 9 and 8S. We must get these errors out of the frame before it goes into test and the auto-check method is the way to go.

Enclosed is a copy of the schedule. Don White will do the review and the first one should be scheduled for September 22nd. (Don will be on vacation the first two weeks in September.)

EH:ps



AUTOMATIC WIRING TESTER SCHEDULE

Project

By DON WHITE

Revision Date

Check Point Table

RB 6/27/66

Ken Olsen

digital INTEROFFICE MEMORANDUM

DATE: August 22, 1967

SUBJECT: Cost Center Charges for Payroll

TO: Operations Committee FROM: Harry S. Mann

Considerable progress has been made over the past year in budgeting and identifying costs by Cost Center number. I am convinced that this progress has gone a long way towards improving the reliability of our financial reports. I do not mean to suggest that the job is now completed or in any shape, manner, or form perfect but it is well along the way.

One area that we do continue to experience trouble in relates to the hiring and transferring of people. The rules under which we have been working were agreed to by the Operations Committee some 12 months ago but I think need to be restated again.

The simple rule is that no one may hire someone and charge them to any cost center but to the one that he is supervising. Likewise, no one can transfer a person to another cost center without the signed approval of the receiving cost center manager. Finally, no charges for time spent by a member of one cost center can be recognized on the cost center of another manager. We believe that it is important to reinforce our efforts in this area because it makes for a strong feeling of responsibility for costs by a cost center manager, if he knows that he is personally responsible for all of the charges that appear on his statement.

The foregoing does not, however, restrict us in respect to charges to various product lines. This, of course, is done through the weekly time reports which, I believe, provide the flexibility that we need for the type of operation that we have.

HSM/ml

Ken Olsen

digital INTEROFFICE MEMORANDUM

DATE: August 21, 1967

SUBJECT: Inventory in Branch Offices and Subsidiaries

TO: Operations Committee FROM: Harry S. Mann

It has recently come to my attention that we are stocking 8/S's in practically every field office in the country. The indication of this appeared recently also in the Sales Newsletter. At the same time, there have been several random comments about the need for establishing more inventories of finished items in the subsidiary operations. Both of these moves involve cash planning and I feel should be discussed at some length by the Operations Committee.

In planning our cash requirements, we assume that the existing policy would not change. By the existing policy I mean that no subsidiary would be permitted to order equipment except as they had an order from a customer and that these would be so designated on the paperwork received here. If indeed we plan to make such a basic change, I feel that it should be aired at the Operations Committee and that the Sales Manager and Group Managers should prepare estimates of how much money will be typed up in this process and what additional sales volume and profit would result from such a change.

HSM/ml

P.S. to Ken Olsen - I would suggest that this be put on the agenda of our next Operations Committee meeting.

Ken Olsen

digital INTEROFFICE MEMORANDUM

DATE: August 21, 1967

SUBJECT: SOLUTION TO ASR-35 PROBLEMS

TO: Executive Committee
Al Alexanian
PDP-8 Marketing Group
Sales Newsletter

FROM: Mike Ford

Thanks to the hard work of several Field Service men and Dick Best, a suitable mod has been devised that completely fixes the ASR-35 operating with a PDP-8. The mod has been thoroughly tested and, as of this date, the ASR-35 may be considered a standard option for the PDP-8, operating reliably as a tape reader, tape punch and keyboard printer.

There are many ASR-35 customers in the field who will want their ASR-35 modified. The DEC position on this is that the mod will be implemented in all customer's machines at no charge according to a schedule to be determined by Field Service. There are over 100 ASR-35's in the field and Regional and District Field Service men must be trained in the implementation of the mod and proper maintenance of the ASR-35. Concurrent with this training process, Field Service will begin implementing this mod in the field according to a planned schedule. Details of this schedule should be sought from Jack Shields.

eem

digital INTEROFFICE MEMORANDUM

DATE: August 18, 1967

SUBJECT: MY ROLE IN RESEARCHING THE EDUCATION MARKET

TO: Mike Ford

FROM: John Holzer

cc: Nick Mazzarese
Stan Olsen
Ken Olsen

Several weeks ago I was given a commission to investigate the Education Market and what the Company should do about it. I am to make a rather broad-brush inquiry as described by my plan-of-attack on page 2 of this memo.

Since you, as a clever, quick-moving, alert manager, already have Joan Fine, Rick Merrill and Bill Landis attacking the Education Market, it is essential for you and I to "liase" well. I hope that you will use me as a resource.

I would certainly appreciate your critique of my plan-of-attack and advice on how I should proceed.

Plan-of-Attack for a Study of the Educational Market for Computers

As an alert profit-seeker in the vanguard of innovators DEC undertakes a broad, reality-structuring inquiry about the Educational Market for computers.

I. The Study as an Action-Enabler

We require that research of the Education Market will help us answer three action-oriented questions:

A. What are the immediate opportunities for DEC to increase sales to the Education Market?

Using existing software and hardware and possibly easily-developed supplementary materials.

B. What are opportunities for DEC to increase sales from six months to two years out?

Using existing or schedule-fixed hardware, and to-be-developed software, supplementary materials and training courses.

C. What are opportunities for DEC to increase sales from 1969 into the distant future?

Using to-be-developed hardware, software, supplementary materials, and training courses.

II. Questions Addressed to the Environment

A. What is the nature of our present romance with the Educational Market?

1. What applications?
   a. Any customer developed software or educational materials already?
   b. Any customer interested in developing these for fee?
2. Which DEC computers? How many?
3. Who is our competition in the applications we already have? What are the relative merits of our product and the competitors' in educational applications?
4. What are effective selling techniques and typical problems for closing the sale in an educational application?
5. Which salesmen (and regions) sell educational applications and which ones do not? Why?

B. How is the Educational Market best categorized?

Is the following breakdown a reasonable and exhaustive one?

Computers for

1. Computer-aided instruction (CAI)
2. Computer-extended instruction (CEI)
   ie. instruction in math or physics using a computer as a motivating tool; result: more reinforced, hence more permanent learning.
3. Academic research
4. Centralized libraries
5. Educational administration

DEC now thinks in terms of the "biomedical" market or the "physics" market rather than the "academic research" market. The Corporation is a big stick wielder in this market, however it is conceptualized and has able, bright minds probing it. Accordingly, the present study will devote only surface attention to the academic research segment of the educational market.

C. About the segments of the Educational Market:
   1. What will be the likely size of each segment as a function of time by
      a. college?
      b. junior college?
      c. high school (public or private)?
      d. elementary school (public or private)?
      e. vocational schools, Job Corps, "Computer Institute"...?
   2. What kinds of software, supplementary materials, services and hardware are appropriate to each segment?

D. What actions are present or potential competitors taking to squeeze profits from the Educational Market?
   1. What segments of the Educational Market is each major factor attacking?
   2. What special marketing techniques are being used? Which are most effective?
   3. What is the nature of present hardware and software development projecrs for the Educational Market? Which are the most effective?
   4. How have fellow combatants constructed a sub-organization to handle EM? What seems to be particularly effective? Why?
   5. What magnitude of profits and returns on investment are being made and are contemplated?
   6. What are the notable successes and dreary failures made in the Educational Market? Why? Lessons?

E. What influence will Federal, state and local governments exert on the Educational Market?
   1. Estimated dollar aid by beneficiary?
   2. Strings on schools?
   3. Profit-ceiling, renegotiation problems?

F. To what extent do teachers and administrators (especially in primary and secondary schools) lack concepts and intellectual depth to effectively use computers as an educational tool?

How widespread is the fear of computers?

III. Methodology of the Initial Phases of the Information Quest

A. Develop a bibliography by using the Harvard and M.I.T. libraries

B. Set up an organized file of collected data.

C. Interview people in our marketing, sales, advertising, and programming groups to uncover random ideas and identify DEC's Educational Market applications.

D. Identify universities who are engaging in research of educational uses of computers and chat with them.

Who are key contacts? Start at M.I.T., Harvard Masters in Arts and Teaching and then branch.

E. Construct a list of individuals who know what the competition is doing in Educational Marketing and try to interview them.

F. Talk to our customers who have developed Educational Market applications.

G. Converse with administrators in progressive schools, with the N. E. A., and with teachers who have operated a Computer Assisted Instruction class.

CONFIDENTIAL

digital INTEROFFICE MEMORANDUM

DATE: 18 August 1967

SUBJECT: Data Trends and Their Contract with ITT.

TO: Ken Olsen FROM: Dave Cotton

CC: Stan Olsen
Ted Johnson
John Jones
Dave Denniston

On Thursday, August 17th, we shipped the second PDP-9 system, without magnetic tapes and control, to Bob Hughes at Data Trends. At that time, it was 17 days late.

During the time that we were trying to complete check-out, we were constantly queried by Data Trends as to when we planned to ship the system. In addition to the numerous messages you received, I was called daily by their comptroller, and on the morning of August 17th, Bill Congleton was contacted by Bob Hughes.

Since Data Trends is not scheduled to deliver completed systems to ITT until Fall, 1968, their apparent panic over a two-week slippage was quite surprising. However, during the past week, I have gained a great amount of information about Data Trend's contract with ITT, and this information has led me to conclude that Data Trends is heading for serious trouble. In order to prevent Digital from becoming the scapegoat for Data Trends, Dave Denniston and I have initiated several steps to both assist Data Trends and protect us.

On Monday, August 14, I was visited by three gentlemen from ITT World Communications who are charged with monitoring their contract with Data Trends. Their visit was prompted by an independent interest in PDP-9s for testing and their inability to obtain sufficient information from Data Trends, but the results of our discussions were both extremely enlightening and a bit frightening. As a result, I asked them to visit Dave Denniston and bring him into the picture; this they did on August 17th.

The pieces of information that they imparted to both of us are as follows:

1. Data Trends has received a contract from ITT to supply a completely-redundant message-switching system for 1500 lines by Fall, 1968. The contract contains sufficient penalty clauses to put Data Trends out of business if they default, and the ITT monitors are worried that they will default.

2. The systems, which are currently configured with two 24K PDP-9s and two 16K PDP-9s (with each alike pair tied together via interprocessor buffers), are expected to run 24 hours per day, 365 days per year. The two different pairs are supposed to spend a fair proportion of their time checking themselves and each other via on-line diagnostics capable of detecting and diagnosing faults to the individual card level in real time. The systems will be maintained on a continuous basis, with the complete redundancy allowing the repair of a faulty component of the system without down-time.

3. A major portion of the contract is for software - for the main program, for operating systems, and for the on-line diagnostics. In spite of this, Data Trends has no great software strength, and they are particularly unskilled and uneducated in writing any form of diagnostic programs.

4. They have chosen to use two PDP-9s in a task that seems more suited for PDP-10s. In front of one pair of PDP-9s will be a multiplexer built by Data Trends, to switch the 1500 incoming lines and assemble, bit-by-bit, the characters of the incoming messages. As currently envisioned, this multiplexer will assemble characters in the core memories of the 24K PDP-9s. It will be interfaced to the PDP-9s through the direct memory access channel multiplexer adapters, and it will steal two PDP-9 cycles per bit received and assembled. This means that, for 1500 lines operating at top speed, the simple assembly of bits into characters will use 15-20 percent of the central processor time. If they had chosen a dual processor PDP-10 system with several independent 8K core stacks, no central processor time would have been lost by the character assembly time, and no time would be required for communication between central processors.

5. Data Trends has shown an unhealthy ignorance of the capabilities (and limitations) of our hardware. Among the things they are doing or contemplating are:

   a. Ordering drums directly from Vermont Research, instead of through us, yet blythely assuming that our software and

diagnostics will run on these drums and that we will give them the necessary packages. As near as both we and ITT can ascertain, neither Data Trends nor Vermont Research has bothered to check if the drums and their interfaces are compatible with ours.

b. Switching the magnetic tape control from the PDP-9 data channel (3-cycle data break) to the direct memory access channel (1-cycle break). Since the former needs no external word count or current address registers, our control does not supply them, so Data Trends will have to seriously rebuild our Type TC59 control.

c. Training the ITT maintenance personnel in the operation and maintenance of the entire system in 3-6 weeks, in spite of the fact that they have never taken our maintenance course and do not know how to maintain the PDP-9 they received in April.

As a result of our independent discussions with ITT and several of our telephone discussions, Dave Denniston and I agreed upon the following course of action:

1. Commencing immediately, Dave will assume full account responsibility for the Data Trends' account and will provide the same amount of information to ITT as would be offered to any customer or potential customer.

2. Shortly, ITT will sit down with Data Trends for a line-by-line discussion of their contract and how Data Trends intends to fulfill it. Dave Denniston and I have offered to be present, if ITT desires us to be so and Data Trends agrees, to indicate any places where Data Trends' plans fall outside the scope of the hardware we supply. We expect ITT to accept our offer.

3. Dave Denniston will encourage Data Trends to purchase independent core stacks, to interface them to their multiplexer, and to use them for the character assembly. This will free up to central processor time of the PDP-9s by 15-20%; allowing a greater chance for the completion of all tasks at peak load and some room for future system expansion. ITT favors this and has indicated that it might be willing to expand the contract to pay for this approach.

4. We will offer limited (2-3 days) consulting help on the design and implementation of the diagnostic programming and considerably more help on the systems programming. The former will be provided by our diagnostic programming group, while the latter will come from field salesmen and the regional software specialist.

5. Dave Denniston will discourage the use of our drum software (and not offer to provide it, since Data Trends is not entitled to it), and he will also severely discourage the moving of the magnetic tape system from the data channel to direct memory-access. In all other engineering matters, he will provide as much help as possible.

6. I will ask ITT if it is feasible to extend the due date of the contract (as I believe they are inclined to do), at least as long a period of time as the longest delay in our delivery to Data Trends. Although ITT does not believe we have delayed Data Trends and that any possible defaults will be caused by their lack of understanding of the software task, they seem inclined to grant Data Trends reasonable extensions if they will mean a better chance of success. I think that it is important that we remove any chance for Bob Hughes to lay the blame for any possible default at our feet. In addition, since we believe that it is more important to assist Data Trends in any reasonable manner possible so as to minimize their chances of failing, Dave Denniston and I will continue to keep abreast of the situation and will offer help when necessary and feasible.

We would both be happy to discuss this situation with you at your own convenience. In addition, we would welcome any assistance and suggestions you might care to offer.

Dave Cotton

digital INTEROFFICE MEMORANDUM

DATE: August 14, 1967

SUBJECT: My Toy Project, a Plan-of-Attack

TO: Stan Olsen
Ken Olsen

FROM: John Holzer

As you are aware, I would like to learn a bit about the education market--for my fun (assuredly) and your profit (hopefully). The projects to which I have been exposed thus far have not concerned our products or the marketplace. Therefore, I believe that a research project on the education market for computers would greatly promote my personal development.

On the succeeding pages you will find my proposal for a research study into the education market for computers. I would appreciate any of your suggestions, comments, criticisms, witticisms on the proposal. Unless you desire otherwise, I will proceed at once using the Jimmy Brown approach: open your own holes in the line. No formal commissioning rite seems necessary except for your go-ahead.

Plan-of-Attack for a Study of the Educational Market for Computers

As an alert profit-seeker in the vanguard of innovators DEC undertakes a broad, reality-structuring inquiry about the Educational Market for computers.

I. The Study as an Action-Enabler

We require that research of the Education Market will help us answer three action-oriented questions:

A. What are the immediate opportunities for DEC to increase sales to the Education Market?

Using existing software and hardware and possibly easily-developed supplementary materials.

B. What are opportunities for DEC to increase sales from six months to two years out?

Using existing or schedule-fixed hardware, and to-be-developed software, supplementary materials and training courses.

C. What are opportunities for DEC to increase sales from 1969 into the distant future?

Using to-be-developed hardware, software, supplementary materials, and training courses.

II. Questions Addressed to the Environment

A. What is the nature of our present romance with the Educational Market?

1. What applications?
   a. Any customer developed software or educational materials already?
   b. Any customer interested in developing these for fee?
2. Which DEC computers? How many?
3. Who is our competition in the applications we already have? What are the relative merits of our product and the competitors' in educational applications?
4. What are effective selling techniques and typical problems for closing the sale in an educational application?
5. Which salesmen (and regions) sell educational applications and which ones do not? Why?

B. How is the Educational Market best categorized?

Is the following breakdown a reasonable and exhaustive one?

Computers for

1. Computer-aided instruction (CAI)
2. Computer-extended instruction (CEI)
   ie. instruction in math or physics using a computer as a motivating tool; result: more reinforced, hence more permanent learning.
3. Academic research
4. Centralized libraries
5. Educational administration

DEC now thinks in terms of the "biomedical" market or the "physics" market rather than the "academic research" market. The Corporation is a big stick wielder in this market, however it is conceptualized and has able, bright minds probing it. Accordingly, the present study will devote only surface attention to the academic research segment of the educational market.

C. About the segments of the Educational Market:
   1. What will be the likely size of each segment as a function of time by
      a. college?
      b. junior college?
      c. high school (public or private)?
      d. elementary school (public or private)?
      e. vocational schools, Job Corps, "Computer Institute"...?

   2. What kinds of software, supplementary materials, services and hardware are appropriate to each segment?

D. What actions are present or potential competitors taking to squeeze profits from the Educational Market?
   1. What segments of the Educational Market is each major factor attacking?
   2. What special marketing techniques are being used? Which are most effective?
   3. What is the nature of present hardware and software development projecrs for the Educational Market? Which are the most effective?
   4. How have fellow combatants constructed a sub-organization to handle EM? What seems to be particularly effective? Why?
   5. What magnitude of profits and returns on investment are being made and are contemplated?
   6. What are the notable successes and dreary failures made in the Educational Market? Why? Lessons?

E. What influence will Federal, state and local governments exert on the Educational Market?
   1. Estimated dollar aid by beneficiary?
   2. Strings on schools?
   3. Profit-ceiling, renegotiation problems?

F. To what extent do teachers and administrators (especially in primary and secondary schools) lack concepts and intellectual depth to effectively use computers as an educational tool?

How widespread is the fear of computers?

III. Methodology of the Initial Phases of the Information Quest

A. Develop a bibliography by using the Harvard and M.I.T. libraries

B. Set up an organized file of collected data.

C. Interview people in our marketing, sales, advertising, and programming groups to uncover random ideas and identify DEC's Educational Market applications.

D. Identify universities who are engaging in research of educational uses of computers and chat with them.

Who are key contacts? Start at M.I.T., Harvard Masters in Arts and Teaching and then branch.

E. Construct a list of individuals who know what the competition is doing in Educational Marketing and try to interview them.

F. Talk to our customers who have developed Educational Market applications.

G. Converse with administrators in progressive schools, with the N. E. A., and with teachers who have operated a Computer Assisted Instruction class.

digital INTEROFFICE MEMORANDUM

DATE: August 11, 1967

SUBJECT: Edmar Instrument Corp.

TO: Ken Olsen

FROM: Harry S. Mann
CC: Bob Savell

Bob Savell advises that you may be interested in making a financial arrangement with Edmar.

I would urge that any such arrangement be either the acquisition of the entire company or at least a controlling interest. Holding a minority interest or simply loaning them money would not be very satisfactory from our viewpoint.

If you would like me to handle any negotiations on this, I would be happy to undertake same.

HSM/ml

I don't know who Edmar is.

digital INTEROFFICE MEMORANDUM

DATE: August 11, 1967

SUBJECT: Answering Customers' Telephone Inquiries

TO: Ken Olsen
cc: Nick Mazzarese
Ted Johnson

FROM: Ron Smart

The phone call from Technicon on Wednesday has opened up three potential trouble spots which I would like to fill you in on a little.

1. Transferring Incoming Customer Calls.

This has been a serious problem and we have been working to improve it by firstly establishing the In-House Sales Dept. (Ron Wilson) and now, by establishing a Central Order Desk (operated by the Sales Dept.).

Already the telephonist has a much better chance of getting a satisfactory connection the first time, because the In-House Sales Dept. accepts all vague requests as well as "Sales Dept." calls and generally can deal with them without a transfer.

Some transfers seem inevitable at present, because the In-House Sales Dept. overloads and the customer will then potentially get better service by being transferred. The probability of having to be transferred is in decreasing order for people wanting: a. module price/delivery quotes, b. module order status, c. computer order status. The latter two are intended to be sent directly to the order processing areas by the switchboard of course.

Later, the Central Order Desk will receive all order status inquiries regardless of product. This will be another big step forward.

2. Providing Order Status Delivery Information.

We have had great difficulty establishing reliable order status information, however, the position is now greatly improved and continues to improve. Given the availability

of this better information, the (sales oriented) Central Order Desk will co-ordinate the information from the different product groups and be in a position to answer most order status inquiries directly. Meanwhile the order processing groups are trying hard to give good service on inquiries and being generally successful, as far as I can judge.

The status of orders which are in the final stages, generally cannot be maintained up to date in the order processing area and someone has to physically check the equipment to establish status. This was the case with Technicon's shipment. Precise information in such cases necessitates a call back to the customer (as was done for Technicon, independently of their phone call to you).

3. Difficult Customers.

I do not know who called you, but the call was probably at least inspired by Harry Gould, Technicon's programmer. You should know that I have had complaints about him from a great many DEC people (mainly secretaries and field service people). He has been very objectionable and unreasonably demanding, especially on our free services, usually combined with threats to call "Ken Olsen." Perhaps, now he has done it! There may one day be a good case for calling his president. I understand there are other president callers, for example the two expediters, Pike at Mitre Corp. and Bob Owens at EGG. Is there someway we can help you deal with these?

Ron

jk

digital INTEROFFICE MEMORANDUM

DATE: August 10, 1967

SUBJECT: OHIO UNIVERSITY

TO: Ken Olsen

FROM: Ted Johnson

I just learned that we lost a sale of a PDP-8 to SCC. They responded to a request for quote for a PDP-8 which included an AFO1 multiplexer type interface. The man who bought is Dr. Klock. They have not had delivery yet and might be having problems. If you have a chance to talk to Vern Alden, you might mention this. The risks from SCC are obvious, they have minimal software. They bought on the basis of instruction set and I think they are probably making a mistake. It would be nice if we could convert the sale back to a PDP-8.

mr

to Ken Like

digital INTEROFFICE MEMORANDUM

DATE: August 9, 1967

SUBJECT: Automatic Wiring Tester

TO: Bob Ames FROM: Don White

Cost of equipment:

PDP-8, Cab mounted	$7250.00
TC-Ø1 Dectape control	$2000.00
2 TU-55 Dectape transports	$1800.00
Total, std. parts	$11050.00
I/O Box, including selectors	$13146.13
Total, overall	$24196.13

These figures are manufacturing costs, and do not include labor. They cover the entire tester up to, but not including, the terminations at the ends of the ribbon cables connecting the tester to the back panel under test. No mechanical fixtures are included.

Breakdown of I/O Box costs:

320	G952 Pin Selector Modules	$9600.00
40	H800W 144-pin connectors	97.60
80	H803 288-pin connectors	318.00
3	PDP-9 Logic Frames	375.00
3	PDP-9 Fan and Margin Panels	423.75
1	PDP-9 Cabinet, 30-inch	145.00
	End panels, doors	400.00
14	R203 Modules	111.02
6	W103 Modules	89.04
2	W800 Modules	29.46
12	R151 Modules	101.40
1	W520 Module	8.08
51	R111 Modules	224.91
6	R303 Modules	98.22
6	R603 Modules	52.38
13	W005 Modules	57.72
2	709 Power Supply	360.40

1	841A Power Control	$60.88
5	PDP-8 I/O Cables (W011C-72C-W011C)	40.00
	Indicators, drivers, control panel	300.00
		$13146.13

digital INTEROFFICE MEMORANDUM

DATE: August 9, 1967

SUBJECT: G952 Cost Estimate

TO: Ed Harwood
Bob Ames

FROM: Don White

Etched Board			2.00	
Transistors				
36-DEC 6534	.20+.05*	9.00		
4- DEC 3639	.25+.05*	1.20		
2- DEC 3009	.25+.05*	.60		
			10.80	
Diodes				
8- D662	.12+.015*	1.08		
88-D664	.09+.015*	9.24		
			10.32	
Resistors				
85-¼W CC	.03+.015*		3.83	
				$26.95
Test				1.50
Lugs, Ribbon Cable				1.50
				$29.95

The G952 is the pin selector module for the Automatic Wiring Tester.

* INSERTION COST

D. White
7/14/67

PROGRAMMING NOTES FOR AUTOMATIC WIRING TESTER

Approach:

Read Run into memory (from paper tape at first, later from disc). Connect sender to first pin in Run, receiver to second, third, etc. and check for continuity. As receiver pins are determined, place a "1" in the corresponding memory bit in a check off box. There must be a bit in the box for each pin on the panel under test. (Hence "box" contains 1060_{10} words.) At the completion of Run continuity tests, search for the first zero in the box. Test for absence of connection between this pin and all others represented by zeros. This test may be speeded considerably by selecting entire modules (LRP with Bit $\emptyset$ = 1). Then if a connection is found, the individual pins may be searched.

Little Subroutine Suggestions:

```
        Loading & Testing
          .
          .
        TAD SR
        LSR             /Load up the tester
          .
        TAD SC
        LSC
          .
        TAD SP
        LSP
          .
```

```
        etc.
        to
        LSR             /ACO = 0
        ION
        STB
        JMP .-1         /Wait for voltages to settle
        IOF
        CLL
        SCC
        STL             /Link indicates open or short
        .               /Now we can check what we should have
        .
        .

Interrupt:
0/      0
1/      JMP INTER
INTER/  DCA ACSV        /Save AC in case several interrupts
        SLT             /(Perhaps link also)
        JMP INTRPT      /Go to rest of interrupt sequence
        SHC
        HLT             /Interrupt should not have occurred.  This
                         perhaps is another interrupt.
        JMP TEXTOUT     /Text tells operator to place relay probe on
        HLT V CLA       /pin which machine just tried to select,
        IAD ACSV        /then press continue to restore testing.
        ION
        JMP I Ø
```

A second program which should be written is a Tester Program. Select same Sender, Receiver addresses. Shorts should always come up. Select Sender Address, any other address, look for open circuit.

D. White
7/14/67

AUTOMATIC WIRING TESTER - DESCRIPTION OF IOT'S

IOT	MNEMONIC	DESCRIPTION
6306	LSR	Load Sender Row Address Register with bits 8 - 11 of AC, and initiate "Tester Busy" delay.
6316	LSC	Load Sender Column Address Register with bits 6 - 11 of AC, and initiate "Tester Busy" delay.
6326	LSP	Load Sender Pin Address Register with bits 6 - 11 of AC, and initiate "Tester Busy" delay.
6336	LRR	Load Receiver Row Address Register with bits 8 - 11 of AC, and initiate "Tester Busy" delay.
6346	LRC	Load Receiver Column Address Register with bits 6 - 11 of AC, and initiate "Tester Busy" delay.
6356	LRP	Load Receiver Pin Address Register with bits 6 - 11 of AC, and initiate "Tester Busy" delay, in addition, bit 0 of AC controls pin/module flip-flop. If bit 0 is A0, individual pins are tested. If bit 0 is A1, all 36 pins of the module are tested simultaneously, and the results "OR"ed together. If bit 0 = 1, Receiver Pin Address is loaded, but ignored.
6301	STB	Skip on Tester Busy = 0. "Tester Busy" is a system of integrating single-shots. These delays are pulsed each time an IOT causing address changes is issued, or each time a relay is operated if "Tester Busy" = 0, the measuring circuit has stablized. See IOT 6311.

6311	SCC	Skip on Closed Circuit. This IOT senses the state of the logic pins being tested. All other pins are floating.
6321	SHC	Skip on High Current, flag set, Clr flag. High Current in the sender bus is sensed by a current monitor. If current is too great, a relay is automatically substituted if available. Relays are permanently tied to the power busses, and an extra relay is available and brought to a special probe. When power relays are used, the length of the "Tester Busy" flag is automatically changed. If a relay is not permanently connected to the pin selected, the high current flag is set, the pin is deselected (to prevent selector burn out) and the "Tester Busy" flag is held set. The tester thus hangs up, but can be recovered by use of interrupt. The use of the special probe relieves the high-current condition, permitting testing to continue.
6321	SLT	Skip on Long Time. The "Long Time" delay is initiated each time a pin is selected. Should the system "Hang Up", this delay will time out and cause an interrupt. SLT allows the programmer to test for the cause of interrupt.

dec INTEROFFICE MEMORANDUM

DATE 8 August 1967

SUBJECT How Nice We Are!

TO Mr. Ken Olsen
Mr. Ted Johnson
Mr. Nick Mazzarese
Mr. Al Alexanian
Mr. Bill Farnham
Mr. Frank Kalwell
Mr. Ken Larsen

FROM joni Jaffe, Denver

I believe this memo is time well stolen from a busy desk. Taking into consideration all of the knocks and bangs we take each and every day the following should give everyone a lift . . .

I called a customer in the Psychology Department at the University of Colorado this morning and he sang the praises of DEC in every key. We are the last outpost in good taste and proper attitude and presentation at the trade shows, we obviously are not only trying to sell our products but we also feel a keen responsibility to our customers, and even to our non-customers. No request nor order is too small to be given our courteous and prompt attention, etc.

On top of all this we offer the most comprehensive line of modules available and our computers are certainly the finest of their kind available.

I'll not mention their opinion of the Denver office for that would then become self praise.

Isn't it nice to know that we are recognized for what we really are . . . and appreciated!

Regards,

joni

digital INTEROFFICE MEMORANDUM

DATE: August 8, 1967

SUBJECT: ENGINEERING EXPENSES

TO: Ken Olsen

FROM: Bob Collings

	1967	1966	1965	1964
Sales	$38.9 M	$22.7 M	$15.0 M	$10.9 M
Research and Engineering Expenses (includes Programming and Drafting)	$ 4.02M	$ 2.60 M	$ 2.27 M	$ 1.81 M
Engineering Expenses as a Percentage of Sales	10.3%	11.5%	15.1%	16.6%

Bob Collings

jeb

digital INTEROFFICE MEMORANDUM

DATE: August 8, 1967

SUBJECT: Jerry Cox

TO: Mort Ruderman

FROM: Gordon Bell

CC: Ken Olsen
Win Hindle

Jerry visited me here and we discussed his programmed console (PC). They are planning to buy 4 more from Spear at $27K each. The price for an equivalent PDP-8 is near this price (or could be if the A-D Multiplexer weren't quite so high). I tried to encourage him to buy the '8 and standardized on it because they'll always be around. He's not quite convinced (as Designer of the Programmed Console (which is near the LINC in order code, etc.)). He said that he'd look into the matter again of whether an '8 could do the job, and possibly give DEC a chance at it.

I think the Washington group is on to a couple of medical applications which will sell multiple (100's) computers, and as such it's imperative to "get that business". I'd almost go so far as to build the PC, but it may be possible to sell him 8's. More than anything he probably wants some recognition. He's get ideas on the simpler tape transport and might undertake the development, and it's possible a package to make the '8 into what he wants could easily be made. It consists of Dataphone interface, keyboard, scope, tape unit, A-D-A converters, and gadget to follow and convert charts. Such a kit might form the PDP-8PC (which would give him the acknowledgement).

I'd sure hate to see Spear PC's used by him when an '8 would do, and I think he could help the '8 by providing the tape, etc. and he likes the idea of having software on the '8.

I recommend that:

1. DEC follow very closely to see if and when the PC's are to be bought.

2. Not let #1 happen.

3. Contract with him for development of PDP-8PC.

4. Loan him a PDP-8 for evaluation or comparison purposes.

Kind

digital INTEROFFICE MEMORANDUM

DATE: August 7, 1967

SUBJECT: WEST GERMAN COMPUTER MARKET (Summary of report by "IFUMA, Institut fur Marktforschumg und Absatzforderund) dated 8/9/66

TO: The Executive Committee FROM: Ted Johnson

1. Annual increase in Germany of computers - 32% versus U.S. (20%), U.K. and France (20% - 22%).

2. World value of installed computers $10 b., 70% American computers.

3. World installations 35,000, U.S. installations, 27,000 (77%).

4. Europe installations, 6,000.

5. Japan installations 1,900.

6. IBM has greater % outside U.S. than in it.

7. Computers/million working population.

U.S.	386
Switzerland	125
Sweden	95
France	59
W. Germany	48
Netherlands	45
Italy	38
Austria	34
England	25
Spain	7

8. Only 150/61,000 IBM WTC employees are American.

9. 1/1966 W. German installations - 2,291 computers, 2,179 on order. Installations projected for 1974-6,000.

10. IBM has 68% of German installations.

11. IBM, R.R. Univac, Siemens, Bull/GE, Zuse - 90% of market.

12. 11/24 competing vendors are U.S.

13. 32.5% of installations and 59.8% on order are under $2,500/mo. rental ($110,000 - purchase price).

14. Computers in Germany

	Installed	On Order
1959	94	75
1960	172	141
1961	308	223
1962	548	268
1963	690	397
1964	1019	738
1965	1657	991
1966	2291	2179

15. Installation by Vendor - total 2,291

CDC	19	Bull/GE	121	Telefunken	21
DEC	7	CAE	3	Zuse	204
Honeywell	14	Electrologica	16	Elliot	3
Univac	251	Eurocomp	68	Ferranti	1
Burroughs	13	SEL *	9	ICT	13
Friden	50	Facit	1	STC	2
IBM	1,370	Monroe Sweden	3		
NCR	26	Regnecentralen	3		
Raytheon	10	Siemens	63		

(*Standard Electric Lorenz)

16. West Germany 1/66 - 2nd only to U.S. in installations.
Japan - 3rd.

17. Total installed or on order 1/66

CAE (SDS) 510	2
CDC 1700	10
PDP-8	12
PDP-7	5
PDP-6	2
PDP-5	1
IBM 1620	83
IBM 1130	78
IBM/360/20	969
IBM 360/30	434
IBM 360/40	103

18. Computer applications as of mid - 67.

43% industrial enterprises.
20% trading, insurance and banking
13% education and research - most of DEC's market in Germany to date.
10% computer service centers
7% government offices
3% utility and mining, etc.

(assuming 4,000 installations now, approximately 600 in our market areas. We probably have 7 - 10% of this market.)

A. As of 1/66, DEC is credited with 0.9% of small computers (larger than CDC - 0.7%) (less than $100,000)

B. As of 1/66, DEC has 0.6% of medium computers ($500K - $1,000) based on 2 - PDP-6's. (CDC bigger here - 1.8%)

19. Chief local competitors in Germany

Siemens - RCA
Siemens
Siemag - Philips
Electrologica - Philips
IBM - Deutschland
Honeywell (Dornigheim, Hanan)

20. Germans are prone to buy complete systems (all peripherals, software, CP) from one vendor.

21. Much stress on service and training.

mr

c- Phil Pockholm 8/14
Joe Sutton

digital INTEROFFICE MEMORANDUM

DATE: August 7, 1967

SUBJECT: TAPE TRANSPORT FOR SMALL COMPUTER FILES

TO: Ken Olsen
cc: Nick Mazzarese
Dick Best

FROM: Gordon Bell

I'm glad to hear that there is finally going to be someone (an engineer and a programmer), assigned at DEC to work on the cheap transport for small computers. We could undoubtedly do it here, if we had a large grant, an awfully lot of time, and a carefully worded statement to render it useless; i.e., we do fundamental research. I hope that it can be made ready for the PDP-8/I. Let's obliterate paper tape from the universe! Here are some thoughts on the data organization of the tape and its use. I assume that a standard stereo, 8 channel (4 pair) audio unit will be used.

Organization of Basic Data On Tape

There are at least two basic data organizations: 1) direct or digital recording, and 2) audio (AM) recording. (See sketch.)

I don't care which method is used, except (today) I tend to favor number 2. This assumes that there is a basic one-character oriented control unit like either: 1) Teletype module for a synchronous or stop/start, or 2) 637-bit synchronous data phone connected to the computer. From the control unit then is connected a mode-in to connect it to tone modulation or frequency keeping. This in turn would connect directly to the tape recorder.

The reason I favor number 2 is that no modifications or circuits are necessary for connecting to the tape recorder. Also, using the audio system, present data phone hardware could be used which assumes a very noisy and unreliable channel between the mode-in and the recorder. The recorder can be placed anywhere. The information as such would be completely ASCII compatible with a parity and block sum check, and could be removed to a remote position if desirable. My feeling is that the ASCII control characters should be used to control the tape recorder by sending characters to: 1) position the head, 2) switch it on and off, 3) switch it from read to write, 4) unit number selection, and 5) just data.

In return, the tape recorder would send: 1) end of tape character interlaced with 2) just data.

Using the above scheme, either recording method would be okay. The layout of the data could be: 1) speed of $7\frac{1}{2}$ to 10 inches a second, 2) 8 tracks per lateral tape, 3) 60 seconds of recording or 480 seconds of data (30 seconds average access time), 4) 2400 bits per second serial data rate, 5) total storage would be 8-bit format, using ASCII, of which only 6 would be used as information:

$6 \times \frac{2400}{8}$ = 1800 useful bits per second, or

150 words per second, or
9,000 words per minute per track, or

72,000 words per 8 tracks (63,000 if only 7 tracks), or

865,000 useful bits per 60 seconds

6) density would be

2400 bits per second x 1 second per 10 inches, or
240 bits per inch

Using the above scheme at 2400 bits per second, a recorder channel band width of only 2400 h z with a signal to noise ratio of one would give adequate performance. As such, a recorder going at 3 3/4 inches per second would undoubtedly perform okay.

Use of Tape in Software Environment

Ideally, the tape would be almost compatible with DECtape; i.e., it must allow data to be replaced on a block-by-block basis. Blocks would be coded by a single track denoting the blocks, or a combination of information track together with several conductive strips to separate things into 1,000-word blocks. My feeling is that using one track which has been prerecorded with lots of padding characters (to accommodate for head switching time and speed variation), and time or block mark information, the head could be mechanically switched among head positions.

It would be desirable to use the software which is presently organized around DECtape. A desirable goal would be to use a 1 tape transport system (and that failing, go to 2 transports) which would provide for editing and compiling.

Some possible systems would be: 1) if the tape will allow inserts of data blocks, 2) if the tape can only be appended, 3) if only one block can be written on the tape (multiples could be written in 1 K word blocks, for example) by putting multiple reflective or conductive markers, and 4) no inserts or appends. Note that 1 and 3 might be the same.

These yield:

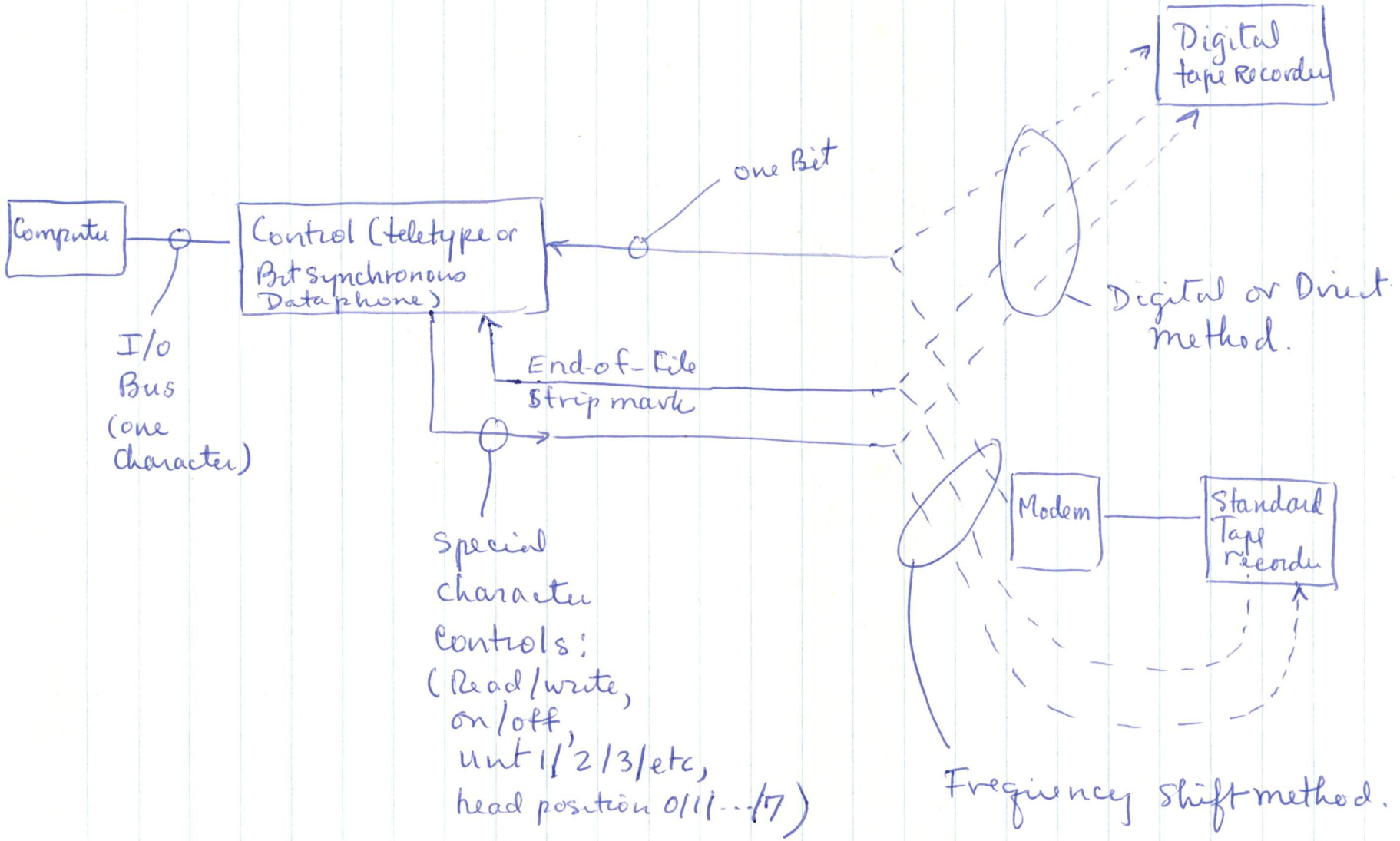
(For 1 and 3)
A system requiring only one transport and two transports if copies of programs are made. A file being edited could be read from one block on a tape and put back on another block on the same tape.

(For 2)
A system requiring two transports for editing. A partial string would be read into core and the position of the string marked. A partial string would be written, followed by blanks. On subsequent reads, more of the string would be read into core and the marker updated. On writing the appended output string, the output tape would first be read

and moved to the blanks, followed by the switching to write, to append the characters.

(For 4)
The tape would just be used for libraries.

C. Gordon Bell



Methods of Connecting Tape Recorder To Small Computer.

CgB 7 Aug. 1967

c - Joan Fine 9/28

digital MEMO

DATE Aug. 4, 1967

TO Ken Olsen FROM Ken Gold

Apparently, Mr. Pavlovich, from Roxbury Latin School had a really tough time of it in both the basic programming course and the PDP-8, 8/S course. I've talked to the instructors, and it seems he had a very tough time catching on to the instruction. I know that the Training Dept. tried extra hard in his case (they knew how interested we were in him, and always cooperate quite well in our projects).

We suspect that he did not apply himself the way he could (in terms of homework, concentration, etc). As a result, I am not going heavy with publicity and not asking for any commitment on his part concerning their computer club. I've merely done a short picture/caption for On Line and sent him a polite letter. It is probably best to let him make the next move as to his plans for a computer club (if he still has them) and any other possible help from Digital.

Ken

digital INTEROFFICE MEMORANDUM

DATE: August 2, 1967

SUBJECT: Publicity for PDP-8, Serial Number 1000.

TO: Ken Olsen
Nick Mazzarese
Mike Ford

FROM: Howie Painter

cc: Allen Kluchman
Jim Jordan
Jack Smith
Jack Hagerty

We have tentatively selected one of the Teradyne PDP-8's (Table Top) scheduled for August delivery as PDP-8 serial number 1000. The reasons for choosing Teradyne are as follows:

1. They are a local company and will be easy to work with in order to achieve optimum publicity within the next two months.

2. It will give us a chance to prove to Teradyne that we are indeed interested in their business, and are continually working with them in all phases of their business, including joint promotion.

3. They are a typical OEM user, and have an important application in the field of components testing.

The plan is as follows:

1. Allen Kluchman will work out the details of joint promotion with Teradyne representatives.

2. Jim Jordan has designed a serial number 1000 name plate for the PDP-8 front panel which will be placed on the Teradyne Machine.

3. Production will officially assign serial number 1000 to an August Teradyne machine.

(continued)

We are shooting for publicity in August magazines, as well as as much local and national newspaper publicity as we can get.

In addition, with Ken Gold we are pursuing publicity with the Summer Institute of Linguistics in Mexico for its unique publicity value. We feel that we can indeed get some good Time/Life in conjunction with Dr. Grimes at the Summer Institute of Linguistics. While we had considered assigning serial number 1000 machine to Dr. Grimes, after looking into the logistics problem of getting on-site pictures, etc., publicity garnered will be late fall or early winter at best. This will be too late for effective timing.

Howie

ewm

digital INTEROFFICE MEMORANDUM

DATE: August 2, 1967

SUBJECT: Visit of Dr. Walter Murdock
President, Standard Programs Inc., New York

TO: Ken Olsen FROM: Ron Smart
cc: Nick Mazzarese

Brief notes on Standard Programs Inc.:

1. They are in the business of selling programming.

2. Murdock would like to have a product in the form of a punched card oriented production control EDP system.

3. He would supply the programming and the sales effort for such a system and he would rely on Cybertronics to build the systems, maintain them, and finance them.

4. DEC's role would be to supply the central computer plus the interfacing modules and provide some design assistance with the interfaces.

5. A week or two ago I had the New York office follow up with Murdock to find how his project was going. The answer was that nothing much had happened. He may well be coming up to explain his project face to face with a view to getting us partly involved. Alternatively, he might be interested in selling us some software. He is a very pleasant fellow and seems to know what he is doing, however, he appears to be a little short of financial support. There may well be something we would be interested in doing with him now, that we wouldn't have wanted to do 6 to 9 months ago.

Ron

jk

digital INTEROFFICE MEMORANDUM

DATE: August 1, 1967

SUBJECT: Wire-Wrap System

TO: P. Kaufmann FROM: R. Harmon

cc: J. Smith
R. Chestna
R. Schmidt

1. The purpose of this memo is to describe the system for generating wire-wrap decks and wiring logics on the Gardner/Denver wire-wrap machine. The objective in analyzing the system was to insure that the finished logic was an accurate reproduction of the engineering block schematic for the logic.

2. Wire-Wrap System

A. Master Tape - This tape contains the information shown on the block schematic.

1. New Logic Procedures

A. Engineering forwards Drafting the block schematic for a new logic.

B. Drafting punches cards from the schematic.

C. Drafting runs a tape from the cards, then a name sort listing from the tape.

D. Drafting compares the name sort listing and the block schematic. If there are any errors (i.e. incorrect pin connections, unseen grounds, inconsistency in blocks), corrected cards are punched and the process returns to (C) above. The last tape run without errors becomes the master tape.

2. E.C.O. Procedures

A. Drafting receives a listing of changes from the ECO co-ordinator. These changes are used to key punch correction cards and mark up the master listing.

B. Using the corrected cards, a new master tape and listing are produced.

C. The new master listing is compared with the marked up listing to determine if there are any input errors. If errors are discovered, corrected cards are punched and a new tape is run.

D. If there are no errors, the last tape run becomes the new master tape.

B. Wiring Program and Gardner/Denver Master Tape

There are currently two programs (PDP-6 and PDP-4 programs) used for generating wire-wrap decks.

Since all new logics, the 8/I, 8/S and PDP-10 use the PDP-6 program, this memo is limited to the latter program.

1. The master tape is used as input to the wiring program which looks at the entire logic and optimises the wiring layout.

2. The wiring program detects the following errors:

   A. Excessive Wire Length

   B. Duplicate Pins

3. Errors are sent to Engineering for correction. Engineering may decide to wire manually or to rearrange the run. If the latter action is taken, the modifications are made, and the wiring program is rerun.

4. The final product of this run is the Gardner/Denver master tape. Listings showing From/To and To/From pin relationships are printed from this tape.

C. Preparation and Forwarding of Gardner/Denver Cards

1. The Gardner/Denver cards are punched using the G/D master tape. These cards are then verified against the tape to detect punching errors.

2. The G/D cards are then interpreted by EDP, the top of the card deck is marked with the logic type and revision number.

3. The G/D cards and listings are sent to Production Inventory Control who then forwards them to Raytheon and DEC Gardner/ Denver machine room.

4. Two decks are sent to Raytheon, one for use as a working deck and the other as a master deck. The old deck is destroyed when a revised deck is received.

D. Wire-Wrap Procedures

1. Production Inventory Control notifies DEC and Raytheon of the number and type of logics and the serial numbers which apply to each.

2. Logic frames are marked with the logic type, revision and serial number.

3. The Gardner/Denver machine operator matches the marking on the frame with the marking on the top of the cards.

4. The rework (manual insertions) is done with blue wire using the error list provided by the G/D operator (information from the interpreted card). Errors detected by visual inspection can be corrected using the To/From and From/To listing.

3. Conclusions

In general, if each responsible person performs their function properly, the system meets the objective. Specifically, the following points are noted.

A. The master tape produced in procedure A-1 and A-2 is checked to insure it is equivalent to the block schematic.

B. The Gardner/Denver tape resulting from the wiring program is not verified against the master tape. Therefore, there is no check of errors resulting from the wire-wrap program. Current experience is that these errors are few and minor and do not warrant the additional effort required to perform this check.

C. The Gardner/Denver cards are verified for correct punching against the Gardner/Denver master tape.

D. The Gardner/Denver operator verifies the marking on the card deck against the frame marking prior to wrapping.

E. Manual rework done in blue wiring can be checked using the To/From and From/To listing printed from the Gardner/Denver master tape.

4. Recommendations

Based on the above analysis and investigation of recent wire-wrap problems, the following recommendations are submitted.

A. The standards and procedures to be utilized by Raytheon for DEC logics be clearly defined.

B. A DEC in-house procedure for isolating and solving wire-wrap problems occurring at Raytheon.

5. Action

The following action is being taken on the above recommendations:

A. A letter to Raytheon detailing the procedures and standards to be used is being drafted. In general, this letter will advise Raytheon that:

1. Blue wire is to be used for wraps not performed by the G/D machine.

2. Gauge of wire to be used.

3. All double wraps by the machine referred to DEC.

4. Production Inventory Control is the DEC contact point for all Raytheon referrals.

B. The following procedure is being established to solve wire-wrap problems occurring at Raytheon.

1. Raytheon notifies Production Inventory Control that a problem exists.

2. Production Inventory Control:

A. Requests the return of the deck logic and problem list.

B. Notifies the people designated to investigate wire-wrap problems (design engineer, production group, wire-wrap supervisor and mechanical engineer) of the problem and the availability of the decks and logic.

3. The personnel investigating take the necessary action to correct the problem (i.e. correct the card deck, rearrange the run, etc.) and forward the card deck and reason for the error to PIC.

4. PIC returns the decks and logics to Raytheon.

5. PIC maintains a record of wire-wrap problems.

Bob

sm

Ken Olsen

digital INTEROFFICE MEMORANDUM

DATE: August 1, 1967

SUBJECT: Progress Report: New System For Reporting On Development Schedules

TO: Schedule Review Members
Project Engineers

FROM: Bob Collings

The short report system for reporting on development schedules has been well received, and it represents a major step forward in maintaining and controlling our development efforts. Many people have commented favorably on the more formal atmosphere and direct focus on the problems at hand.

One major shortcoming has become more critical as the length of the meetings has been shortened, and that is the lack of consistency in the reporting of projects. You can certainly appreciate the task of adjusting to six or more different sets of symbols and methods of presentation during the 1 1/2-hour session. Therefore, we are willing to sacrifice some individual creativity in the manner in which schedules are maintained in hopes that the standardization of presentations will facilitate communication and result in more useful reviews. To achieve this standardization, the following uniform techniques should be utilized:

1) The progress point should be indicated by a letter (rather than a circle, star, etc.). This letter will be placed above the activity, positioned so that it indicates the time remaining before the activity is completed. For consistency, the letters will begin with A for the first month of the fiscal year (July), and progress sequentially through June which will be the letter L (July is A, August is B, September is C, etc.). For the August reviews, please be sure that all points are updated so that the progress points for July (A) and August (B) are noted.

2) A red line should be drawn with a felt-tip marker from top to bottom of the schedules representing the day of presentation.

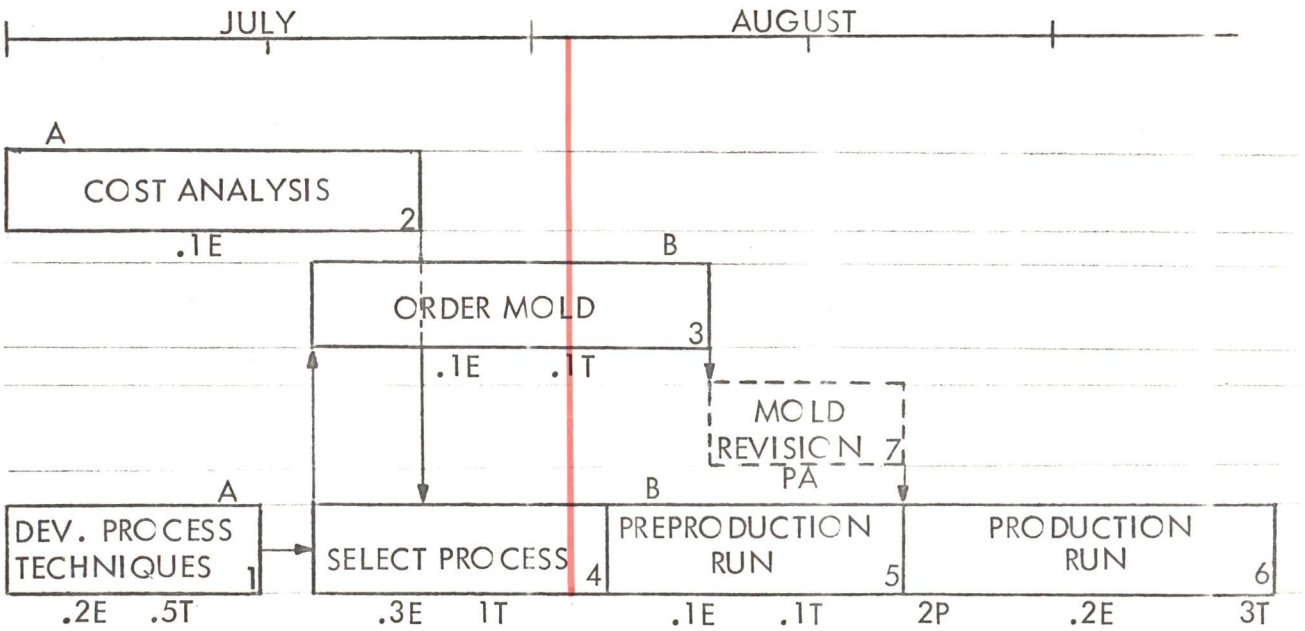
3) Manpower estimates made as accurately as possible (in conjunction with the service groups) should be noted below the activity. The following symbols are effective in abbreviating these estimates:

E	Engineer	P	Production
T	Technician	PR	Programming
D	Draftsmen	WM	Wiremen
TW	Technical Writing	PA	Purchasing Agent

4) The number of the activity may be noted inside the box in the lower right-hand corner. Footnotes and explanations with the corresponding number are included in the lower section of the graphical schedule.

5) Legibility and readability have also been a problem. In reviewing all of our present schedules, it is quite evident that typing the activity names in upper case letters is an obvious preference. Saul Dinman has done this on his schedule chart, and the results are quite striking. Saul claims masters can be folded and typed without a problem. A second choice is hand-lettering in upper case letters only. All other alternatives become illegible at the distances that these charts must be read.

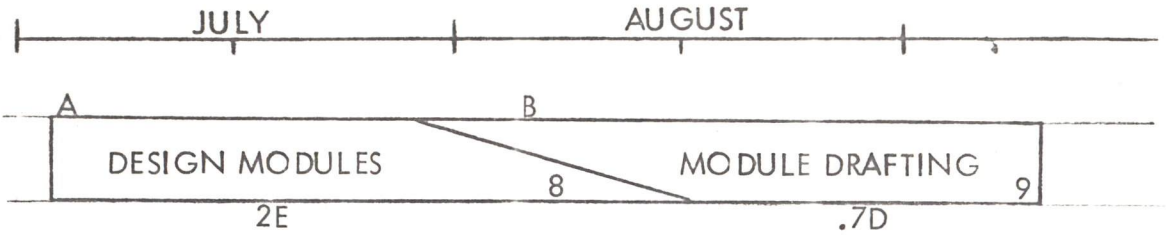
6) Several of the schedules (George Wood's Plastic Module, in particular) are quite effective in the use of arrows to represent the interrelationship of activities. While some projects do not lend themselves to this technique, it should be used wherever possible. The following example illustrates this point as well as the above points:



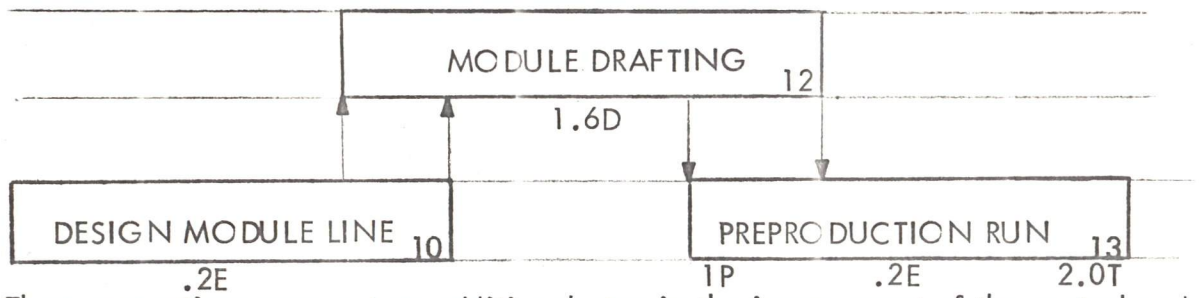
The schedule above indicates that activities three and four cannot begin until activity one is completed. Activity five depends upon the completion of four, and the beginning of activity six depends upon the completion of three and five. Note the use of a conditional activity (mold revision). IF the revision of the mold is necessary, it is already

included in the schedule. Note also the use of a dotted line when an arrow passes over one activity to another.

7) A practice that is confusing is the use of slanted lines, for example:



It is understood that in the designing of a line of ten modules, as some of the module are completed, they will be released to Drafting while others are still in the design phase. The problem arises in that it is not possible for one letter to accurately repre ent the point of progress of these two activities, therefore, a much better method is to sh ow them as partially parallel activities rather than sequential:



These suggestions represent an additional step in the improvement of the control and reporting of development projects. Certainly other ideas will be developed and incorporated in future months, and your comments and suggestions are welcome and encouraged.

Attached is the schedule for August. Please include all of the suggestions above in your August presentation, and remember the three questions that must be answered for each late project.

1) Why is it late?

2) What will be the effect of its lateness?

3) What is being done to bring it up-to-date?

jeb

SCHEDULE REVIEW PROJECTS FOR THE MONTH OF AUGUST

August 4

8:30 a.m.	PDP-8/I Electrical Design - (Ed deCastro)
8:40 a.m.	PDP-8/I Mechanical Design - (Jim Jordan)
8:50 a.m.	Integrated Circuit Tester - (Bob Hughes)
9:00 a.m.	PDP-8/I Production Engineering - (Ed Harwood)

August 11

8:30 a.m.	PDP-9 Programming - (Jim Murphy)
8:40 a.m.	PDP-9 Disc File - (Dan Wardimon)
8:50 a.m.	M Series Modules - (Larry White)
9:00 a.m.	Plastic Module - (George Wood)
9:10 a.m.	AMT IV - (Alan Ricketts)
9:20 a.m.	K Series Modules - (Russ Doane)
9:30 a.m.	Technical Writing - (George O'Neill)
9:40 a.m.	TU20 - (Joe Godbout)

August 18

8:30 a.m.	PDP-10 Central Processor - (Bob Savell)
8:40 a.m.	PDP-10 I/O - (Bob Wyman)
8:50 a.m.	PDP-10 Memory - (Derrick Chin)
9:00 a.m.	PDP-10 Systems Software - (Larry Portner)
9:10 a.m.	PDP-10 Diagnostics - (Leo Gossel)
9:20 a.m.	TU-79 Tape Transport - (Phil Backholm)
9:30 a.m.	Automated Drafting - (Bill Melesky)
9:40 a.m.	338 Display - (Dave Brown)
9:50 a.m.	339 Display - (Dave Brown)
10:00 a.m.	PDP-9 I/O - (Don Vonada)

August 25

8:30 a.m.	Bigger Disc - (Ken Fitzgerald)
8:40 a.m.	Strate Engineering - (Tom Stockebrand)
8:50 a.m.	Data Processing - (Dave Packer)
9:00 a.m.	PDP-8 Disc Systems Software - (Roger Pyle)
9:10 a.m.	PMA-8 - (Lewis Illingworth)
9:20 a.m.	Plant Engineering - (Al Hanson)
9:30 a.m.	Process Engineering - (Joe St. Armour)

digital INTEROFFICE MEMORANDUM

DATE: July 31, 1967

SUBJECT: Cheap Rand Tablet

TO: S. Ogdon

FROM: A. Titcomb - Cambridge

cc: W. Long
D. Brown
K. Olsen ✓

A group at M.I.T. has constructed an inexpensive and improved version of a Rand Tablet. The key ingredient is a piece of Teledeltos paper which is used to form the "writing" surface. The property of the paper that makes it useful is its linear conductivity. The work surface can be made extremely large, and the necessary circuitry is simple. Accuracy of digitization can be achieved to 1/32".

Would you be interested in investigating this as a possible product for DEC?

CONFIDENTIAL

digital INTEROFFICE MEMORANDUM

DATE: July 25, 1967

SUBJECT: PDP-9

TO: Stan Olsen FROM: Larry Seligman

cc: Ken Olsen

Stan has asked me to write down what I think to be the major errors made on the PDP-9 so that we can avoid their repetition on the next project. In order that this memo not be completely negative, let me first make a few positive introductory observations.

The PDP-9 was, to my knowledge, the first computer development project taken seriously. Sufficient manpower, equipment, and time were allocated to enable the designers of the product and of the production facilities to complete their tasks well. The resulting product is, overall, mechanically and electrically sound. The resulting production facilities, the first of their kind here at DEC, represent a large advance over - say, the PDP-7 "production line." Let me define "analytic development techniques" to include well thought through circuit, logical, and packaging design, manpower and material scheduling, and production planning.

In those areas of PDP-9 development where analytic techniques were not used, the product suffered. These include:

a. documentation - The writing of specs by PDP-9 design engineers started only 6 months ago; the maintenance manual has not as yet been completed, even after a year's gestation.

b. memory - We have tried to make the most (by patching) of an original McCalip design that really needed complete rework.

The above were symptoms, not problems. Of the two major problems, the first was clearly my responsibility. In a perhaps misguided effort to develop the talents of a few of the other engineers on the project, I did not do enough of the detailed design work myself. As a result, the memory and IO section are only mediocre designs. While they work well enough that we can confidently ship them, manufacturing cost is high and they have been subject to frequent modifications. For the same reason, almost all aspects of PDP-9 engineering were 2-3 months late. The high production items should, I now think, be designed directly by top engineers; supervision by such a person is not sufficient.

The mitigating effect, however, is that Don Vonada, who did most of the detailed central processor design, has come to be recognized as a really good engineer. While he lacks a wide background in programming and systems design, his intelligence and motivation have proven to be admirable.

The other major error lies in the production area. Essentially, the original concept that the production line extend all the way out to the shipping dock has never been carried out. The line now stops when the three basic subassemblies are supposedly checked out and (after much prodding of Harwood's group) also heated and margined.

Each of the three frames has been on the line less than two days and the line typically runs at 1/3 capacity; yet it usually takes more than a week to assemble the three frames and IO gear into a cabinet and ship. The production line philosophy, designing and debugging a product until production is smooth, has not been carried through. Feedback from basic and systems checkout areas is poor, the same sloppy production checkout techniques in use on PDP-7 carry over today. No one seems committed to the goal of having every part, every subassembly, and every system work when assembled, without the need for repairing either minor or major problems.

The 8/I production facility may remedy the above problems, but I predict not. As we move to real mass production of computers, the same sort of first quality, analytic engineering must go into the design of the production facility and into product design improvement, or we will forever be tied to the output of a limited number of technicians.

LS:mdo

Larry

COMPANY CONFIDENTIAL

digital INTEROFFICE MEMORANDUM

DATE: July 21, 1967

SUBJECT: Facility Expansion Proposal

TO: Executive Committee FROM: D. Knoll

It is proposed:

1. That a four year facilities expansion plan be adopted by the Committee as current thinking.

2. That a four step program leading to the purchase of a specific 85 acre future plant site be undertaken.

Investigations of potential future plant sites have been undertaken over the past six weeks. Much background information exists from which comparisons of labor markets, building costs, etc. could be made. However, since time is of the essence, only the key factors relating to the proposed decisions will be presented.

Facilities Expansion Plan

Attachment 1 shows projections of man power and space requirements through 1971. Based on these projections, we will become quite cramped and space limited in the Mill by July, 1969, two years from now. Space requirements will increase thereafter. We would require space outside of Maynard prior to July, 1969 if sales projections are exceeded, if labor cannot be obtained in Maynard, or if there was a catastrophe at the Mill.

While a catastrophe is unlikely, the probability of exceeding sales goals and encountering severe labor availability problems would seem high. Commitment to a program for planned expansion at this time will permit us to wind up four years from now with an efficient second plant rather than a conglomeration of small operations haphazardly spread around the area. At the same time, it will enhance our rebound ability in the event of a catastrophe at Maynard.

Site Selection

Three prime criteria were used in site selection:

1. The site must be close enough to Maynard to allow retention of a significant portion of the present labor force in the event of a catastrophe at the Mill.

2. The site must be close enough to Maynard to allow close production co-ordination between plants.

3. The site must be far enough from Maynard to tap and attract a new labor supply of 1,500 people with favorable characteristics over the next four to five years.

Given a site which meets the above criteria, such factors as land and site preparation costs, favorable tax structures, favorable community relations, utility availability, and labor rates, etc. should be considered.

An ideal site has been located by Harry Mann through the Shawmut Bank. This site is at the south-west corner of the intersection of highways 2 and 495. This site satisfies each of the three prime criteria.

Program

The following program is proposed:

1. Executive Committee approval of the general facilities expansion plan philosophy.

2. Proceed immediately to obtain a sixty-day option on the proposed property at a cost not exceeding $1,500, if we buy it and $5,000, if we do not buy it giving us the option of purchasing the property for a price not exceeding $150,000.

3. Once the option has been secured, and in less than sixty days, proceed to tie down the following details:

   A. Obtain a preliminary site development plan and cost estimate with concentration on proposed building locations, means of access and cost, waste disposal cost and feasibility including perculation tests, cost of

providing adequate electrical, water and gas supplies. The cost of this plan should not exceed $5,000.

B. Obtain a more detailed labor market survey through the Personnel department. This ideally would include a commitment that 1,500 people can be hired for the plant over the next few years.

C. Obtain tax commitments from and develop the start of a relationship with the town of Littleton. Determine the cost of town provided utilities. Find out whether there is a possibility that they would bring utilities to the property line. Any incentives we obtain will have to be agreed upon prior to purchase or our chances for them are nill.

D. Decide on the method of financing the property and obtain loan commitments, if necessary.

4. Make a presentation to the Executive Committee of the results of Step 3. Obtain an Executive Committee decision to exercise the option obtained in Step 2. This will occur prior to the expiration of the option or between October 1 and November 1.

Conclusion

Today, approval of Step 1 and authorization for Step 2 above are requested. It is my feeling that such action will start us down the track toward obtaining the best of only a few sites which meet all of DEC's requirements for their next plant.

DCK/sm

Attachment

D. Knoll
7/21/67

Man Power and Space Projections

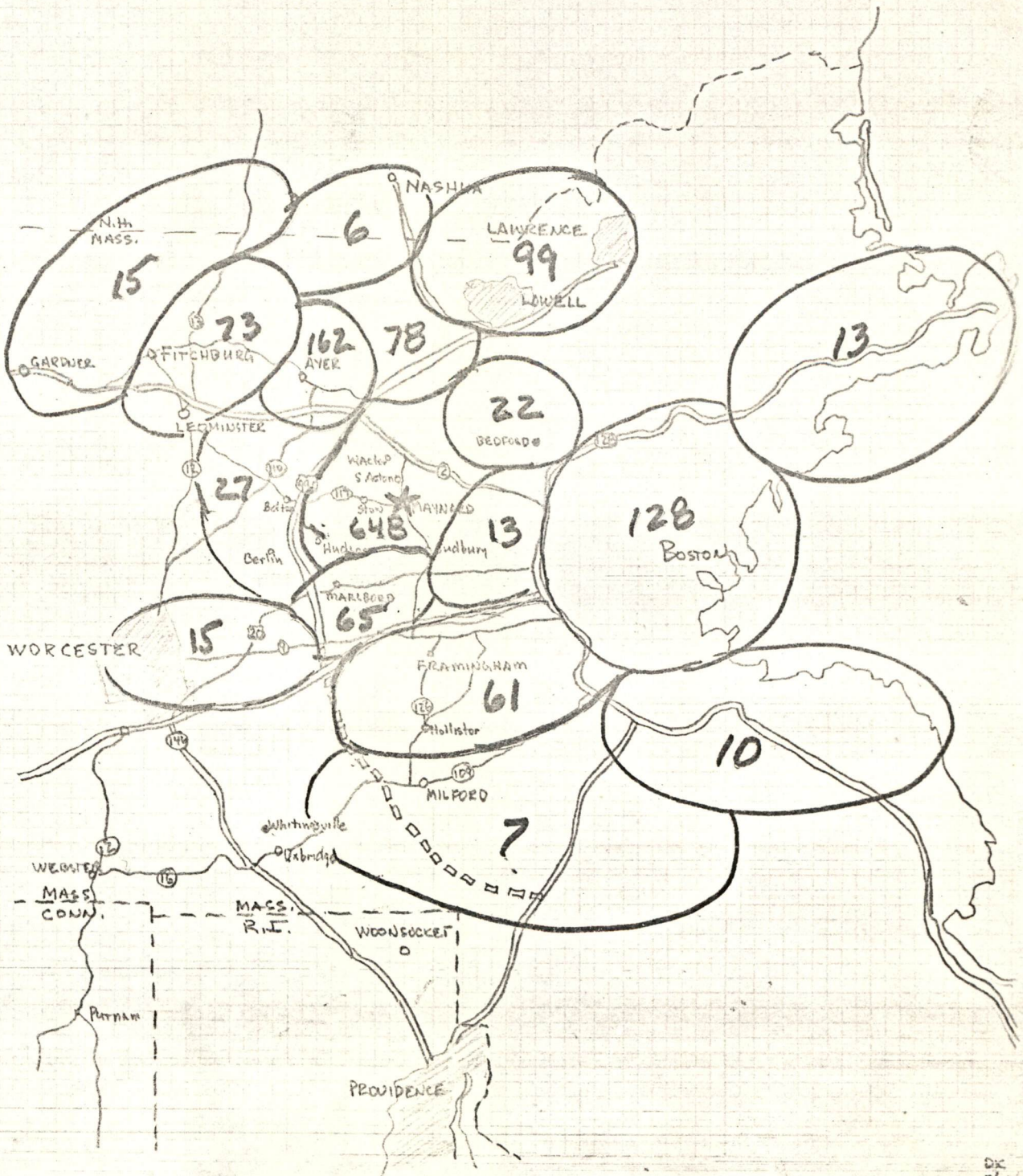
	History			Projection			
	July 66	Dec. 66	July 67	July 68	July 69	July 70	July 71
Sales - Past Year	22M	30M	37M	52M	66M	83M	105M
Equiv. Full Time People	832	1071	1267	1740	2130	2590	3180
Space Occupied	285K	305K	368K	409K Sq.'	575K Sq.'	675K Sq.'	800K Sq.'
Dollar Sales/Person/Year	26.5K	28.0K	29.2K	30K	31K	32K	33K
Space/Person	342 Sq.'	284 Sq.'	290 Sq.'	280	270	260	250
Space Available at Maynard				565	565	565	565
Space Required				None	10K Sq.'	110K Sq.'	235K Sq.'

sm

MAYNARD & VICINITY

Scale 0 5 10 miles

LABOR FORCE RESIDENCE
JULY 67



DK
7/19/67

digital MEMO

DATE July 21, 1967

TO Ken Olsen FROM Phil Backholm

Ken:

Here are the estimated manufacturing costs of the TU 79. The mechanical hardware was sent out for quotation to at least 3 different vendors. I have a complete list of vendors and their individual cost estimates if you are interested.

Phil

/crh

Ken Olsen

digital INTEROFFICE MEMORANDUM

DATE: July 19, 1967

SUBJECT: PDP-8, PDP-8/S BACKLOG/ORDER RATE ANALYSIS

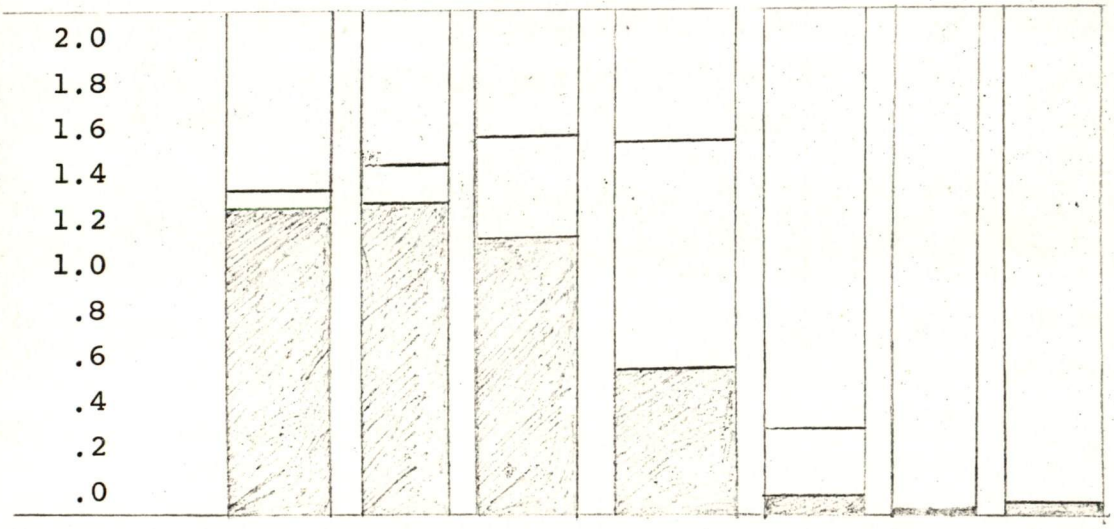
TO: Executive Committee
cc: Howie Painter
Bill Landis

FROM: Mike Ford

The charts below represent the net dollars/month (list price less 10%) of the equipment ordered from Production for the months of July through December. The solid portion of each bar represents that portion of the monthly dollar volume that is secured by customer purchase orders. Attached to this report is the breakdown of each monthly order from Production, product by product. This backup sheet (ammended) is the same sheet used to back up the PDP-8/8S/8I Product Line Fy '68 budget and has been in the hands of the Production Department for several months.

The order rate and production forecasts have been upset somewhat by the rather amazing fact that we logged orders for 115 PDP-8's during the month of June. This has caused us to increase PDP-8 production rates from 44/month to 55/month for the next quarter and significantly increase production rates in paper-tape equipment and extra memory. These changes are reflected in the graphs below.

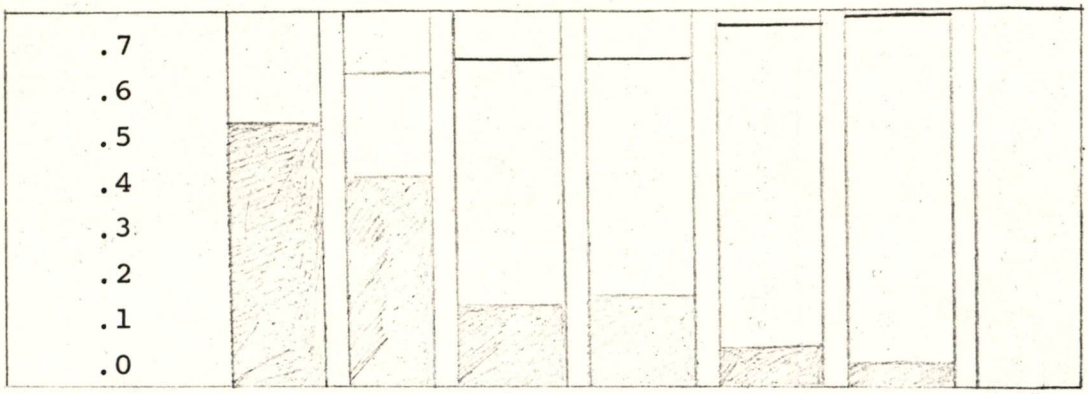
PDP-8



Machines with P.O./Machine Slots	46/46	48/50	42/55	25/55	15/40	5/40

Total Backlog 4.6

PDP-8/S



Machine with 52/60 35/60 10/60 3/60 1/60 1/60
P.O./Machine
Slots

Total Backlog .6M

Sales Remarks

Below is a section of my last report to the Executive Committee on the PDP-8 order rate/backlog situation.

Processors (as of March 1, 1967)

8-month Average Booking Rate	2-month Average Booking Rate	Production Rate	Backlog
processors/month over last 8 months	processors/month over last 2 months	units/month requested from Production - next 3 mos.	total units
37.5	41	40	148
By comparison (as of June 1):			
40	45	44	147
By comparison (as of July 1):			
50	80	50 (average)	197 (181 - July-Dec.)

As shown by the above chart, the astonishing sales of the PDP-8 over the past few months has been offset by an increase in the production rate and

the system is still a stable one. We are still advertising heavily "quick delivery" and have managed to keep just enough flexibility in the schedule to pull this off when required, in spite of increased sales activity.

In order to maintain the above backlog situation and meet budgetary requirements, we must book (net) 1.2/month (3.6/quarter).

By comparison, we booked 3.9/quarter in Q3 and over 5.0/quarter in Q4 for Fy '67.

Not shown as backlog, but nevertheless existent to some degree, are 100 machines on OEM Quantity Agreement that have not yet been released and another (28) 680 systems (RCA-IS) which are currently very close to final negotiation.

PDP-8/S

10-month Average Booking Rate	2-month Average Booking Rate	Production Rate	Backlog (total units)
34	40	60	81 (66 customers - 15 demonstrators for quick local sale)

Booking Rates	Q2	1.245
	Q3	1.039
Est.	Q4	1.45

This past quarter has shown an increase in PDP-8/S sales, which I expect to continue throughout the year.

To build up the customer backlog and achieve a sales rate that is stable with the forecasted production rate requires that sales increase to 2.0 million/quarter (net) for Q1 and Q2 of Fy '68.

The PDP-8/S sales/backlog situation is disappointing and not stable at all. As can readily be seen, for the month of July we will build 60 machines - against 27 customer purchase orders and 8 demo purchase orders, the remainder going to the stockroom for "return mail delivery".

The sales problem seems to be that the PDP-8/S is not getting its share of sales effort because of several factors:

1) fears concerning reliability,
2) uncertainty as to limitations of -8/S in a given customer application- "sell -8, rather than -8/S to be sure",
3) relative unavailability of options such as extra memory, disk at a reasonable price.

To correct these problems, we have done the following:

1) Set up Irv Doucette (with Alan Ricketts, Jim Cudmore and Saul Dinman as consultants) as the Engineer responsible for solving -8/S reliability problems. We have listed all the known problems and have solved the first few and are on the way to solving the remainder. By promoting these activities heavily, we can overcome the salesman's fears.

2) Set up a program to collect, collate, and report back to the field, customer applications of the -8/S so that new salesmen have some examples and references to help them to decide where and when to sell -8/S.

3) Released A/D, options, 340, extra memory, and disk for shipment with some price adjustments where necessary to create more attractive packages.

4) Personally attended each Regional Meeting and reported enthusiastically on these and other things we are doing to create more sales.

5) Personally contacted salesmen on a daily basis to kid, push, and prod them into spending the time to bring home the orders we need and to provide special services (quick delivery, etc.) as required.

6) Personally pushed on OEM and Qty customers with large numbers of yet to be released orders. There are over 200 orders in this category.

These steps are <u>working</u>. Most Regional Managers and salesmen express optimism with regards to near term sales possibilities. Within 4 to 6 weeks, I expect to feel the full brunt of today's action, and I expect existing OEM customers to start releasing on a more regular basis. The combination of these two effects will carry us up to and beyond our sales goals.

eem

Options 8/8I	$K	J	A	S	O	N	D	J	F	M	A	M	J	Q	Q	Q	Q
A/D 138 139																	
AF01A	4.5	10	10	10	10	10	10	10	7/3	5/5	2/9	/13	/14	135	135	99/36	9/162
D/A AA01A	2.8	2	2	2	2	2	2	2	1/2	1/2	/4	/5	/6	17	17	11/10	/40
804 Opt 1	4.8	5	5	5	5	5	5	5	5/3	7/5	1/12	/12	/12	75	75	85/40	15/180
PC0 2	2.5	3	3	3	3	3	3	3	3/7	3/10	2/12	2/12	2/12	20	20	20/75	18/90
3	3.0	2	2	2	2	2	2	2	2	2/1	/2	/2	/2	18	18	18/3	/18
34D	2.8	3	3	3	3	3	3	2	2	1/3	/4	/4	/4	25	25	25/9	/34
CR01C	4.1	1	1	1	1	1	1	1		1	/1	/1	/1	12	12	8	/12
350B		1	1	1	1	1	1	1		1	/1	/1	/1				
Proc. Opts DM01	2.7	5	3	3	3	3	3	3	3	3/1	1/2	/3	/3	24	24	24/3	3/22
KR01	.6	9	6	6	6	6	6	4	4/4	4/6	2/6	1/7	1/7	11	11	7.5/6	3/12
PT08	.8	4	4	4	4	4	4	4	4	4/4	/5	/5	/5	10	10	10/3	/12
182	3.5	4	4	4	4	4	4	4	4/2	4/3	/5	/5	/5	42	42	42/18	/53
183	1.5	7	7	7	7	7	7	7	7/4	7/7	4/10	4/10	4/10	32	32	32/18	18/46
184	7.5	10	10	10	10	10	10	10	10/5	10/7	4/12	4/14	4/14	225	225	225/90.5	96/302
188	2.0	3	3	3	3	3	3	3	3/1	3/2	/6	/6	/6	18	18	18/6	/36
189	1.5	2	2	2	2	2	2	2	2/1	2/1	/2	/2	/2	9	9	9/3	/9

	$K	J	A	S	O	N	D	J	F	M	A	M	J	Q	Q	Q	Q
Typesetting	12	4	5	5	5	5	5	5	5	5	3/2	2/4	/5	168	180	180	60/156
RM08	18.8	1		1	1	1	1	1	1	1	/1	/1	/1	38	55	55	/55
TC01/ TU-55	11	12	11	10	10	10	10	10	10	10	3/15	2/15	2/15	363	330	330	77/495
680	7.0	4	5	5	5	5	5	5	5	5	2/4	1/5	/6	98	105	105	21/105
RF-32	6.0	5	7	10	10	10	10	10	10	10	1/15	1/15	1/15	132	180	180	18/270
DS-32	3.0	1	2	6	6	6	6	6	6	6	1/5	1/5	1/5	27	54	54	3/45
338	37	2	2	2	2	2	2	2	2	2	1	1	1	222	222	222	111
TC58/TU20	22		1		1		1		1		/1		/1	22	44	22	/44
Total														1743	1843	1781/320	452/2198
PDP-8	18	44	50	55	55	40	40	30	25	25	15	10	10	2,160	2,160	1,440	630
PDP-8I-ship	10							35	40	50	60	80	80	ø	ø	1,250	2,200
build				5	10	15	20	25	30	40	50	60	70				
Grand Total														3903	4003	3221/1570	1082/4398
														Less 10% Discount -	3513	3603	2899/1413	974/3958

Options B/S	$K	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	Q	Q	Q	Q	Q
A/D 138E	2.5	11	6	6	2	6											58	20			
139E	2.5	2	2	2	1												15	3			
AF01A	4.8				1	2	3	3	3	3	3	2	2	2	1	0		29	43	35	14
ADC-1	2.5				4	6	8	8	8	8	4	4	4	2	1	0		45	60	30	8
AD-85	1.7																				
D/A 1	2.6	1	1	1	1	1	1	1	1	1	1		1				5	5	5	3	
AA01A 2	2.0	1	1	1	1	1	1	1	1	1		1					6	6	6	2	
w/AA04 3	2.8																				
804 opts. PC01	4.8	5	5	5	10	5	5	5	5	5	3	2	2	1	1	1	72	96	72	34	14
PC02	2.5	3	5	5	10	10	10	10	10	10	5	5	5	3	2	1	33	75	75	38	15
PC03	3.0																				
34D	2.8		3	1		1		1		1							11	3	6		
CR01C	4.1																				
350B	8.9																				
Processor OM 8S	3.0			6	6	8	11	11	11	11							18	75	99		
MC8S	3.5			4	2	2	2	2	2	2	1	1	1				14	21	21	11	

	$K	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	Q	Q	Q	Q	Q
DB8S	1.7			2	4	6	9	9	9	9	5	4	4				3	32	46	22	
ME-8S	1.0			1			1			1							1	1	1		
MM-8S	3.0			1			1			1							3	3	3		
DF-32	6.0			2	4	6	9	9	9	9	6	5	4	3	2	1	12	114	162	90	36
DS-32	3.0				1	2	3	3	3	3	2	1	1	1	1			18	27	12	6
Total																	256	546	626	277	93
PDP-8/S	10.0	50	60	60	60	60	60	60	60	60	35	25	15	5	5	5	1700	1800	1800	750	150
Grand Total																	1956	2346	2426	1027	243
																	Less 10% Discount	1756	2110	2186	927	220

Ken Olsen

digital INTEROFFICE MEMORANDUM

Memo #66

DATE: July 18, 1967

SUBJECT: Facilities Planning-Prioty List

TO: Executive Committee FROM: Al Hanson

Enclosed you will find a prioty list of the various departments to be relocated or expanded. This is only a proposal and should be analized as such. I want each of you to study this list carefully and submit all comments or omissions to me as soon as possible. Once the prioties have been established, there will not be any changes to the schedule except by complete agreement of the Executive Committee.

AWH/slc

July 18, 1967

MANUFACTURING

FACILITIES PLANNING

PRIOTY LIST

ITEM	DEPARTMENT	SUPERVISOR	PRESENT LOCATION	PROPOSED LOCATION	DATE TO COMPLETE MOVE
1	Crating	F. Kalwell	5-5	5-3	Jul 15
2	Module Stockroom	F. Kalwell	5-4	5-3	Jul 22
3	P D P-8	B. Dugas	5-4	5-1	Aug 19
	" "	" "	5-4	5-1	" "
	" "	Al Kzajkowski	5-4	5-1	" "
	" "	Bob Hazeltine	5-4	5-1	" "
4	8 I Pilot Line	J. Smith	New	5-B	Aug 19
5	Personnel Dept.	R. Lassen	5-4	5-4	Sep 9
6	Incoming Inspection	H. Crouse	5-4	5-4	" "
7	Semi-Cond. Test	H. Crouse	5-4	5-4	" "
8	Module Test	D. White	5-4	5-4	" "
9	General Accounting	R. Dill	3-5	5-2	Sep 16
10	T U 7 9	P. Backholm	4-3	5-1	Sep 30
11	Teletype Line	L. Jones	5-5	5-1	" "
12	Options Check	D. Ambrose	5-5	5-1	" "
13	Options Assy.	R. Gilletto	5-5	5-1	" "
14	Display Assy.	R. Massulla	5-5	5-1	" "
15	Display Check	J. Dimauro	5-5	5-1	" "
16	TC01 and TC02 Check	R. La Fosse		5-1	" "
17	Disc. Assy.	K. Fitzgerald	4-5	5-1	" "
18	Disc. Check	" "	4-5	5-1	" "
19	Manuf. Admin.	P. Kaufmann	5-5	5-1	" "
20	Photography-Studio	G. Lord	12-3	5-2	Sep 30
	Direct Mail & Trade-shows	T. McInerney	A & M	7-1	" "
21	Small Computer Adm.	N. Mazzarese	5-3	5-2	Oct 14
22	Special Systems Eng.	B. Long	5-3	5-2	" "
23	Special Systems Tech.	" "	5-3	5-2	" "
24	Dig. Test Sys. Eng.	P. Greene	5-3	5-2	" "

July 18, 1967

MANUFACTURING

FACILITIES PLANNING

PRIOTY LIST

ITEM	DEPARTMENT	SUPERVISOR	PRESENT LOCATION	PROPOSED LOCATION	DATE TO COMPLETE MOVE
25	Dig. Test Sys. Tech.	P. Greene	5-3	5-2	Oct 14
26	Small Computer Eng.	C. Crocker	5-3	5-2	Oct 30
27	Marketing Tech.	M. Ford	5-3	5-2	" "
28	P D P-8 Eng.	" "	4-2	5-2	" "
29	Small Computer Adm.	A. Alexanian	5-3	5-3	Oct 14
30	Marketing Service	F. Kalwell	5-3	5-3	" "
31	Module Admin.	S. Olsen	5-3	5-3	" "
32	Sales Admin.	T. Johnson	12-3	5-3	Oct 30
33	Plant Eng.	A. Hanson	4-5	5-B	" "
34	Mech. Eng.	L. Prentice	4-4	3-5	Nov 4
35	Tech. Writing	G. O'Neill	3-5	5-2	Nov 11
36	Manuf. Warehouse	J. Smith	5-5	4-5	Nov 30
37	Plastic Module	G. Wood	7-1	5-B	Oct 15
38	Printed Circuits	N. Perryman	4-4	5-B	" "
39	Data Process	D. Packer	3-5	5-2	Nov 30
40	Gardner Denver	J. Smith	6D-1	7-1	
41	P D P010 Expan.	S. Mikulski	5-5	5-5	
42	Prod "D"	V. Augello	6B-3	4-3	
43	Sub. Assy			4-3	
44	Wiring			4-3	
45	Test			4-3	
46	Drafting Expan.	R. Melanson	4-4	4-4	

Electrical Engineering Dept
University of B.C.
Vancouver 8

and Dominion Radio-Astrophysical
Observatory. Box 248,
Penticton, B.C.

The Manager,
Digital Equipment Corp. of Canada
39, Dundas Road East,
Cooksville, Ont

15 July 1967

Dear Sir,

Last week I happened to sit in on a talk given by your representative, Jack Richardson, to the staff of the D.R.A.O., where I am spending a few weeks. He was there to tell them the merits of your PDP-9 for various applications on the site.

I would just like to tell you that I have never seen a better presentation of a complex technical product. Mr. Richardson laboured under many handicaps: It was very hot and stuffy, the plane was late, he was unexpectedly confronted with a whole room-ful of listeners, many of whom were much his senior and were eager to ask searching and critical questions.

Yet Jack performed flawlessly: He knew all the answers, and could give them clearly and with just the right degree of informality. They kept him on the firing line for over 4 hours, but he hardly wilted at all.

Actually, I personally have no part in making the decision on what computer to buy here. Furthermore, the decision was more or less made before he ever came. However, if there had been need to sell your product, you could not have sent a more effective salesman.

Yours sincerely

Fritz K Bowers
(Professor)

digital

4 August 1967

Prof. F.K. Bowers,
Electrical Engineering Department,
University of British Columbia,
Vancouver 8, B.C.

Dear Sir:

Many thanks for your letter of 15 July concerning the presentation given by Jack Richardson at D.R.A.O.

Let me first of all thank you for taking the time to comment on the meeting. If the marketing of sophisticated technical apparatus has anything in common with retail selling, it is the dependence on customer feedback. Favourable feedback of course is always very encouraging.

Your letter will go on record in Mr. Richardson's personnel file.

Your remarks are gratifying for another reason. I think that many of us have come to regard technical marketing as an inferior profession - and for very good reasons. There are too many people in the business who simply do not know their products. Performances such as Jack's tend to set a standard for the profession. We like to sell on the basis that we can give better support and better customer orientation than anyone else. On top of that, I feel that our product line is second to none, and that our ethics both here and in the U.S. are flawless. Jack Richardson symbolizes all of the above points, and I am so gratified that you have been impressed by him.

If I can be of any help, please do not hesitate to contact me.

Yours sincerely,

D.J. Doyle,
Manager.

DJD:jp

DIGITAL EQUIPMENT OF CANADA LIMITED, P.O. BOX 370, CARLETON PLACE, ONTARIO
PHONE — OTTAWA (613) 237-0772, CARLETON PLACE (613) 257-2615. TELEX: 013-442

1240

digital EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

cc: Operations Committee
Bob Lassen
Sales Training Folder
Jack Richardson File

CONFIDENTIAL

K. Olsen

digital INTEROFFICE MEMORANDUM

DATE: July 13, 1967

SUBJECT: CHICAGO DISTRICT

TO: Executive Committee
Ron Smart
Jack Shields
Mid West Regional File

FROM: Ted Johnson

This memo outlines the business we have and see in the Mid West. As part of our program of planning sales and field service, we will attempt to inform you about our District and Regional activities in these and similar memos.

mr

I Bookings for FY 1967 = approx. 1.8 million

Bookings for FY 1968 = 2,680, 000 budgeted

Modules	380
8 Family	900
LINC-8	350
PDP-9	500
PDP-10	400
Mem. Test	150

II Present Staff = 3 Sales (T. Quinn, W. Karavatos, V. Carlson)

2 Field Service (G. Slaw, P. Benoit)

III Installations in the District

Classic LINC	7
LINC -8	3
PDP-5	2
PDP-7	2
PDP-8	35
PDP-8/S	5
PDP-1	1

IV Discussion:

This district has realized a substantial increase in volume in FY 1967. Key characteristics of its present sales and sales history are:

A. 1/3 of sales are modules.

B. Scattered pockets of business, outlined in the attachment, consisting of universities and emerging industrial controls customers.

C. Relatively heavy biomedical research (LINC-8)

D. Good typesetting prospects, more progressive than the East.

Future organization should follow the scattered markets. Chicago will house the Regional Office, with immediate requirements for software and typesetting specialists to support

IV (cont'd)

regional sales. Two good possible areas in PDP-10 and basic system PDP-9's. Two prospects for applications specialists look excellent: Pickett, software, L.A. man for typesetting. Regional Manager required.

The office will benefit by Regional leadership, but the effort there has been reasonably systematic and conscientious. A Regional Manager should facilitate better direction and measurement of past and current performance. The chief weaknesses are software knowledge and inspiration. Chief strengths, consistent and organized sales effort. The geographical spread argues for branch salesmen living close to accounts over the future, backed by supervision and applications expertise.

V Summary of 1968 Geographical Forecast

Chicago Area	700K
Milwaukee Area	900K
St. Louis Area	250K
Madison Area	150K
Minnesota	150K
Urbana (Ill.)Area	150K
Indianapolis Area	300K
Kansas City (Miss.)	100K
Iowa	50K
Total Approx.	$2,700

VI Major Expansion in Future

Machine tool business (Milwaukee)
St. Louis
Chicago (depending largely on Bell Tel., Weston Labs. Western Electric)

VII Noteworthy Current Developments

A. Increased penetration at Argonne finally (9's, modules, 8's).
B. PDP-10 Prospects: U. of Indiana, R. R. Donnelly (typesetting).
C. Nuclear Data buying basic 9's.
D. Cutler Hammer buying 8's under AIL blanket order.

VIII Key Competition (in order)

Computers	Modules
SDS	EECO
Interdata	SDS
CDC	3C
ADI	
3C	

*Note significant weakness of 3C

KEY CUSTOMER/PROSPECT LIST

AREA	CUSTOMER	KEY	PRODUCT	1968 FORECAST
Chicago				700K
	Argonne	✓	C,M	
	U. of Chicago	✓	C	
	Allied		M	
	R. R. Donnelly	✓		
	Nuclear Data		C	
	Northwestern U.		C	
	Bell Tel.		C.M	
	Western Electric		M	
	Zenith Radio (Mil. Prod. Div.)		M	
	Illinois Tool Works			
	Victor Electronics			
	Engis Equipment (Hilger Watts)			
	Loyola			
	Bendix (Indiana)			
	International Harvester			
	Progressive High School in North Chicago area			
	M. Reese Hospital			
	Presbyterian Hospital, St. Luke			
	Honeywell Ind. Control Division			
Milwaukee				900K
	General Electric X-Ray		C	
	Badger Meter		C,M	
	Cutler Hammer			
	Marquette U. and related Medical Schools		C	
	RVA - Racine Vicker Armstrong			
	Machine tool manufacturers			
	A.C. Electronics			
St. Louis				250K
	McDonnell Aircraft			
	Conductron (training devices)			
	Washington U.		C,M	
	St. Louis U.		C	
	Monsanto			
	Emerson Electric			
	U. of Missouri			
	Jewish Hospital			
	Kirksville College			
	Columbia Gazette (type)			

AREA	CUSTOMER	KEY	PRODUCT	1968 FORECAST
Madison				150K
	U. of Wisconsin		C	
	Woodward Governor (Rockford)			
	Sunstream Aviation			
Minnesota				150K
	Fabritek			
	U. of Minnesota		C	
	3M			
	Mayo Clinic (Rochester)			
	Hospitals (St. Mary's, etc.)			
	Weismantel Associates (systems)			
	MTS Corporation (hydraulic servo, test systems)			
	Honeywell			
Urbana (Illinois)				150K
	U. of Illinois		C	
	Bradley Univ. (Peoria)			
	Indiana State Univ.			
	Crane Naval			
	Tri-State College			
Indianapolis (and Lafayette)				300K
	RCA (Home Instrument Div.)			
	Indiana Univ. Med. Center			
	Indiana Univ. (Bloomington)			
	Western Electric			
	Purdue		C, L-8's	
	Duncan Electric		M	
Kansas City (Miss.)				100K
	Bendix			
	Western Electric			
	TWA			
Iowa				50K
	U. of Iowa		L-8	

Ken Olsen

digital INTEROFFICE MEMORANDUM

Memo #64

DATE: July 12, 1967

SUBJECT: Storage of flammable liquids

TO: All department managers FROM: Al Hanson

Digital has just recently acquired an excellent storage area for flammable liquids. This facility is located on the first floor of Building #5 (Walnut Street end) and has sufficient capacity to store all red-label material for the entire plant. This area will be shown to anyone upon request.

The following rules are suggested by our insurance carrier:

1. That all flammable liquids be stored in a Class I-Group D classified area. (This area is Classified Class I-Group D).

2. That all flammable liquids used in the plant shall be removed from the classified area on a daily basis in approved safety cans. Any flammable liquid left over at the end of the day's work, shall be returned to the classified area that same day.

3. All flammable liquids shall be sent to the classified area immediately after they have been properly received by the Receiving Department.

If there are any further questions or if I can be of any assistance, please call.

cc: Department Managers
Receiving
Purchasing

AWH/sc

digital INTEROFFICE MEMORANDUM

DATE: July 7, 1967

SUBJECT: Engineering Work in Canada

TO: Ken Olsen

FROM: Harry S. Mann

The Canadian government has several programs for sharing the costs of doing engineering and research in Canada. In reading the material on these programs, I find that there is no requirement that the company turn over its work to the government or to others for their use, nor is there any special constraints or procedures that one has to follow. These conditions, of course, are very unlike those which are in vogue in the United States.

The problem that we should address ourselves to is whether, as a matter of company policy, we would be prepared to do any engineering work in Canada and make application for approval by the Canadian government for a grant and set up to do the work, assuming we got such approval. This would only make sense, of course, if we felt we could efficiently handle engineering projects in Canada.

If there is any interest in pursuing this approach, I would be willing to undertake a visit to the proper authorities in Canada, with other interested people, and find out from them more specifically what kind of program they would approve and what other ground rules they would want us to work to beyond those shown in the documentation.

HSM/ml