

cc - Operations Comm. 1/10/68

DEC 28 REC'D

*John Jones*  
*Mike Ford*  
*Mort Ruderman*

DIGITAL INTEROFFICE MEMORANDUM

DATE: December 26, 1967

SUBJECT: RANDOM CONCERNS AND FEARS ABOUT FUTURE DEC PRODUCTS AND DESIGN PHILOSOPHY

TO: Ted Johnson FROM: Jack Shields *discussion folder*

As we continue to grow we are developing more and more powerful products that have lower prices. I feel we have made considerable contributions to industry in this area. However, I do have some concerns about potential problems on future generations of machines.

1. Almost all of our engineers are very conscientious of tangible costs and strive diligently to keep these to the lowest possible level; e.g., number of components, modules, interconnectors, etc. As we continue to try to reduce the costs in this area, we introduce complexity rather than simplicity and I don't really feel that our engineering staff has a good basis for evaluating trade-offs.

*what chance do you have to develop this kind of thinking*

2. When it comes to costs of testing and field maintainability, our component and automated testing costs are being reduced considerably, yet our field service costs continue to rise due primarily to the fact that most of the costs are the use of highly skilled labor. Therefore, it would seem reasonable to use more components, etc., as required, in order to make a simple easily maintained machine.

*some idea*

PDP-9 is a good example. It is a good competitive product in its price range, however, it is a very, very difficult machine to maintain because of the use of different techniques and its design philosophy. It has very little built in maintenance aids. For example, we don't even have a set of MA indicators even though this was requested time after time in the design process and brought up at the design review. Most diodes are all wired in to the memory stack -- assumption the diodes will hardly ever fail.

Murphy's law prevails and most memory failures most frequently have been traced to these diodes. The problem of replacing a simple 12¢ diode is very complex and costly.

1/5/68 cc. KHolsen

*As you see, Jack is very concerned about the "trade-offs" implicit in new product designs.*

*Ted*

3. The large module philosophy of PDP-X concerns me greatly, and I just flatly don't believe it can be done. Experience dictates these decisions, yet we don't seem to take advantage of our experience. I don't mind problems, but continuous reoccurrences of the same problems are inexcusable.

After asking a few questions on PDP-X it becomes obvious that the machine will have control memory for instruction implementation and will also use this technique for peripheral controls. I contend this is a very complex system which will be extremely difficult to maintain and that the manufacturing savings will be written off in field problem costs and customer and sales frustration which are impossible to evaluate.

God knows we have enough problems with our OEM customers trying to maintain "simple computers" like the PDP-8. What will they do with machines like these?

Do you have any idea how we can inject some of these thoughts into the minds of our new product engineers? 

Why is it Bob Savell has so much feeling for this problem area?

Why can't we draw on past experience and mistakes?

Is it primarily new people with new ideas or old people with the same naivete? Can't we build a simple, reliable, more expensive OEM computer? 

JJS:ned

E. D. Castro  
M. Ford  
P. Kaufman  
D. Knolls  
N. Mozzarese

K. Olsen  
J. Prentice  
J. Smith  
R. Sogge

12/24/67  
Pg 1 of 7

To List

From Jlt Amour

Subject: BI - Repackaging proposal

Outlined below is a proposal for repackaging the BI which differs from the charges discussed Friday 12/22. These charges can be accomplished in a minimum of time provided an <sup>approximate 2"</sup> increase in wire length for not greater than 5% of the wire count will not affect performance.

The change involves cutting and folding the main frame casting to put the central <sup>processor units</sup> in a modular package, repackaging the power supply into a modular package to be installed <sup>in</sup> ~~separately~~ the same <sup>manner</sup> as other options, rotating all cabinet frame member (legs) 90° to provide room for wire routing and dress, dressing all wires so that no slack exists when the units are all the way in or all the way out of the

unit, reworking the control panels <sup>and other items</sup> as recommended and reevaluation of cooling including opening up sheet metal in options for better flow and obtaining <sup>some</sup> control over the air pattern.

This change is recommended over that previous discussed since it gets us closer to the ideal configuration. All items will be 19" rack mountable in the same manner. It is possible that the original option ~~package~~ <sup>count</sup> for a single 19" rack can be maintained.

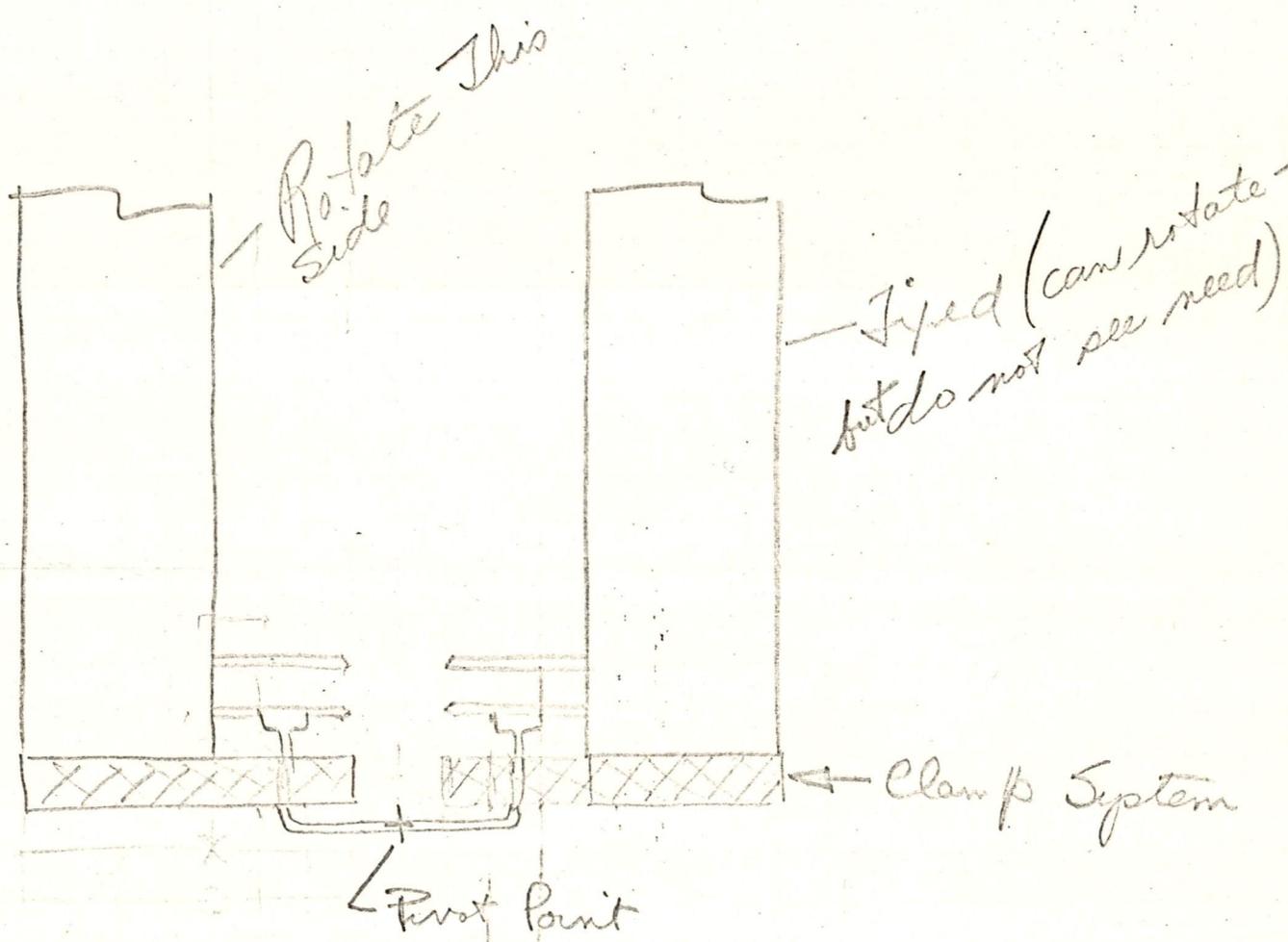
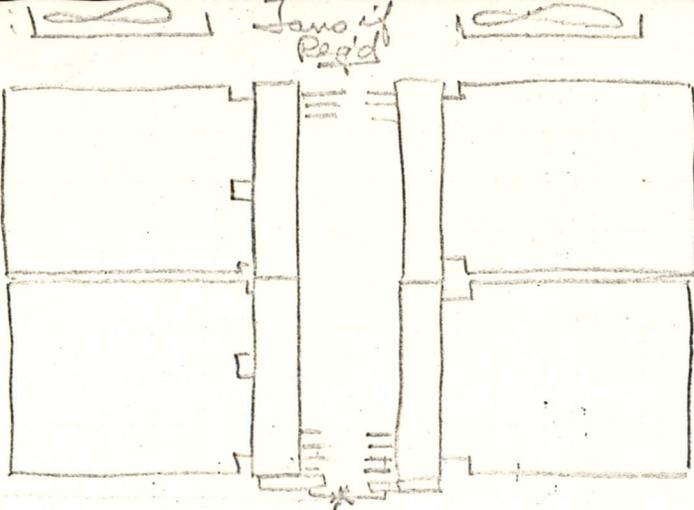
Mechanical Engineering will have a mock up of the changes proposed Friday 12/22 available for critique Friday 12/29. If the attached proposal is of interest, a similar mock up of this configuration can be available at the same time. We ~~should have~~ <sup>need</sup> an opinion on effect of increased wire lengths before going <sup>so</sup> far down this road <sub>in this direction</sub>

(A) Central Processor into modular pkg. -

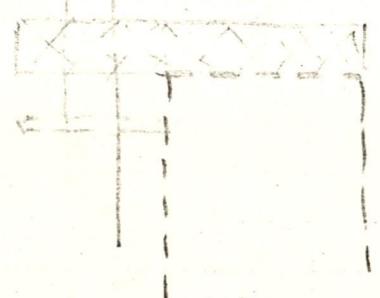
- (a) cut casting approx midway between 2<sup>nd</sup> row of blocks
- (b) add splice + pivot member to open up casting
- (c) Add <sup>2,000 inches</sup> members for wire clamping and spacing of blocks
- (d) Change wire list to add 2,000 inches to wires that cross area now spaced
- (e) Assemble as previous except include spacers + clamp members
- (f) Wire wrap to same pins - will need some new lengths (<5% of wires)
- (g) After wire wrapping clamp wires that cross "gap" (need procedure)
- (h) Rotate into "closed" position
- (i) Assemble into cabinet mtg

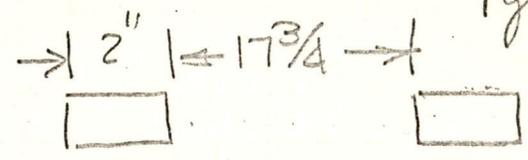
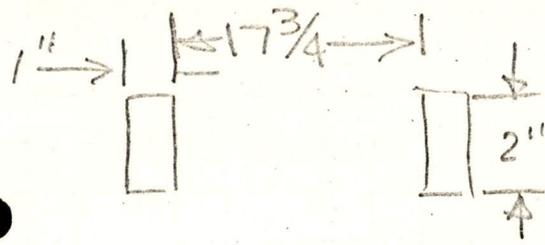
Note - See pg 4 of 7 for sketch of proposed configuration

- (B) Repackage power supply into modular pkg for 19" rack
- (C) Rotate cabinet frame members 90° to provide room for wire routing + dress - (see sketch Pg 5 of 7)



Assembly to be  
 mtd on frame for  
 "drawer" type  
 insertion + withdrawal





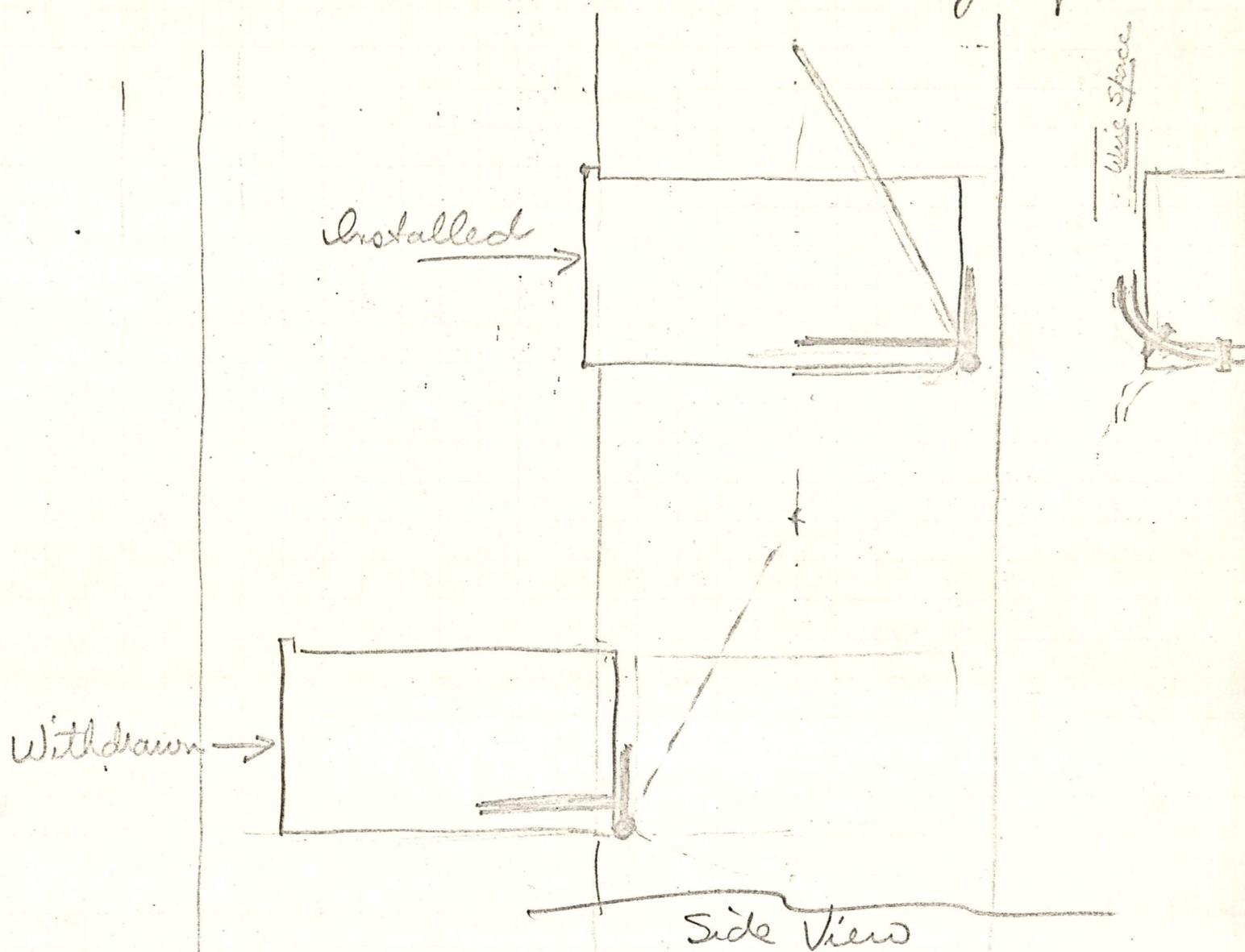
Present leg construction

Proposed const.

Note - Have not measured but do not expect overall cabinet dim to be greater than Budd or Amcor INCOR

- D. Dress all wires so that no slack exists when units are all way in or all way out. - Proposed method also eliminates all floating wires within basic cabinet space.

All cabling etc will be clamped to option and extend into space created by rotating cabinet frame members. See sketch pg. 6 of 7 for description.



- (a) Cables go from sub ass'y into side wall space
- (b) Cans go up or down after entry into this space
- (c) will go to central pivot point for distribution as req'd
- (d) Can alternate cables <sup>from each option</sup> left + right if req'd for free movement.
- (e) Should be able to make "harness" of cable assemblies for production installation

E Rework control panel  
Power distribution wiring etc

F - Reevaluation of cooling -

- (a) Open up solid sheet metal on bottoms of options for better air distribution
- (b) Air input should be based on item with critical cooling need (believe this is dice)
- (c) Look at possibility of locating major fan between central processors and power supply pulling air from top (to ana need of b)
- (d) Evaluate opening patterns on top of unit to determine if ~~(can)~~ can obtain better cooling in critical areas
- (e)

**digital**

INTEROFFICE MEMORANDUM

DATE: December 21, 1967

SUBJECT: PAINT ON OUR CABINETS

TO: Ken Olsen  
cc: Pete Kaufmann

FROM: Loren Prentice

I asked Dave Nevala to check into the field service complaint that the paint peals off our cabinets. This is the result of his findings.

Approximately six months ago a set of 19" cabinets were painted without either a wash primer or zinc chromate under the paint. As many as could be found at that time were retrieved. He also found approximately ten PDP-10 cabinets that are presently assembled upstairs without the proper base preparation.

We were not able to find out exactly how many 19" cabinets might have slipped through.

Loren

jaf

**digital**

INTEROFFICE MEMORANDUM

DATE: December 19, 1967

SUBJECT: MR. THEODORE BIRNBAUM - YOUR MEMO OF DECEMBER 6, 1967

TO: Ken Olsen

FROM: Mike Ford

1. Does your respect for his confidences permit us to contact him regarding PDP-8 as a part of his system? What was his reaction to your suggestion of using PDP-8?
2. As you may know, Bill Congleton was investigating a proposal from a Photon executive to go into a similar business. The Photon executive came to us (Stan) and we sent him to ARD.
3. It's a tough business; no one has really been successful except Alphanumeric and Larry Buckland. The key that both have is superb technical talent (hardware and software). Lots of people try without one or the other and lose - I think including RCA!

Mike

eem

**digital**

**INTEROFFICE MEMORANDUM**

**DATE:** December 13, 1967

**SUBJECT:** Parking Lot

**TO:** Ken Olsen

**FROM:** Harry S. Mann

You asked whether or not we could fill in the cove between the new parking lot and the road to give us more access to the road. The direct answer to this question is that we could only do it by getting a further approval from the town and the Conservation Department, etc. The agreement we had with them only covered the area currently prepared and by implication developing the walkways from that new area to Building 5.

The cost elements that would be involved in further filling of the pond are rather prohibitive. In the first place, we would have to truck fill in from some outside location, plus the fact that, aside from this cove area, the pond gets quite deep. For these reasons, we question the wisdom of further filling of the pond except as a last resort.

An alternative that may be worth looking at in the future is the possibility of draining the pond completely and doing what had to be done to make the bottom useable for a parking lot. This would probably be less expensive and might possibly avoid any further arguments with the conservation people on the grounds that the conservation acts all relate to protecting a water supply from contamination, etc. The objections to this approach are, of course, you would be parking on a still lower level and making the connection to the plant that much more difficult. The other objection is that we would be losing a good source of firefighting water if we were to eliminate the pond.

As you may recall, we are facing another potential problem in our existing parking lot by the fact that Mr. Ledgard, who owns approximately 2/3 of the original Thompson Street parking area, is asking for a fantastic increase in rental following the expiration of the lease in 1972. I hope we can work this out satisfactorily and would be very reluctant to be forced to lease this property at an unreasonable rate. Time will tell on this score. In the meantime, we are quietly looking around the rest of the land surrounding the mill to see if there are any other likely spots within reasonable distance that we could use for parking, not only for the possibility of replacing the Ledgard land, but also to provide additional facilities for further expansion.

*Ken Olsen*

DEC 6 1967



# INTEROFFICE MEMORANDUM

DATE: December 6, 1967

SUBJECT: MODULE SALES

TO: Stan Olsen  
cc: Al Devault

FROM: Saul Dinman

As you know, we are currently running at less than half of our allocated amount of sales time. It is true, however, that we are making our booking quota as a whole, even though some regions are far below their quotas.

From time to time I have heard attitudes expressed by field sales personnel and management that are worrisome with respect to the future performance we have projected for the module product line. Attitudes such as, "Module sales is a training ground for salesmen". "You get promoted from module sales to computer sales." "We teach our salesmen by letting them sell modules and when they prove they're really good salesmen, we put them on computer sales." "If we are to be judged by a figure of merit system that directly relates to dollar volume sold, why should we sell anything but PDP-9's and 10's." These are the kinds of attitudes that can really put a crimp in the module product line's growth, assuming our projections of potential are correct.

I feel that the only way to change peoples' attitudes now is to offer a reason to view module selling as a way to achieve personal and professional growth. If the figure of merit system is to be used to judge sales performance, then it should be modified by a multiplier which normalizes the F.M. to reflect its contribution to corporate profits, i.e. the multiplier should be \$profit/\$volume of a particular product line sold. This would rate the salesman on his active contribution to corporate profits, rather than corporate dollar volume.

Another problem area is the crediting of orders booked directly by Maynard from continuing customers. Many customers after purchasing an initial order through a salesman for a prototype run (i.e. generally a small order) start ordering their production quantities directly from Maynard. The credit for these orders gets transferred back to the cognizant sales office but not the salesman who really made the sale. If the figure of merit system is to be used, the credit for continuing sales to a customer must be credited to the cognizant salesman.

If the current trend of using module sales as a training ground is to continue and a figure of merit system based purely on dollar volume is to be used, the module product line must assume the volume generated by field sales will saturate sometime in the near future. If this is so we still have other alternatives available. One is to hire salesmen who are dedicated only to module sales and who rated on a figure of merit system that only applies to module sales and not total corporate sales. Another method is to establish a "super" sales team at Maynard that works directly for the product line and let them "blitz" certain customers who are chosen by their potential dollar volume. This group would work in conjunction with the local field salesmen and credit for the sale would be transferred to him.

Memo to: Stan Olsen

- 2 -

December 6, 1967

If we really believe that the module product line will continue to grow as we have projected it, we must start work on some system that will assure us of enough sales time to meet future projections.

SBD:cc

digital

INTEROFFICE MEMORANDUM

DATE: December 6, 1967

SUBJECT: STUDY BEING MADE BY CORAL RESEARCH IN JAPAN

TO: Ken Olsen ←  
Nick Mazzaresse  
Stan Olsen  
Win Hindle  
Harry Mann  
Pete Kaufmann

FROM: Ted Johnson

This is a demonstration of some of the data being collected by CORAL Research in Japan.

Mr. Ingoldsby will be in the U.S. soon and I will work with him early in January. He will report to us mid-January. I plan to have a clear plan by that time and prepare some moves as part of a proposed effort for the coming calendar year.

We apparently had a good indication of interest at the recent physics show, U.S. Trade Center, Tokyo.

enc.

CORAL, INC.

MARKETING RESEARCH CONSULTANTS

Central Building  
30, 4-chome, Jingu-mae  
Shibuya-ku, Tokyo  
Telephone: 408-3401,  
403-2625, 403-0351

NOV 30 REC'D

November 25, 1967

Mr. Ted G. Johnson  
General Sales Manager  
Digital Equipment Corp.  
146 Main Street  
Maynard, Massachusetts

Dear Ted:

The study of Japan current and potential DEC equipment users has progressed through a satisfactory test phase and is now in the full scale field phase. A preliminary test of user companies was initiated on November 13th following receipt of the company list for research from Ron Wilson on November 12th. The test was completed on November 18th with evaluation completed on the 20th. The full scale field phase was initiated from November 21st. Several minor adjustments have been made in approach systems and questioning techniques, however, in general, the quality of data obtained is considered very satisfactory. A summary of data areas obtained is enclosed for one company checked, Toshiba Beckman. This data is not in final form and is merely to demonstrate the types of data being obtained.

Fee for the study is as discussed at one hundred dollars per case. The list provided by Ron Wilson requires 29 cases. Total fee, if all cases are satisfactorily completed, is thus \$2,900. Generally fees are billed one half at initiation of the study and one half at completion and approval. We have therefore provided an invoice for one half of project fee.

Mr. Ted Johnson

- 2 -

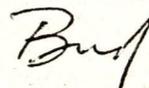
November 25, 1967

Completion of the study and final presentation is estimated for January 25th. We had hoped to complete the study somewhat earlier however we have found an incremental time element is required a) to pinpoint appropriate purchase decision-makers and b) since considerable field staff travel time will be involved. I expect to be in the United States from late December and will maintain contact with you to arrange a convenient time to meet and review the project.

Incidentally as requested by Ron Wilson we are currently investigating Mr. Shiraiwa to determine the reasons behind his termination at Rikei. A small charge covering our expenses will be made at the time of presentation.

With best regards,

Sincerely,



Francis H. Ingoldsby

FHI:ay

TOSHIBA BECKMAN - SUMMARIZED FIELD DATA

1. PRODUCT

A. Familiarity with DEC Product:-

Toshiba Beckman is most familiar with DEC models PDP-8 and PDP-8-S. They also understand DEC produces a LINC-8. However they have no knowledge of any other DEC products. On all 3 products which are known to Toshiba Beckman they would like more information. They have been provided to date one Xerox copy of the DEC catalog. If possible they would like to receive at least 10 original copies of the DEC catalog.

B. Comparison to Competing Products:-

Toshiba Beckman believes that the PDP-8 series computers at the present time have no competition in Japan. Other medium and large DEC equipment is competing with Hitachi, NEC, Fujitsu and IBM.

Toshiba Beckman considers themselves qualified only to evaluate PDP-8-S product. This product is rated excellent as a small size, versatile, inexpensive computer. They are not sure about other DEC product however.

The only problems Toshiba Beckman has had with DEC PDP-8-S equipment are minor to date. PDP-8-S part W706 and

W707 caused some trouble. According to their reading of the DEC catalog the part could be used at 32°C and above. They used the equipment at 70°C and the part was damaged. Thus they believe temperature range may be a future problem and that IC used in equipment may cause trouble. They have also had some problems with word-time generator unit parts A38 and R111. They believe root of the problems may be in faulty diodes. A settlement on all problems has been satisfactorily negotiated with U.S. Beckman Co. who provided free replacements for faulty parts since breakdowns occurred during the warrantee period. Toshiba Beckman expects no trouble in the future.

C. Applications of DEC Product:-

The company uses DEC product in equipment sold to the a) auto industry for automobile exhaust gas analytical systems, b) the chemical industry in equipment used for control of chemical plants.

2. AGENT

A. Introduction to Rikei

Toshiba Beckman case learned about DEC product initially from the U.S. Beckman Co. since DEC equipment was incorporated in some Beckman systems. Their first DEC equipment purchase was direct from the U.S. for a Fuji Heavy Industry installation. Toshiba Beckman learned about Rikei at a U.S. Trade Center electronics show in which DEC participated. Rikei sent an engineer to assist in their first installation for Fuji and the technician spent three days with Toshiba Beckman.

B. Information provided by Rikei - General

Rikei provided PDP-8 and PDP-8-S data at Toshiba Beckman's request. However this material was contained in one Xerox copy of a catalog as was noted earlier. Materials were passed to them directly by DEC salesmen. Currently DEC salesmen call twice monthly. Primarily interested in the PDP-8-S, Toshiba Beckman has talked with Rikei engineers as well as salesmen about various aspects of this computer. They are satisfied with the information they have received about the PDP-8-S.

C. Information provided - Spare Parts

Toshiba Beckman has discussed DEC spare parts with Rikei several times. They have imported \$1,300 worth of spare parts through Rikei. Although they have asked Rikei for advice on quantity and administration systems for establishing spare parts inventory no advice or assistance on this has been forthcoming to date from Rikei.

D. Quality of Sales Force

They feel Rikei salesmen are honest and sincere in approaches and rate them high for this reason. Salesmen knowledge of products is general but satisfactory from their standpoint. Sales engineers appear well qualified and knowledgeable in DEC PDP-8-S product.

E. Impression of Service Available

Toshiba Beckman expresses concern about the size of Rikei sales and sales engineer staff. While not knowing exact size they feel it is too small to do an adequate all around job. They noted that when they requested an engineer for the PDP-8-S installation they had to wait since one was not available immediately. Thus they feel that Rikei may have only 5 or 6 engineers and this may cause problems as the

number of installations grow and user situations arise  
requiring immediate assistance.

3. SERVICE QUALITY

Service is divided into both installation service and afterservice in maintaining systems. Toshiba Beckman in terms of their limited service experience with Rikei considers that an adequate servicing job is being performed by the agent. Installation assistance provided thus far has been satisfactory. They as yet have no afterservice experience. Engineering assistance for applications evaluation is satisfactory. In general, they feel that Rikei does an honest and sincere job in attempting to provide service. Generally, imported items require longer waits for replacement of parts and service is usually inferior as compared to domestic companies. However, Rikei is working hard at providing service and this attitude balances out the shortcomings of delays for imports.

4. PROMOTIONAL IMPACT

A. DEC Promotions noted

The only promotion noted by Toshiba Beckman for DEC product has been participation in a U.S. Trade Center exhibition.

B. PR Areas for greater emphasis

This firm strongly believes that DEC should place much greater initial emphasis on clearly establishing a corporate image because they feel DEC is not well known as yet in Japan. Secondly, in terms of product emphasis, Toshiba Beckman believes that DEC should concentrate promotional activity on two products; the PDP-8-S and LINC-8. They feel the small computer line is so good it should be the focus of all DEC attention. As well a permanent exhibition of the PDP-8-S should be considered with occasional lectures and demonstrations of product. A key weakness of DEC according to Toshiba Beckman is that the name of DEC and their product is not well known due to lack of promotion. Their feeling is that DEC should attempt to build a 'small IBM' type image; solid, versatile, etc.

5. SALES POLICIES

Toshiba Beckman is not aware of Rikei sales policies for computers since no purchases have been consummated. However in terms of spare parts payment terms, they negotiated an initial Rikei position of 90 days to 120 days.

Delivery for the spare parts was delayed 10 days from contract date but since the fault for delay was partially their own (improper purchase record and license delay) no claim was made.

In terms of computer pricing by Rikei, the PDP-8-S is being quoted at ¥5,200,000 according to Toshiba (parent co.) as relayed to Toshiba Beckman. They are not sure of PDP-8 price but believe it is more expensive than the 8-S. Generally this firm believes the DEC price is inexpensive and below what similar equipment would cost to make in Japan.

Toshiba Beckman considers the 3 month guarantee period for computers provided from shipment as too short and not competitive. It reveals, they believe, that DEC is not confident of their own product. Japanese buyers are quite sensitive on this point and like 6 to 12 month guarantees according to Toshiba Beckman. Since the 3 month DEC guarantee is from shipment date it provides in effect a 1 month operational guarantee if shipment and installation time is considered. This is a severe weakness of DEC sales policy at present according to Toshiba Beckman.

6. CONCLUSION

A. Rating of Rikei Sangyo

Toshiba Beckman feels that, comparatively, Rikei is a satisfactory agent as far as sales to them are concerned. On a scale of 10 they rate Rikei 8 at present in terms of all variables. The rating is designed so that a figure of over 5 indicates a positive agent impact.

B. Key Computer Purchase Decision Variables

In making a computer purchase decision Toshiba Beckman rates the following factors of primary importance:

Quality

Price

Delivery Terms

Service (installation & afterservice)

Of secondary importance are:

Payment Terms

Sales Engineering Service  
(assistance on determining applications  
prior to sale, etc.)

Sales Promotions

Of minor importance is:

Whether product is produced in Japan  
or abroad

C. Future Plans

Presently Toshiba Beckman has plans to purchase one PDP-8-S in the near future for incorporation in a system to be sold to an automobile firm. Also possible is another sale incorporating a DEC PDP-8-S for a chemical process control application.

**digital**

INTEROFFICE MEMORANDUM

DATE: December 1, 1967

SUBJECT: MODEL BUILDING

TO: Ken Olsen

FROM: Bob Collings

cc: Dave Packer

Dave Packer and I have begun to explore the following areas where model building techniques may be appropriate:

Corporate and Product Line Profit and Loss

Cost Center Budgeting

Market Models

Production Models

Product Life Cycle

Dave has made arrangements for us to meet with several of the MIT people who are prominent in the field, beginning on Wednesday, December 6. I think it would be best to wait until this familiarization process has been completed before bringing the subject to the Operations Committee for discussion.

Bob

mac

**digital**

INTEROFFICE MEMORANDUM

DATE: December 1, 1967

SUBJECT: A. De Vitry's Letter of 10 November 1967.

TO: Ken Olsen  
cc: Harry Mann

FROM: Ted Johnson

Dr. Storey bought the first PDP-5 in France. I sold it to him. I'm surprised to hear that he's back in Canada. I think he's a fine person. I'm not sure if he'd fit in our organization, but I'd like to explore it with him. I will contact him if you want me to and also write an answer to Arnaud.

Ted

mr  
Attachment

11/21  
cc - Harry Mann  
Fred Johnson

ARNAUD DE VITRY

12, RUE DE LA PAIX  
PARIS 2. FRANCE

November 10th 1967

Mr. Kenneth H. Olsen  
Digital Equipment Corporation  
Maynard, Mass.

Dear Ken,

During my visit to Maynard, I mentioned briefly the desirability of giving a lot of study to DEC's position in Europe five to ten years from now. I would certainly be happy to discuss this subject in more detail with whomever you would like to designate to work more particularly on this question.

Thinking that, long-term, you may be interested in attracting top people who may want to stay resident in Europe while in the employ of DEC, I shall try to send you information on top candidates who may be of interest to DEC for Europe.

I am told that such a man might become available approximately a year from now: Mr. L. R. O. Storey, a U.K. citizen who worked for many years at the Observatoire de Paris. He is one of the great specialists on the study of propagation of low-frequency waves and was one of the first clients of DEC in France. I believe he bought one of the PDP 4s. Mr. Storey has recently decided to find another occupation and is presently, for one year, teaching in the Department of Physics at the University of Toronto. You may want to check through John Jones whether he knows Mr. Storey and maybe have Mr. Storey visited in Toronto to see if he could fit with your short-term plans in the U.S. and your long-term plans in Europe. He is a close friend of Mr. Jean Lebel, who recommends him highly.

Yours sincerely, .

A. de Vitry

**digital**

INTEROFFICE MEMORANDUM

DATE: November 30, 1967

SUBJECT: 8/I Design

TO: Joe St. Amour

FROM: Pete Kaufmann

cc: Ken Olsen  
Nick Mazzaresse  
Mike Ford  
Dave Knoll  
Loren Prentice

Your meeting on the 8I Mechanical Design discussed some thirty-five items that needed to be fixed. I think this is the wrong approach to solving the problem and do not think this approach will yield the necessary results.

Would like you to call a smaller meeting soon, consisting of Mike Ford, Nick Mazzaresse, Ken Olsen, Loren Prentice, Dave Knoll, Dick Sogge, you, myself and anyone else anyone desires and start the mechanical design from the beginning again. Would like to start and reconsider the marketing constraints on the design and if we can modify or change those, think this will open up an entire new area of possibilities so that a completely new mechanical design for the 8I and our standard cabinet can be accomplished.

This is the only approach that makes any sense to me at this time.



Pete

jb

**digital**

## INTEROFFICE MEMORANDUM

DATE: November 29, 1967

SUBJECT: Graphics Group at BTL, M.H.  
(Dr. H.S. McDonald, Dr. W. Ninke, Dr. G. Baldwin)TO: Ken Olsen  
John Jones  
Ted JohnsonFROM: Dave Denniston  
Mid-Atlantic Region

About nine or ten months ago a three-way meeting was scheduled in Murray Hill between Bell Labs, NSA, and DEC. At that time five or six representatives from Digital visited with BTL. NSA was represented by Nick Farmer. Locally, we found out about the meeting only one or two days ahead of time and invited ourselves. The tone of the meeting was excellent; everyone agreed (or seemed to) on the proper structure for Graphics II. The idea at that time was to try to develop a standard product that would suit all parties represented. After this meeting, BTL began to get somewhat irritated with DEC, and felt that we had "dropped the ball". Dave Brown had agreed to write up minutes of this meeting, but this was forestalled by his work with the 338. In fact, feedback from DEC was at this point nonexistent. Finally, Nick Mazzaresse visited with Bell and things began to move forward with regard to DEC's roll in Graphics II. I believe that it was Bell that was aggressive in pushing this project forward, not DEC, and that their belief was that we should have been keenly interested.

Bill Ninke did, in fact, mention over lunch one day, "You guys ought to go out and see what the rest of the world is doing as well as MIT".

Bell has also developed a small totally incremental display system driven directly from a disc called GLANCE. This has been written up in several magazines. The prototype is presently running with a PDP-7 and a Data-Disc. Because of our earlier lack of enthusiasm with respect to development of Graphics II, BTL decided that a different supplier for this second system would probably be more preferable anyway, and they have adopted the DDP 516.

The delivery slip on PDP-9's was somewhat aggravating to Bell although they accepted it without too much comment. Their real disappointments came after the delivery of their systems. Another group in BTL, Winston-Salem, is also developing a Graphics system based on the PDP-9, using CDC display devices, called Graphics III.

These two groups have been fairly close and the competitive spirit has been friendly. Unfortunately, they have been in close communication over their mutual problems with the PDP-9's. I am sure that this has helped to spread the word far and wide throughout the Bell system that the PDP-9 is not an especially good machine. The major complaints from Bell have been as follows:

1. Engineering of the machine (and especially the options) was not complete when the system was shipped. The number of ECO's (as well as other malfunctions not covered by ECO's) have been almost too great to bear.
2. Documentation of the hardware, especially options, leaves a lot to be desired (they bought a 343 slave display with one of their PDP-9's, and the only documentation they received besides a set of logic prints was instructions on how to mount the "digital" logo, which I am afraid, made them smart a little more.
3. Diagnostic program indexing, along with an introduction to the proper customer use of diagnostics, is completely lacking. A general impression of our diagnostics is that we stuffed every write up that might be appropriate in a notebook without regard to order or usefulness.
4. They feel the physical construction of the machine is "cheap", and they have commented specifically upon the plastic front panels and the weak back plenum door frame.

After George Baldwin finally took over the final Graphics II development, Bill Ninke disappeared into the woodwork. I am positive that Bill is now developing a 16-bit oriented Graphics system as a follow-on to Graphics II, and my fear now is that our next offering will be too late, as were our M Series modules, to pick up this desirable Bell Labs business.

All in all, I feel that our relationship with this very key group in Bell has deteriorated drastically over the last year and a half. We in the field are certainly not completely blameless here either. I am sure that we could have pushed a little harder on the home office to try to keep this customer group as satisfied as possible. I look on this as a personal loss, since this is one of the first groups I worked with at Bell, and it has, indeed, been one of our most staunch supporters and best references within the Laboratories.

At this point, about the only approach to improved relations that I can see is to show genuine concern and to provide the best possible field service and support that we can, so that over the next six months to a year, we turn out looking better than Computer Control.

November 21, 1967

Sick Leave

Win Hindle

Pete Kaufmann

cc: Ken Olsen

C I noticed in the minutes of the Personnel Committee, November 10, that a doctor's certificate is required for hourly employees who are absent for five days because of illness. On the surface it would seem to me that people who are out five days at a clip or for an extended period of time usually have a good reason.

O The people I really worry about are those that take twelve long weekends during the course of a year, one day at a time, but always use their twelve days of sick pay. How can we control this?

P At a recent "tea" the lead personnel in modules reopened the question of why we don't pay for unused sick pay. The real question I guess is which way the net cost to the company is less.

Pete

jb

Y

**digital**

INTEROFFICE MEMORANDUM

DATE: November 21, 1967

SUBJECT:

TO: Ken Olsen

FROM: Lewis Illingworth

I called Mr. Parisi yesterday. He has bought out the military part of the General Electronic Labs, and manufactures special radio equipment. (Office phone: 254-2312, home phone: 332-9629.)

He estimates that \$10,000 is a conservative price for the navigation receiver in large quantity runs. The receiver design may be difficult if stringent phase shift limitations are imposed within the pass-band.

cmp



# INTEROFFICE MEMORANDUM

DATE: Nov. 20, 1967

SUBJECT: Plans for Display Systems

TO: Pat Greene

FROM: Klaus Pichler

CC: See Distribution

This memorandum describes the results of our experiments to put a quantitative measurement on the parameters that are important to cathode ray tube displays. In it you will find cost, as well as performance information describing the various approaches to the problem. The purpose of these experiments is to outline the possibilities before us, in order that we may choose a proper course for development of the analog front end.

The attached graph (Exhibit A) shows performance/price relationships of different display types which we are considering.

Three basic groups are shown:

- a) Displays for high precision applications.
- b) Displays for medium precision applications. (Digital resolution - 9 bits)
- c) Displays for remote terminals or alphanumeric displays with storage capabilities.

## Exhibit A

There are many factors which influence the choice of location on this curve, such as writing speed, brightness, spot size, display area, quantity of displayed information, contrast ratio, linearity, stability, repeatability, etc. One might argue as to the exact position of the various products on this curve; however, it does indicate the trend.

It is our opinion that we should undertake two projects immediately, one being the tv tube type random point plotter, i.e., using a standard tube. This package will satisfy the needs of several product lines for a cheap, random point plotter.

The area of viewing surface available to the user is a strong selling point when making cost comparisons.

The second project ought to be the replacement for the Type 30 display.

After completion of the two projects above we anticipate that it will be necessary to develop a remote graphics terminal. The parameters of this terminal are not completely defined at the present time.

#### Exhibit B

This shows in tabular form the different parameters by which we tried to make comparisons of the various approaches. You will notice that there is two general approaches to the problem. One being magnetic deflection and the other, electrostatic. We did include the Tektronix storage scope only to compare it on a few of the outlined points. This type of approach does not fit into the random point plotting situation unless there is a desired need for local refresh memory. Then it does become a competitor.

The established selling prices are based on two facts.

- 1) The manufacturing price is multiplied by a factor or 2.5, if it was manufactured by DEC.
- 2) If we purchase the item on the outside, then we add 30% to this cost for a comparative selling price. When an item is purchased on the outside, there is no value added by DEC, so in all fairness we must add this percentage when considering the price comparisons of the various approaches.

Exhibit C & D show the results of our spot size measurements of 19" and 23" standard tv tubes. We concluded that these tubes will perform adequately for the inexpensive random point plotter.

Contained in the appendix are some further comparisons of several different types. When we meet with the marketing people, we should firm up our future course of action.

Klaus

/ds

Enclosures

Distribution: D. Brown  
D. Cotton  
M. Ford  
L. Gale  
L. Halio  
J. Jones  
R. Lane  
N. Mazzaresse  
S. Ogden  
✓K. Olsen  
H. Painter  
M. Ruderman

APPENDIX

1) 16" Electromagnetic High Precision Display

This front end proposal has been described in detail in P. J. Greene Memo, titled XXXXX Display, October 18th, 1967. It represents a suggestion to reduce the price of the present Types 30 and 338 Display Systems. This offers a price reduction of 30%.

2) 16" Electrostatic High Precision Display

One of the major factors handicapping the performance of electromagnetic display is its plotting speed. This deficiency can be overcome by going to an electrostatic type tube. The trade off here is the high voltage necessary for the required deflection over a large screen face. This is typically 200 volts per inch. At the present time Sylvania manufactures a 16" CRT (16 AMP4) that does present the high quality required. The circuitry would have to be implemented by two vacuum tubes made by Raytheon. (CK5894, \$18.40 each). Although the CRT price is quite high, the following comparison indicates the "real" price of the tubes.

<u>Electrostatic</u>		<u>Electromagnetic</u>	
CRT	\$350.00	CRT	\$190.00
Screen Protect.	30.00	Yoke	192.00
	<u>\$380.00</u>		<u>\$382.00</u>

The high speed does not come free. The electrostatic high precision display will cost 15% more than the electromagnetic because of the 1000V deflection power supply.

3) TV Tube Type Display - Medium Precision, Medium Speed

Using ordinary television tubes with 23", 19", or 16" screens, a relatively inexpensive display can be built. The following points indicate what precautions must be taken to make the tv tube a useful computer driven display.

- a) Use 18KV anode high voltage (improves spot size as well as brightness).

- b) Use high Vg2 standard tubes operated at maximum Vg2 voltage (improves spot size but increases video drive requirements).
- c) Restrict the viewing area to 10" x 10" for 23" tube and 7.5" x 7.5" for 19" tube, (See Exhibit C and D - spot size uniform over viewing area. The smaller area reduces deflection drive requirements considerably)
- d) Redesign deflection yokes for equal impedance in X and Y.
- e) Use 9 bit accuracy for a closer match between digital and analog resolution.

Both the 19" and 23" tubes will fit in a standard 19" rack. In one case, the tube will be mounted vertically, and the other horizontally. This will not be apparent to the user because of the "bezeled off" viewing area.

Standard tv tubes are manufactured with P4 phosphor. If a customer decides to use this display for photographic work, the decay time of the phosphor becomes a problem. We could provide P7 phosphor (standard now on computer displays), as an option for additional cost. Another solution to the problem is to use a high precision slave for taking pictures.

#### 4) TV Type Tube Display for Remote Terminal

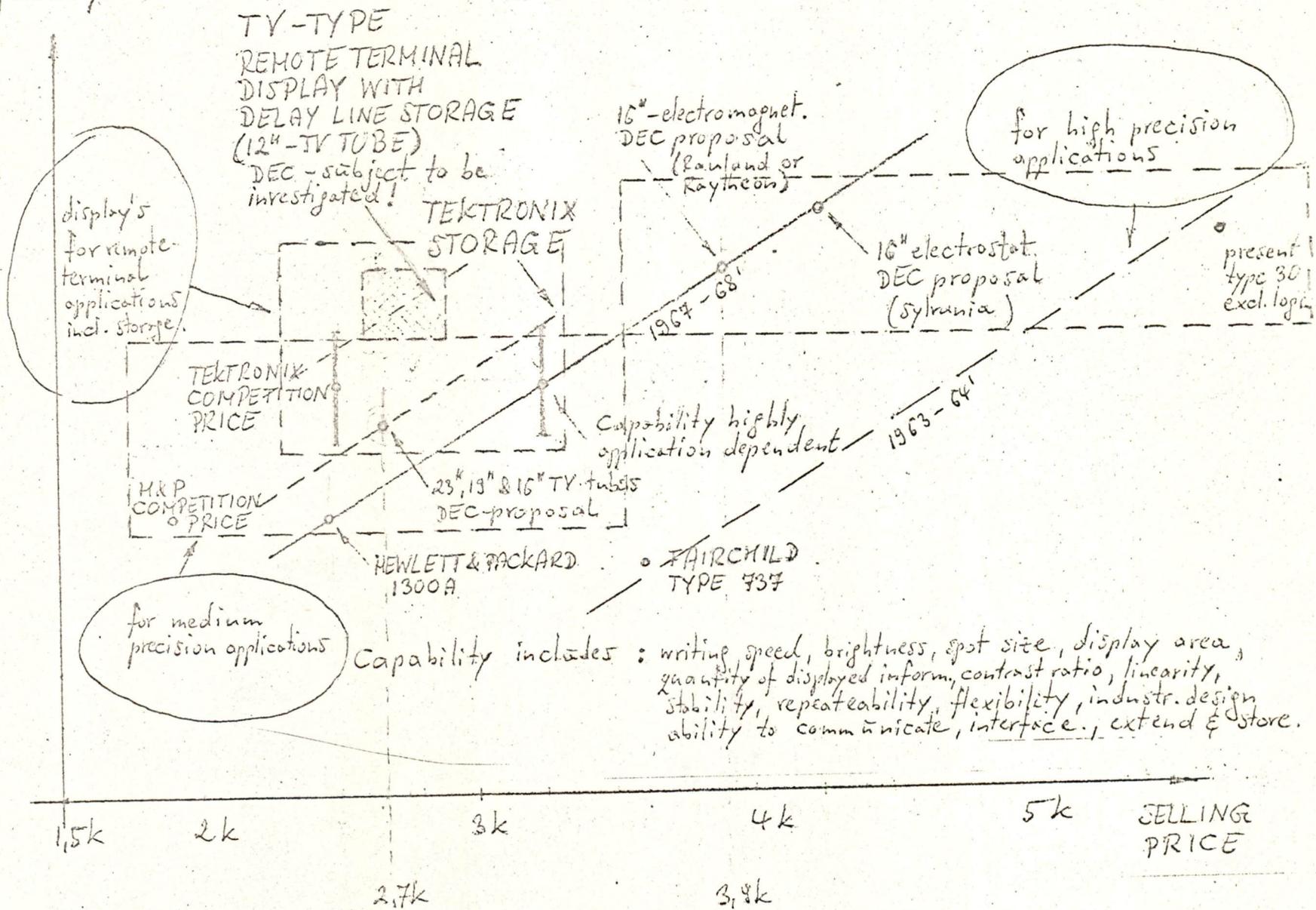
A remote terminal for a time sharing system requires in most cases a memory device. In our opinion, a delay line storage device has a very good performance/price ratio (storage tubes like Tektronix's have the disadvantage that no light pen device can be used, i.e., communication between display device and computer is very restricted). Because of the serial nature of information stored in a delay line, a tv raster type of deflection would give the best matching. The deflection circuitry and high voltage generator can be made much cheaper than the circuitry required for a point plotting device because of the bandwidth involved.

With estimated manufacturing costs of .5K for the display and .6K for the delay line storage (without logic), the selling price would be 2.75K. This would be very competitive with Tektronix's storage display:

Addition of the logic circuitry for character generation, editing and limited graph plotting capabilities would bring the total selling price to approximately 5K.

# Capability versus price relationship of CRT displays.

Capability



Capability includes: writing speed, brightness, spot size, display area, quantity of displayed inform, contrast ratio, linearity, stability, repeatability, flexibility, industr. design ability to communicate, interface, extend & store.

EXHIBIT B

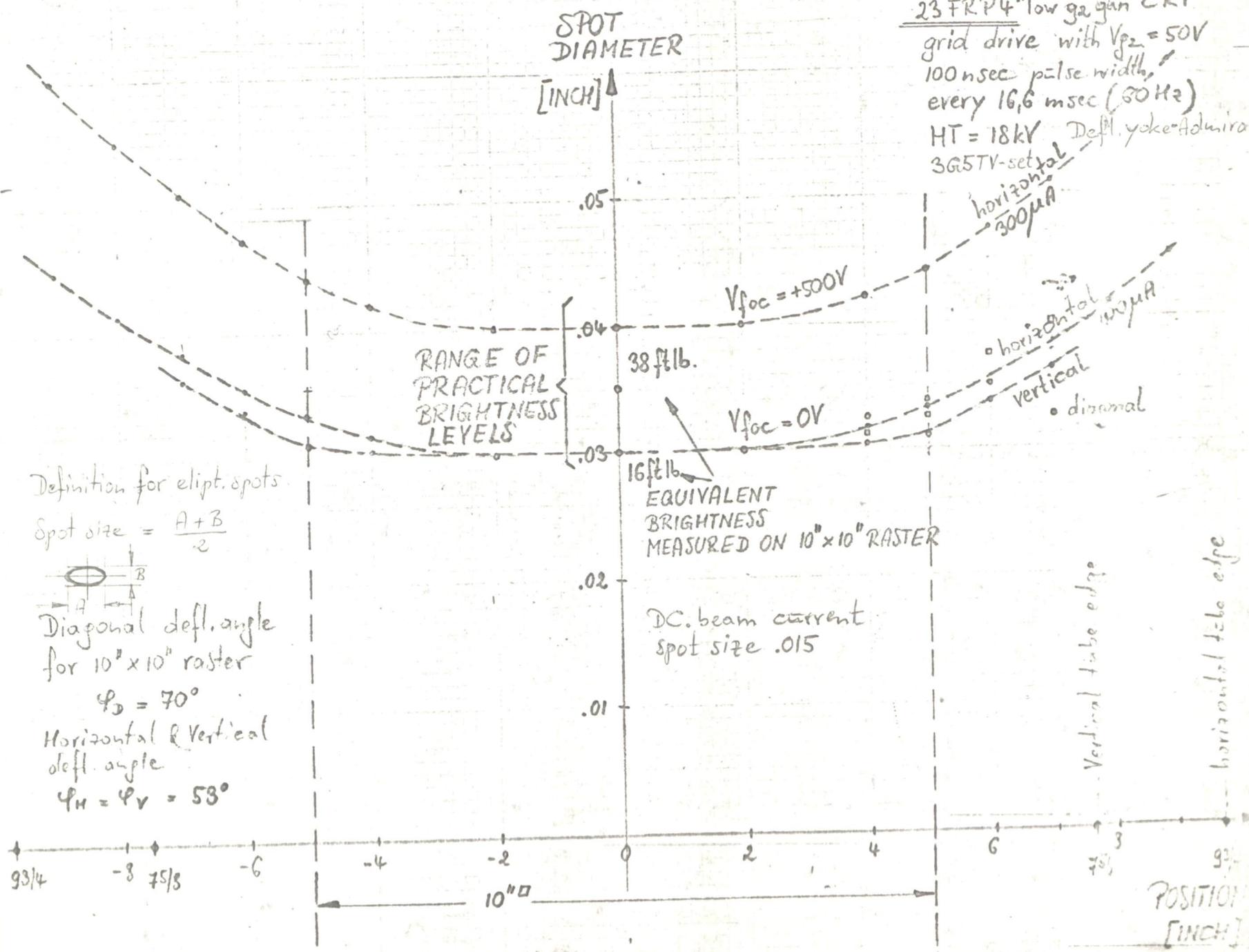
MAGNETIC DEFLECTION

ELECTROSTATIC DEFLECTION

	Present Type 30 Exc. logic circ.	16" Rauland Tube	19" TV Type 23" Tube	16" Sylvania Tube	H-P Electro. Post Accel Mesh Grid	Tektronix
CRT	130.	190.	20.	350.	H-P only	storage 8-1/2x11
Screen Protect	30.	none	none	30.	none	-
Mech. mount cabinet	240. 300.	25. 200.	none 200.	25. 200.	self contained	self contained
Defl. device	192.	192.	20.	none		
Defl. output amplifier	355.	240.	120.	150. (Electron- tube CK5894)		
Defl. pre- amplifier	240.	68.	68.	68.		
Foc. device	110.	none	none	none		
Power supplies						
low voltage	*250.	220.	220.	95.		
high voltage 1000v/100w	none	none	none	320.		
M.V.	125.	175.	175.	175.		
Intens. Ampl.	*50.	15.	15.	30.		
Bias control CRT-jungle	*50.	37.	37.	57.		
Spot size						
center	0.015"	0.020"	.040	0.020"	.030"	.020"
corner	0.030"					
Random Plott- ing speed	35μs	5μs	10μs	.5μs	.35μs	20μs
Precision	High	High	Med. High	High	Med.	Med.
Linearity	.1%	.1%	.5%	1%	±1%, 10% short vect	1%, 10% short vec
View surf.	10" x 10"	10" x 10"	10" x 10"	10" x 10"	8" x 10"	6-1/2" x
Drift	.1%/8 hr	.1%/8 hr	0.5%/8hr	.1"/hr	.1"/hr	.1%/hr
Price	\$2075. mfg.	\$1362. mfg.	\$875. mfg.	\$1500. mfg.	\$1900. sale	\$2500. sale
Checkout & Assy	\$ 200.	\$ 200.	\$200.	\$ 200.	-	-
Rolling price (x2.5 or cost +30%)	\$5688.	\$3905.	\$2678.	\$4250.	\$2470.	\$3250.
	*Est.					

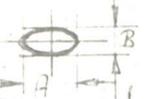
BY Bernard Nolan DATE 11/14/67 SUBJECT CRT SPOT SHEET NO. C OF  
 CHKD. BY K. Pichler DATE 11/14/67 JOB NO.

Worst case spot size measured on  
 23FRP4" low gain CRT  
 grid drive with  $V_{g2} = 50V$   
 100 nsec pulse width,  
 every 16.6 msec (60 Hz)  
 HT = 18kV Deft. yoke - Admiral's  
 3G5TV-set



Definition for elipt. spots

Spot size =  $\frac{A+B}{2}$



Diagonal defl. angle for 10" x 10" raster

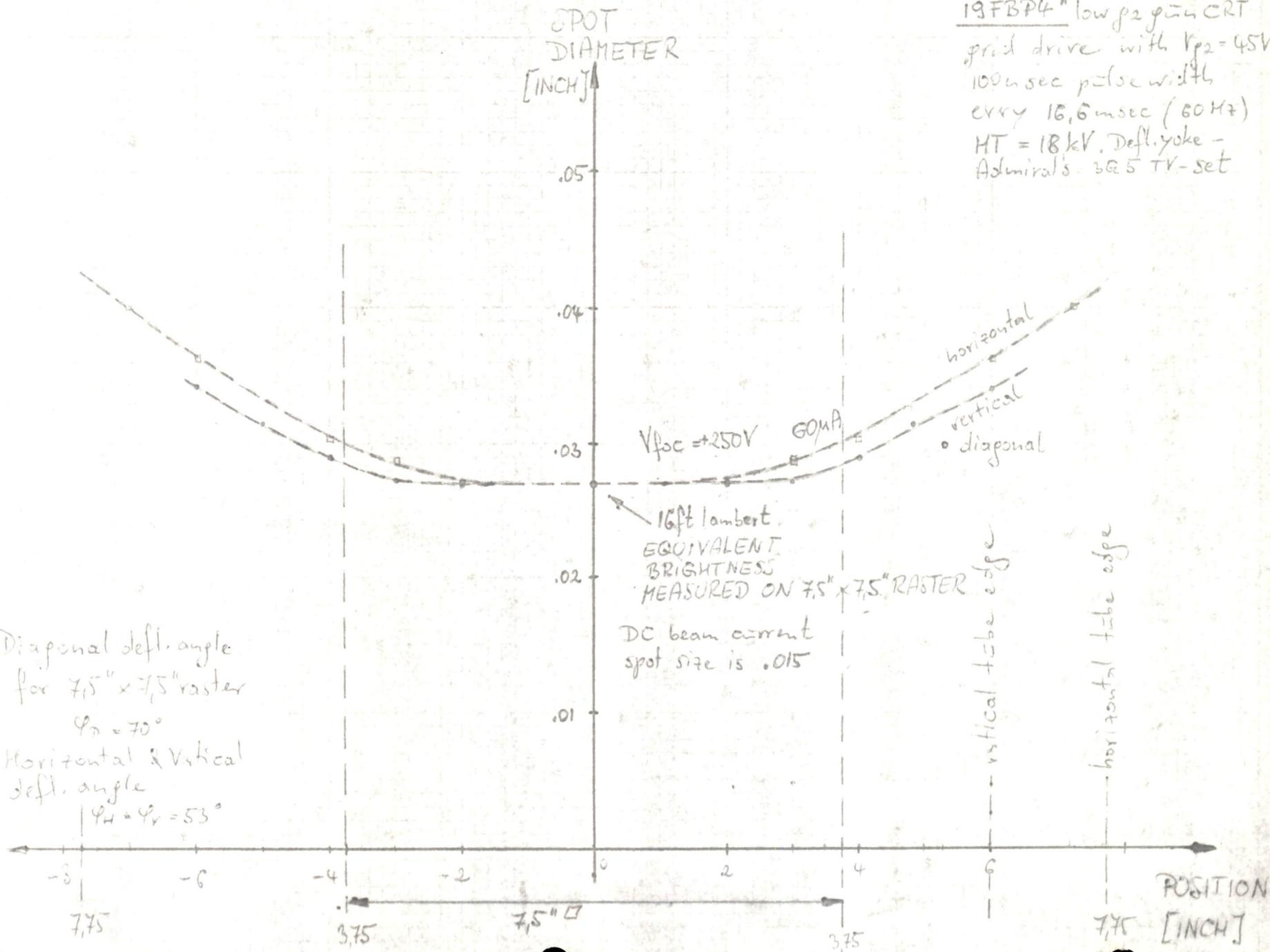
$\phi_D = 70^\circ$

Horizontal & Vertical defl. angle

$\phi_H = \phi_V = 53^\circ$

9.375 -8 7.5/8 -6 -4 -2 0 2 4 6 7.5/8 9.375

Diagonal defl. angle  
for 7.5" x 7.5" raster  
 $\phi_n = 70^\circ$   
Horizontal & Vertical  
defl. angle  
 $\phi_H = \phi_V = 53^\circ$



Worst case spot size  
measured on  
19FBP4 "low p2 g2 CRT"  
grid drive with  $V_{p2} = 45V$   
100  $\mu$ sec pulse width  
every 16.6 msec (60 Hz)  
HT = 18 kV. Defl. yoke -  
Admiral's 3025 TV-set



# INTEROFFICE MEMORANDUM

DATE: November 20, 1967

SUBJECT: Computer Communications, Inc.

TO: Ken Olsen  
Pat Greene

FROM: Bob Savell

I talked to a fellow named Dale Newberg at the FJCC. They do refresh 60 times per second and therefore each apparent dot on the screen is really composed of two dots, one above the other on each interlaced frame. They use a core and not a delay line. The core stores 1000 9-bit characters. They would not tell us how they change the characters into video information. More than one TV can be bussed onto the output of the controller. They had three going at the show and all looked good.

They modify the TV with the addition of one PC card. They cable in both sync and video to the TV.

Also talked to Paul Bauer at Digital Devices about the delay lines, and he pointed out that the line usually used is the one that Pat Greene has, which is a 8 millisecond line with a 2 to 2 1/2 megacycle band width. This is enough to store 1000 characters at 8 bits per character. By using the 8 millisecond line and refreshing it at 60 cycles per second rate you have an additional 8 milliseconds which can be used for updating, etc. This, of course, would not work on a conventional TV scan if you are going to use both interleaved frames.

I did not get price and delivery information as I assumed that Pat would have all of this.

Would it be possible that we could use a core memory instead of a delay line since we can buy core planes so inexpensively?

bwf

**digital**

## INTEROFFICE MEMORANDUM

DATE: November 20, 1967

SUBJECT:

TO: Ken Olsen  
cc: Stan Olsen  
John Jones  
Ted Johnson

FROM: Dave Denniston

McDonald's group at Bell Telephone Laboratories has had some problems with their PDP-9's and the "bad word" has spread through B. T. L. at a fairly high level; in fact Hank's boss, Dr. Ed David, has just lost a PDP-9 sale for us at Holmdel by specifically telling the group in question there to buy a DDP 516 in lieu of the PDP-9 (which they had selected). The 516 was not even competition for us on this sale up until this point of time.

What I would like to suggest is a visit to B. T. L. sometime early in December. Since you know Hank fairly well, I would certainly feel more comfortable if you were along, and needless to say, all other interested parties are welcome. I will have a memo written within the next day or two outlining my feelings with regard to our loss, over the last year, of rapport with this very important group at B. T. L.

*10 - Gloria Prazzy 12/7*

**digital** INTEROFFICE MEMORANDUM

DATE: November 17, 1967

SUBJECT: Your Notes on Tea Party

TO: Ken Olsen

FROM: Harry S. Mann

These comments relate to the question raised by the production girls' group leaders at the recent tea party.

1. We have instructed the guards not to park anyone on the ramp of the present parking lot. They were doing it because the present lot is overfilled and it was the only solution to providing space for everyone. Now that the new lot is about to be used, we can discontinue this.
2. The question of blocks to prevent cars from going off the parking lot has been planned for. We have ordered railroad ties to form a barrier around the periphery of the new lot. We have also saved timbers from some of the dismantling that we did in Building 5 to line the American Can parking lot. The fact that we have had several of our people go off the American Can lot is interesting in view of the fact that the American Can Company and Irving Berg insist that there was never any problem like this when they were using it. I don't know what to conclude from this but in any event we plan to take corrective action.
3. I am not sure what you mean by the exit situation but I gather you mean what doors will be open from the building. We have made special provisions for the supervisors to open doors from Building 11 ground floor and the Machine Shop areas. In addition to that, we have the exits from Building 12 and also have two exits open from Building 5. One of these exits is the lobby and the other one is on the third floor in the middle of the building. It is our plan to make another entrance and exit to Building 5 to the new lower parking lot. This plan cannot be implemented until Spring, however. What we had proposed to do was station the guard at an entrance which would be essentially at the ground floor level of the building and have that entrance open from approximately 7:30 AM to 8:30 AM. We would then close that entrance and open the lobby for the use of visitors and employees during the day. At the end of the shift, we would repeat this procedure of opening this bottom door. In addition to that, we expected to open the door at the other end of the building close to the American Can lot instead of using the exit we now have open in the evening on the 3rd floor as mentioned above. We also plan to open that door on the Walnut Street side of the building in the morning as well as soon as we can take one of the guards off the parking detail. We expect to be able to do that as soon as the new lot is put in operation in the next week or so.

4. The suggestion that the parking lots be assigned to people by shifts does not seem to be practical. In the first place, it would cause all of the traffic to be leaving the one lot at the same time. By letting a random pattern exist, it tends to even out the exit flow to some degree. There is also the practical problem that people generally flow into the parking lots in the morning starting at a little after 7 AM and continually flow in until the 9-3 shift comes to work. It would be impossible for the guards to recognize who was on what shift since there is so much overlapping even though starting hours are different.
  
5. We agree that the lighting in the parking lot is marginal. Our main problem has been keeping the lights that are there in operating order because of the vandalism that occurs in terms of the youngsters in the area throwing stones or BB shots at them and we are forever replacing them. We have placed an order to put in more powerful lights on the existing poles if we can ever get Mr. Joyce to perform this job. Although he is a nice fellow and gives us good prices, his reliability and service has been horrible. If these new lights still are not acceptable to people, we will then have to consider a very expensive re-lighting of the entire area, going to more poles around the periphery of the parking area, and I would guess we are talking in terms of \$15,000 to do the entire job if such became necessary.
  
6. The silk screening area ventilation has been vastly improved over the past two weeks. There were some very unsatisfactory conditions for the handling of the solvents that have been used. These matters have been cleared up and we feel the situation is now well in hand. To further improve the area, however, we have ordered and expect to receive shortly a degreaser which will further reduce the amount of raw solvent being used in the area. As regarding the heating problem, Al Hanson has taken this up with Irving Berg to no avail. I will undertake to persuade him that the problem needs correction. If I can get nowhere with him, we may have to consider some supplementary heating ourselves. Gas-fired units to supplement the present heating system seem to be out of the question because we would have to carry the vent lines all the way to the top of the building. Al Hanson has proposed a complete engineering survey be made of the heating system for the entire complex. Maynard Industries has no interest at all in this and we will have to decide ourselves whether it is worth undertaking or not because if major alterations were indicated, we would probably have to absorb the cost of this ourselves. It is premature to comment on this at the moment, but we will keep everyone posted as soon as we have something more definite.

K. Olsen



INTEROFFICE MEMORANDUM

DATE: November 13, 1967

SUBJECT: PROPOSAL ON JAPAN

TO: Operations Committee

FROM: Ted Johnson

I propose that we now take a direct interest in the Japanese market and proceed, through a series of solid tactical steps, to establish ourselves and that we continually evaluate the potential and stability of the market as we go along.

I believe it is necessary to open up an office in Japan in order to do a good job there and to have at least one engineer. There are a number of possible ways to set up an office. One of the easiest is to set up a Sales/Service office which can act as an engineering support function without ability to engage in commercial transactions or take orders. This would require a trading company, or equivalent, in Japan as a parallel operation. I have asked Ed Schwartz to proceed on the basis of the information I brought back, including a list of lawyers who specialize in this area, to investigate how far we could go with the Charter, that is, how free a Charter we might be able to get within a short period of time which would allow us to expand beyond support to an activity engaging in commercial business and possibly, in the future, with the other activities such as manufacturing and special engineering.

Regardless of the way we go, the total operation will require a number of very well-trained Japanese engineers. Some of these are now available with Rikei and, with additional training, Jack Shields and I believe they have the enthusiasm and ability to do an excellent job. Our industry has a degree of mobility of labor compared to the standard, and I believe we can successfully command the loyalty of bright young technical people in Japan.

I have engaged a consultant in Japan to do a study for us on our reputation, and the reputation of Rikei in Japan. I believe this consultant will be invaluable as a future ally, and the price of the initial survey is only \$3,000. A rough outline of the project is being routed to your attention, and Mr. Ingoldsby might be able to discuss the conclusion of his study in person, in Maynard, mid-December.

If we are very realistic, sensible, cautious and straightforward in our strategy, I believe we have a very good chance to develop a sizeable market in Japan. We are concurrently exploring several possibilities, some of which are indicated in the contents of this report, such as OEM potential with large companies such

as Toshiba, smaller OEM companies, other trading companies, building up our service for our own OEM's in Japan, and also studying any reasonable possibilities for joint venture operations. We are not encouraging discussion of joint ventures of licensing other than to use it as an entree for investigating customer potential and improved future relationships with influential industrial firms.

I have enclosed additional material and propose to provide more material as we go along to keep our finger on the pulse of Japan and its attitudes toward foreign investment and foreign trade. You might read the article in Fortune last month which indicated the business environment in Japan and the eventuality of freer trade.

I believe that my proposal, in summary, is to receive the go ahead to set up an office in Japan, subject to final confirmation of the explicit form of this entry after study by a lawyer. I urge your support of my continuing efforts to develop a step-by-step plan which will be presented for your full study as we go along.

mr

Enclosures

### PURPOSE OF TRIP:

The purpose of the trip was to get a first-hand impression and view of the selling effectiveness of Rikei and the state and potential of the market for our products. We had insufficient data to work from to make a decision about our future direction in Japan. It was hoped that a more realistic contract could be negotiated or new approaches taken to substantially increase sales despite restrictive government policies, especially in the research areas.

### CONCLUSIONS:

- 1) In both research and industry, the mood in Japan very definitely seems to favor the small computer and requirement for our technology.
- 2) Our company carries prestige in Japan and our products are respected, both for quality and price.
- 3) Building on our image of technical competence through a qualified sales and service organization should result in a very substantial increase in sales this coming year.
- 4) In order to support any sales effort and provide us necessary control over the activities of a trading company, we must set up a branch office in Japan as soon as possible.
- 5) Our areas of the industry offers more mobility of labor and more possibilities for "American-style" business than any other business I can imagine. This is a clear and distinct advantage.
- 6) More information is needed to support these observations. A consultant recommended by a friend in Polaroid, and enthusiastically supported by the commercial attache in Tokyo, (Bob Kan, who was the best foreign service official I've ever met), was hired to do a survey of our position in the Japanese market, in terms of broad image and competitive position. (F. "Bud" Ingoldsby CORAL Research)

- 7) Clearly, the sales strength of Rikei as it exists rests with:
  - A. Mita - very bright, enthusiastic, a strong DEC type.
  - B. Horokoshi - works for Mita, also competent on DEC equipment.
  - C. Sano - doing service work on testers. Also technically sharp.
  - D. Hori - more questionable, but apparently good.
- 8) Rikei is split with strong tensions at this point between the "Motorola" and "DEC" factions. Rikei has been set up to support Motorola IC sales but not DEC. They claim a change. We are set up to see if they are prepared and going to change. If not, they should be washed out of our system and plans. This will be established within 1 - 2 months.
- 9) Mita and crew are our best assets. At this point, our strategy will center on keeping them going, either as DEC employees or as employees of a trading company. The major consideration should be the use of their talents and control so we establish a strong technical sales and support base and image in Japan.
- 10) A sales engineer will be selected to be assigned to Japan for 6 months, pending approval, to move ahead on a branch office.
- 11) Mr. Schwartz, our attorney, will be asked to look into all aspects of setting up a branch as soon as possible (Japanese attorney - I have recommended list, charter possibilities - flexible enough for the future, patent protection - let's close this loop immediately, banking connections, accounting connections.) I urge approval of this step as necessary to long-range success and timing of our necessarily sensitive strategy at this point.
- 12) Push on Toshiba LINC-8 entre to test possibilities of selling to large OEM - but press for strategy of "neutrality" with respect to large cartels. (Big Eleven, Big Five, etc.)
- 13) Avoid firm contractual relations with Rikei, particularly until Mita strategy clear and we have some more inputs on our image.

TOSHIBA (Tokyo Shibaura Electric Company, Limited)

This meeting was arranged at our request through Mr. Takou of their New York office.

Toshiba is a \$1b per year corporation. It is licensed to make the GE Pack computers. It is particularly active and interested in process control and research instrumentation for the physics and biomedical field and was selected on this basis as a possible OEM and useful input, since it is one of the "Big Five".

At the meeting were: Mr. Y. Makino, Manager of the General Engineering Staff, overseeing the whole computer activity, Mr. Yoshisuke Iwai, Chief Engineer of the Medical Equipment Division, Mr. T. Sasaki, Manager Inland Operations, International Cooperation Division, and chief negotiator, and Mr. Takeshi Matozaki, engineer in the medical electronic department (section chief).

They had a precise interest in the LINC-8, as a result of government interest in computers for biomedical applications and because, I think, both Mr. Iwai and Matozaki have kept in touch with this product. (Iwai with Wes Clark, Matozaki visited Mort Ruderman at DEC in August this year.) They were not as informed as they should have been about our whole product line.

They will submit a proposal on the LINC-8, probably wanting to buy DECtape and pay royalties for the software with the intention of building their own LINC-8. We can use this as a tool to OEM LINC-8's or PDP-8 family machines to all of Toshiba. I expect this proposal in a few weeks and will work out the details with Mort Ruderman at that time.

I urged them to inform us of their developments (disc pak, calculators, etc.) in case we could use their components or market their smaller devices.

All in all, the meeting was very open and encouraging. Mr. Ingoldsby, our consultant in Japan, went along as a listener. He knows Japanese, they didn't know it, and he felt it was one of the most candid, encouraging meetings he had ever heard of this sort. I affirmed my belief that our company and business area has unique potential in Japan.

T. Johnson  
October 1967

MITI

We visited MITI with Mr. Hosoi of RIKEI to hear their position on granting import certificates and express our point of view. Mr. Kyoichi Shimazaki was the MITI representative. Although he expressed the official view that "a computer is a computer", he admitted that we are in an area that requires special definition.

We sold hard on the following points:

- 1) the controller and instrument definition vs. the "computer"
- 2) value of small computers, DECUS active society of world scientists, etc.

I believe we made a slight dent - and should continue pushing.



# INTEROFFICE MEMORANDUM

DATE: November 1, 1967

SUBJECT: COMPUTER INDUSTRY IN JAPAN - A Survey of Basic Facts and Opinions

TO: Operations Committee

FROM: Ted Johnson

March, 1967 - 2609 computers installed (3rd largest national market).  
Next 5 years forecast - \$2.7 b.

Boom in Banking. Time sharing looked to.

Fiscal year 1966 figures - deliveries

Extra Small	< \$28K computers	166 Domestic/ 1 Imported	} Our business area
Small	\$28 - \$110K	204 Domestic/ 104 Imported	

(Imported includes IBM, Domestic includes joint ventures where over 50% ownership by Japanese partner)

Operating Systems (Installations) as of March 31, 1967

	<u>Domestic</u>	<u>Imported</u>	<u>Ratio of Imp./Tot. (approx.)</u>	
Large	58	122 (IBM)	72%	} We could alter this drastically
Medium	612	500	45%	
Small *	534	237	30%	
Extra Small *	544	.2	.3%	
	<u>1748</u>	<u>861</u>	<u>33%</u>	
Value (\$)	\$281M	\$343M	55%	

Special Purpose Computer Systems (as of March 31, 1967)

Mitsubishi	4	Government, university
(2) <u>Toshiba</u>	3	University, government
Nippon Electric	11	EDP
Hitachi	7	Banking, Elec. power industry
(1) <u>Fujitsu</u>	74	Industry, schools

Probably most in our markets

1965/1966 Imports from U.S.

	Units	1965 <u>1,374</u>	1966 <u>436</u>	trend to importing fewer, larger machines.
	\$	\$15M	\$13M	

Slight increase in importation of I/O equipment \$1.8M in FY '66.  
DIGITAL EQUIPMENT CORPORATION • MAYNARD, MASSACHUSETTS

## COMPUTER MARKET IN JAPAN

	<u>Installation</u>	<u>PDP</u>	<u>Application</u>	<u>Sold by</u>
1.	Yokagowa	8	Direct Digital Control	Rikei
2.	"	"	" " "	"
3.	"	"	" " "	"
4.	"	"	" " "	"
5.	"	"	" " "	"
6.	Tokyo University	"	Nuclear Research	"
7.	" "	7	" "	"
8.	" "	5	" "	"
9.	" "	*L/8	Bio Medical	"
10.	Nissan Auto	8	Automatic Drafting System	UDM (US)
11.	Toshiba/Beckman	8/S	Emission Analyzer	Beckman (US)
12.	Stars & Stripes	8	Typesetting	? (US)
13.	Tokyo Denka	8	Automatic IC Testing	Terradyne
14.	Koyama	8	X-Ray Diffractometry	Hilger & Watts

## POTENTIAL CUSTOMERS

	<u>Company</u>	<u>Application</u>	<u>Computer Type</u>
1.	Toshiba	X-Ray Diffractometry (OEM)	PDP-8
2.	Rigaru Denki	" " "	PDP-8
3.	Shimazu	" " "	PDP-8
4.	Shimazu	Gas Chromatography (OEM)	PDP-8 8/S
5.	Yanagimoto	" " "	PDP-8 8/S
6.	Mitaka	" " "	PDP-8 8/S
7.	Nakanishi Metalworks	Model Simulation	PDP-9/340 - 339
8.	Tech. Institute of Japan Society for Promotion of Machine Industry	Model Simulation	PDP-9/340 - 339 (99%)
9.	Kokuyo	Automatic IC Testers (OEM)(10 systems)	PDP-8 8/S (99%)
10.	Kuwano	" " " (OEM)	PDP-8 8/S
11.	Tokyo Denka	" " "	PDP-8 8/S
12.	Yokagowa	Direct Digital Control (OEM)	PDP-8
13.	Hokushin	" " " (OEM)	PDP-8
14.	JAERI	Nuclear Research	PDP-9 (99%)
15.	Mutto	Graphics	PDP-8
16.	Mitsubitshi UKA	Oil Refinery (OEM)	PDP-8
17.	Seitetsu	Chemistry Control (OEM)	PDP-8
18.	Kao Soap	" " "	PDP-8
19.	Samyo Pulp	Paper Mill	PDP-8/S PDP-8
20.	Kanega Fuchi	Chemical Control	PDP-8
21.	Ajimomoto	D.D.C. (OEM)	PDP-8
22.	Nippon Kokan	D.D.C. (OEM)	PDP-8
23.	Univ. of Japan	Oceanography	PDP-8

Other Comments

Yokagowa is trying to build their own computer-Yodic-500 Hokushin is a competitor of Yokagowa  
- Yokagowa asked Rikei not to sell PDP-8's to Hokushin. Hokushin now looks like a good  
potential customer (OEM) in direct digital control. They now manufacture their own system but  
realize their limitations in this area.

Total system would be:

Computer PDP-8	-	DEC
Instrumentation	-	Hokushin
Line	-	Chunjidakuko

We can do a big OEM business in Japan.

PDP-8/S was written up in Japanese Electronic Industry Association (almost all computer orientation).  
as significant price performance breakthrough.

Recently Dr. Terao (Tyko Un.) came back from IEEE all charged up on the PDP-8/S. He is considered to  
be Japan's expert on D.D.C. and gave a talk on the 8/S at the last meeting of the Japanese Control  
Institute.

**digital**

INTEROFFICE MEMORANDUM

DATE: November 13, 1967

SUBJECT: Company Stationery

TO: Ken Olsen

FROM: Ted Johnson

In reference to your memo of November 3, 1967 on standardizing letter-head paper, it has been our practice to see that each field office uses the same logo with their own return address.

I have recently re-instructed the field on this procedure, which calls for all printing to be done here in Maynard.

It may also interest you to know that we have standardized on calling cards.

**digital**

## INTEROFFICE MEMORANDUM

DATE: November 10, 1967

SUBJECT: RESPONSIBILITY OF MANAGEMENT IN A DEC SUBSIDIARY

TO: FROM: Ted Johnson

Managers of DEC subsidiaries have general management responsibility for all operations carried on by, in and with the subsidiary. In addition to sales and field service responsibilities, therefore, the subsidiary (or other designated area) manager is responsible for all other business of the subsidiary, including collections of money from customers, manufacturing plans and efficiency, control of inventories, correct accounting and financial reporting, enforcement of corporate policies and procedures, and the general use of company resources.

The activities of the subsidiaries are governed by budgets and proposals which are submitted to Maynard through the Vice President, Sales and returned through him. Because of the dynamic growth of the subsidiaries, it is not possible to specify in detail in this memoranda which items must be subject to proposal and which must depend on the judgement of the subsidiary manager.

In general, the subsidiary manager will delegate responsibility for functional areas, such as accounting and manufacturing, to a subordinate who will be selected for his capability in that area. The subsidiary manager is required to call in the services of corporate functional managers, such as the Vice President, Finance and Vice President, Manufacturing, and their respective departments, to assure complete satisfaction in the job being done. Subsidiary functional managers will be selected and appointed by the subsidiary manager but with the direct approval of the respective corporate functional manager.

The subsidiary functional managers will normally be required to report to the respective corporate functional Vice President or other corporate functional managers (such as Manager of Personnel, Manager of Customer Training, etc.) on an operating basis. Corporate functional managers are responsible to the corporation for the professional performance and efficiency of those functions throughout the whole corporation, including the subsidiaries.

It is the corporate goal to develop increasing self-reliance in general functional management in the subsidiaries. The degree of direction by the corporate functional managers will depend on the state of self-reliance and capability of functional and general management in the subsidiaries.

This means that the subsidiary manager must assure the Vice President, Sales, and company Operations Committee, that expected standards of performance are met and that he is informed sufficiently in all areas to command prompt corrective actions and programs. Since he is not expected to have a detailed knowledge of certain areas, such as accounting, and manufacturing, he must therefore assure the Vice President, Sales that his functional subordinates are working with full effectiveness with the corporate functional managers and effectively managing their respective areas.

Since, in effect, subsidiary functional managers must report to both the subsidiary manager and the corporate functional manager, it is imperative that the subsidiary manager see to it that the relationship and responsibilities are made clear and not be allowed to, in any circumstance, be confused in the functional manager's mind or performance. With the clear direction and proper involvement by the subsidiary manager, the respective functions should operate effectively within the approved budget and to the agreement of the corporation.



Theodore G. Johnson  
Vice President, Sales

TGJ:mr

digital

INTEROFFICE MEMORANDUM

DATE: November 8, 1967

SUBJECT: 8/I Pedestal Model

TO: Mike Ford

FROM: Jim Jordan

cc Ken Olsen  
Stan Olsen  
Dick Dubay  
Dave Knoll  
Loren Prentice  
Stan Znamierowski  
Bill Vallaincourt

The purpose of the meeting held with the persons listed above on November 8, 1967 was to review the Pedestal 8/I. Specifically the base was to be reviewed for changes made since appearance models were produced.

As it turned out we reviewed the entire concept of free standing computers. Ken raised the point that this project was using up valuable engineering time that could be used for urgent production and product improvements. The conclusion of this discussion was that we would continue to engineer, document, and build the 8/I Pedestal Model, but all future products will be carefully reviewed so that the present situation does not occur again.

Additional points discussed were:

1. The rack mounted 8/I should be photographed and promoted in a Bud (or similar) cabinet.
2. Wider casting flanges for increased stability of the frame.
3. A two-tone color scheme for the legs should be explored so that there is no wear problem.

One item that was not discussed was the construction of a model of the pedestal which would include two fabricated legs to simulate the castings, the connecting tubing and the covers. This exercise will probably be expensive but will be worth while to experiment with various structural configurations.

JJ/sd

**digital**

INTEROFFICE MEMORANDUM

DATE: November 7, 1967

SUBJECT: Tariff Threats

TO: Ken Olsen

FROM: Win Hindle

In answer to H. Leaman's memo to you regarding tariff threats, I suggest we not do anything. On the whole, New England Congressmen are anti-tariff anyway.

bwf

Ken Olsen

digital

INTEROFFICE MEMORANDUM

DATE: November 7, 1967

SUBJECT:

TO: Operations Committee

FROM: Ted Johnson

The Sales Meeting in Europe was highly successful and very encouraging. We will have to continue to work hard to keep up the kind of spirit and enthusiasm we see in young men in that organization and I am increasingly confident that we are developing a number of young managers. With a little more time, we will be able to fill senior spots in the European organization.

The service side is more in question. This is the area we will have to concentrate on very actively. We are looking for some experienced senior supervisors in France and Germany. We have several good supervisors in England. In Germany, we have the highest degree of confidence in the manager of field service, Osi Josbaecher, he has an excellent attitude and a good technical background. We hope to have a new manager in France very shortly.

In looking at what will be our success in Europe, it becomes increasingly obvious that the area which will largely affect our future is our ability to establish a reputation for good service in Europe. Service outside of the United States, is always a key point and is always on the minds of customers. If we, in fact, could keep the people in our User's Society and general market at a high level of confidence and respect for our field service organization, I am sure that this in itself would be a very powerful argument for continuing to buy from us over the long term. This might call for advanced increases over the next few years and senior people and perhaps sending a number of Americans to Europe. I think it is well worth it, and is something we must do to make sure that we realize the kind of return on the investment we have made so far in Europe.

cc: Jack Shields

K. Olsen

DATE: November 1, 1967

SUBJECT: DEC REPRESENTATION AND SALES IN HAWAII

TO: Operations Committee  
Ron Smart  
Ken Larsen

FROM: Ted Johnson

The subject of sales in Hawaii has come up through sales and prospective sales in Hawaii and prior contacts with prospects and the agent in question, Harkom, by Ken Larsen.

Hawaii, 50th State, has 700,000 people. The market there essentially consists of :

- (A) University of Hawaii and funded research in oceanography, biomedical, etc.
- (B) Government facilities.
- (C) Possibly some industrial control areas.
- (D) Hospitals, etc.
- (E) Miscellaneous - typesetting, etc.

For the next year, \$200,000 might be a reasonable goal - excluding PDP-9's and PDP-10's.

After discussion with Ken Larsen and the two principals of Harkom (Bob Harners and Barry Kommel), we propose the following plan.

- (1) Hawaii be treated as a remote sale, i.e. list with installation and possible warranty (latter unlikely) as extra.
- (2) That Harkom be engaged as our representative on an exclusive basis for modules, 8/S, 8, and LINC-8.
- (3) That PDP-9 and PDP-10 leads be negotiated separately for possible compensation as judged fair by DEC.
- (4) That in return Harkom provide:
  - A. Sales leads, monthly reports on prospects and customers and customer liaison.
  - B. Help on installation.
  - C. Teletype service for the period of 90 days after installation, extendable by contract between Harkom and the customer.
- (5) Customers will place orders directly with DEC with Harkom help in pricing and terms.

mr



# INTEROFFICE MEMORANDUM

DATE 27th October, 1967

SUBJECT Report of Core Memories Ltd. and sample of material from a new core fabricating process.

TO K. Olsen

FROM Rod Belden

P. Kaufmann

H. Crouse

c.c. T. Johnson

J. Leng

The attached notes describe in some detail the activities of a new subsidiary of Data Products Corporation called Core Memories Ltd. CML is now producing ferrite cores and finished memory stacks. They have submitted a very attractive quote to DEC with a price in the order of 1.2 cents per bit, for quantities we could use during the next year in Europe and Canada. Henry Crouse has details.

If a local memory stack (CML, Plessey, Mullard) is used in the U.K., the cash duty saving is 14% of the equivalent Maynard list less discount plus import uplift (our present transfer terms). This is approximately \$190 per 4K memory.

The ferrite strip attached shows something of the new core fabrication technique used by CML. The strip was worked and rolled to the correct thickness and density. Then cores (30 mil) were "cookie cut" by a multiple-head cutter. The binder is dissolved from the remaining scrap and the ferrite powder re-used.

*Note: process is still confidential  
until FICC.*

Report on Visit to Core Memories Ltd.,  
Dublin, Ireland - Oct. 24 1967

Trip Purpose: Core Memories Ltd. has submitted to DEC a very competitive bid to supply PDP-8 memory stacks. The purpose of the trip was to see if the design and the production techniques used by CML justified their quoted price. CML is just over one year old. Other local vendors under evaluation are the Plessey Co. Ltd. and Mullard Ltd.

Summary of Findings: The prices quoted by CML appear to be justified by the company's new core fabrication techniques and an apparently efficient production process which has been designed with high volume, low cost in mind. Unlike most other manufacturers of memories, CML fabricates cores, assembles and tests stacks all under one roof.

Cores are fabricated by a newly developed process in which ferrite powder is mixed with a binder and rolled into thin sheets (8 mils. thick) to the proper density. The core is then shaped through a cookie cutting process. These two well controlled steps replace the traditional compression forming technique which produced only moderately high yields. The stacks are strung by conventional methods and appear to be well tested on CTC testers. The same process and equipment appears to be capable of producing 18 mil. cores in the near future.

The two principal technical men, Victor Sell and Walter Wiechec (stack design and core development, respectively) have both been working with memories for at least 10 years and have put together a fairly simple and well controlled process. The largest customer today, of finished stacks, is Honeywell of Scotland who are taking approximately 30 stacks a month. Primary financial backing is from Data Products Corp. of California. Both labour and additional space are available for continued growth.

Recommendations:

1. Immediately purchase 2 or 3 CML stacks (to the new PDP-8 specs.) for test and evaluation at Maynard. Contact Bob Emglert, Data Products Corp., Los Angeles, 213-837-4491.
2. Visit the Data Products booth and see the CML display at the Fall Joint Computer Conference in November.
3. Agree to a target date (suggest Nov. 30) for choosing a supplier of memory stacks for the European market, then work out projections of how and when deliveries from this new vendor can be combined with our present memory vendor contracts.

## BACKGROUND DETAILS OF CORE MEMORIES LTD.

See attached statement of company capabilities written by Core Memories Ltd., in April 1967. Below is additional information gathered from visit to CML.

Location and Facilities: CML is located in a suburb of Dublin, Ireland on a new industrial estate which has been supported by development grants from the Irish Development Authority. CML occupy a new modern one storey building of 27,000 sq. ft. and has adjacent land for expansion to approximately three times this space. Production and test equipment appears to be primarily of American manufacture and of high quality. The plant and offices are well laid out, brightly illuminated and clean. The production group (mostly girls) are young and appear to be interested in their work.

Personnel: See attached company capability statement of CML. In addition CML has recently hired a Production Manager from Fabritek in Wisconsin. Fred Baker who joined CML 3 weeks ago. The newly appointed U.S.A. sales representative of CML products is Bob Emglert with offices in Los Angeles (Data Products Corp.). Tel: 213-837-4491.

Financial Backing: CML is a subsidiary of Data Products Corporation. Data Products owns 65% of the equity and the CML principals own the remaining 35%. Through the Irish Development Association, CML has received grants for their building, capital equipment and training programme (up to 38%).

Customers: CML is delivering stacks to Honeywell in Scotland for the H200 at a rate of approximately 30 per month. They say this will increase to 50 a month in the late Spring. They are also supplying some small memories to Data Products for use in line printers etc. CML is anxious to sell their ferrite cores directly to Burroughs, Elliott and English Electric. Because of their new core process they see this as their largest market.

Production Process: CML is now finishing on the order of 1 million cores per month. As soon as they can confirm the orders they would like to push this up to 5 million or better a month. (This does not seem to check with 30 complete stacks a month as that number of stacks would require over  $1\frac{1}{2}$  million cores per month - I would tend to believe the core figure and think that the stack number is a target which they may reach in the next few months).

(a) Core Density. A new core fabrication technique may be the key to CML's success. They have divided the core forming process into two steps, density and dimension. Ferrite-lithium powder is mixed with a binding agent and the material is rolled into thin sheets about 6" wide and 8 mils. thick. Density is measured by cutting out a circle from this sheet of about  $\frac{1}{2}$ " diameter and accurately measuring the dimensions and weight. Because the sample size is large compared to the final core, density is measured accurately without the need for delicate precision balances (one of the problems today of the traditional core process). The sheet is reworked and rolled until it is of the correct uniform density.

(b) Core Forming. Strips cut from this sheet are joined and fed into the "cookie cutting" machine. Here the cores are punched out with a multiple punch head (the present design is 6 head). Although the head has three moving parts to make the outer and inner cuts as well as to release the core, the tool wear is minimal because of the low energy required for this cutting operation. Tool life is relatively short in a traditional high energy compression forming process (stoke press). The CML equipment looked simple and inexpensive. Scrap left over after cutting is reworked by dissolving the binder and recovering the ferrite powder.

Core baking is done in semi-conductor ovens under well controlled temperatures. Mechanical and electrical tests on samples of cores control the baking time.

(c) Testing and Quality Control. Each mix of powder is given a batch number and the cores produced from this batch are kept together and logged in the various QC records. Approximately 250,000 cores are made from each small batch. Bound notebooks of the test results are kept on each batch. Samples of 250 cores are taken from a group of less than 10,000 and samples of 500 cores from a group of more than 10,000. A look at the density measurement records indicates that variations over several weeks are in the order of 10 parts in 300. This produces a much higher yield of core than the traditional process.

(d) Layout and Artwork. The standard CML matrix frame connections have been laid out on one 48" square transparent sheet. On this master is the frame for both 4K and 16K planes. CTC have their own design for the pad to which the magnet wire is soldered - a long shape which aids even solder flow. Identification lables and functions are etched on the board to assist with assembly and QC.

# CORE MEMORIES LIMITED

GREENCASTLE ROAD - COOLOCK - DUBLIN 5 - IRELAND

TELEPHONE 332251 TELEX 5183

## COMPANY CAPABILITIES

### History and Objectives

Core Memories Limited was formed by a talented group of engineering executives with extensive experience in the field of ferrite core memories. They were deeply involved in all phases of operations such as research, development, production and marketing of ferrite cores, arrays, and stacks. Through the years most companies in the U.S.A. and very many in Europe have used products developed and manufactured by them.

Our objective is to fill the increasing need for memory devices in

1. The data processing industry
2. The communications industry
3. The broad field of automation

Towards this Core Memories has committed its resources to leading industry in the state of the art development leading to new products and to the improvement of production techniques in the field of cores and stacks.

Great emphasis has been placed on building an organisation for maximum efficiency on high volume orders. As the quantity of computers with core memories is increasing and the average capacity of the memory is increasing also, this emphasis is necessary for the industry to be able to handle the resultant large increase in core requirements.

### Personnel/Organisation

Core Memories principal officers have a considerable depth of experience in the electronic component industry in general, and the ferrite core and stack industry in particular.

H. Joseph Cornyn, Managing Director, holds a B.S.E.E. degree. He has previously been associated with Bell Telephone Labs, Radio Corporation of America, and Westinghouse Electric Corporation in engineering, marketing, and management positions. His experience over the past 15 years has been concentrated in the field of advanced electronic components, including semi-conductors and magnetic materials. His most recent assignment was Operations Manager for the Molecular Electronics Division of Westinghouse.

Victor Sell, Director of Engineering, holds a B.Sc. degree. From 1956 until 1966 he was associated with Telemeter Magnetics Incorporated, which later became Ampex Computer Products, in various engineering positions. His most recent assignment was Chief Engineer for Stack Design for Ampex. In this capacity he had complete responsibility for all stacks designed at Ampex, including the H.200. Mr. Sell holds many patents in the field of magnetic core stacks.

Walter Wiechec, Director of Core Development and Production, holds a B.S. degree in Physics. He has previously been associated with Radio Corporation of America, Stanford Research Institute, and General Motors Corporation. His experience over the last thirteen years has been exclusively in the field of ferrite cores. In particular, he has been a pioneer in the development of lithium wide temperature cores and is the author of many papers in scientific journals.

Ronald Heath, Director of Marketing, holds Higher National Certificates in Electrical and Mechanical Engineering. He has previously been associated with General Dynamics, Telemeter Magnetics (later Ampex Computer Products), and Electronic Memories. His experience in the ferrite core memory field includes design engineering, application engineering, and marketing and dates back to 1958. Mr. Heath's most recent position was Marketing Manager for Commercial Products with Electronic Memories Incorporated.

Mitchell Elliott, Manager of Quality Assurance, is a graduate of the University of Paris. He has been previously associated in instrumentation engineering operations with the U.S. Army and Tektronix. His experience in instrumentation, which extends over a period of six years, is directly applicable to his present position where he is in charge of all test and instrumentation.

As of March 31st 1967, Core Memories employed a total of 80 people. Distribution among the various departments is as follows:-

Management and Marketing	6
Engineering	9
Quality Assurance and Test	4
Ferrite Development and Production	7
Array and Stack Production	48
Maintenance	4

All of our present personnel have been selected with particular regard to their ability to become lead personnel and supervise new employees.

By December of 1967, the Company will employ approximately 210 people. This figure will increase to approximately 325 people by August 1968.

## Facilities

Core Memories operations are conducted in a wholly owned modern building four miles from Dublin and very close to the International Airport. The building was designed and constructed to Core Memories specific requirements and is the most up to date facility for core and stack production in the industry. It has a total area of 27,000 sq. ft. which is divided into the various departments approximately as follows:

Management	1,200 sq. ft.
Engineering	2,000 " "
Production Administration	1,200 " "
Core Manufacturing	3,000 " "
Temperature Stabilised Test Rooms	350 " "
Array and Stack Production	19,250 " "

For the equipping of all departments, Core Memories Ltd. has made a substantial investment in capital equipment. Core development and production, stack development and production are all equipped with the most modern test facilities and manufacturing aids.

Complete ferrite core manufacturing facilities are available for milling, blending, precision pressing, and sintering at high temperatures in electrical kilns. Stringent process control ensures the correct physical size and shape, chemical composition and correct firing procedures, so that ferrite cores have suitable magnetic characteristics.

The engineering laboratories are liberally equipped with test equipment required for the design of ferrite cores and arrays. Included are magnetic testers for studying and plotting of core characteristics, environmental chambers for testing and evaluating cores and stacks over various temperature ranges, and testers for evaluating core properties in arrays and complete stacks.

Core Memories has a complete range of specially designed jigs and the fixtures for the production of ferrite core stacks. The complex and specialised equipment used for testing cores and stacks include Highspeed Core Handlers, Computer Test Corporation Core and Stack testers, and the conventional complement of oscilloscopes, magnetic pulse generators, and specially designed special purpose test equipment.

## Test Resources

Successful core stack production requires that all parts be 100 per cent tested during all phases of in process and final stack production. As it is of prime importance to ensure that only good cores are wired into the stack, Core Memories uses unusually stringent core test procedures to verify both mechanical and electrical characteristics.

Test Resources(Contd.)

Every core is completely tested for electrical characteristics in the core grader. Acceptance is based upon the ability of each individual core to pass exacting tolerances for switching time, peaking time, "ONE" output level and "ZERO" output level. The equipment used for this phase of the test program is C.T.C. Model C.301, Core Tester; and Ramsey CH.100 Core Handler. They can test 1,000 cores per minute.

After this testing, acceptable cores are then subjected to a statistical sample test. The level of the sample is defined by United States MIL-STD-105D. In a typical batch of 100,000 cores, a sample of 800 will be taken. Every core in the sample must pass for the batch to be acceptable.

After the AQL test another sample is taken and tested at different drive conditions and at high temperature. This is done because a practical memory system will not operate at one drive current and temperature all its life and it is essential that cores be tested under different conditions to ensure that their performance can be predicted when drive current and temperature drift.

The cores are also subjected to a mechanical strength test. It is not practical to thoroughly test a core electrically and then have it break or chip in the wiring process because it is too weak mechanically.

All of the previous tests must be passed before cores are given to the production line for wiring.

After individual arrays are wired, each core undergoes at least three complete electrical tests for all critical storage patterns. Automatic stack and array testers simulate all characteristics of the eventual drive system of the customers memory, including rise time, pulse width and current amplitudes. All Core Memories test equipment has automatic error detecting circuits.

*Ken Olsen*

SALES CALL REPORT

SUBJECT: Dr. Jerome Cox, Washington University  
St. Louis, Missouri

LINC-8  
8-I

FROM: Mort Ruderman

DATE: October 27-28, 1967

A number of topics were discussed which I will try to brief everyone on.

1. The Program Console. From my understanding, Spear is having some financial difficulty and cannot really aggressively promote the Program Console and, therefore, will take the approach of only filling orders upon request. Jerry Cox feels that no one else can make the Program Console, mainly on account of the programming investment. Even with the LINC-I this is a problem since Jerry has gone to a 12-bit A/D and a 12-bit scope display, and this complicates the structure of the LINC-X. However, Jerry does agree that the Program Console is more emotional with him than anything else.
2. 8-I or LINC-I: Jerry is embarking on an electrocardiogram diagnosis system that looks very good. There is a possibility it might be the PC, but it seems like the 8-I or LINC-I will be the system. The approach here is to have 4 or 5 satellite computers tied to a bigger LINC computer with a very large disc on it, probably the Data disc or, possibly, DEC's disc for the 9 or the 10. The secret here is to get Jerry a machine as fast as possible. The approach is to sell him the damaged LINC-8, at a reduced price. He would like to do this, and has set his upper limit at \$25,000. It looks very reasonable that we might do this.
3. Jerry's involvement with the development of the LINC-I: He seems to be interested in this, and mainly to have Macro module compatibility. He is extremely enthusiastic about Macro modules and thinks that the existing Classic LINC users and many new people will want the Macro modules. We will only design them to be compatible with the Classic LINC I/O so, therefore, if we are going to get into the Macro module business we will have to do the conversion from the Classic LINC I/O to the PDP-8 I/O.

MACRO-MODULES: Jerry feels these will go out on bid, probably not to a computer company, but to a module manufacturer and, since we are both, we are in a very favorable position. I seem to get the implication from Jerry that he would rather it not be DEC, mainly because they seem to have been so committed to DEC in the past, and if they are going to be successful they must spread out their association. However, I am very much interested in Macro modules, and I think we should look at them when the bid is out.

What I hope to be doing with Jerry in the next few months is:

- 1) Attend an Electrical Engineering Seminar with Gordon Bell, which Jerry is organizing.
- 2) Meet with Jerry & Wes Clark and detail the LINC-I structure development so that they are very much aware and, we will, hopefully, have their blessings.
- 3) Sell Jerry the damaged LINC-8, and get him into the electro-cardiogram system and committed to the LINC-8 and LINC-I which will be a substantial market for the LINC-I annually; maybe something like 25 to 50 machines.

All in all, the meeting was very constructive - not with all the enthusiasm that I have known Dr. Cox to have in the past toward DEC. I associate this, however, to Dr. Cox's now being in the same environment with the Wes Clark group for the past two and one-half years.



# INTEROFFICE MEMORANDUM

DATE: October 26, 1967

SUBJECT: PDP-8/I Announcement October 31

TO: Ken Olsen  
Nick Mazzaresse  
Mike Ford  
Howie Painter

FROM: *Steve*  
Steve Bowers

cc: Allen Kluchman

The plans for the PDP-8/I announcement at the Annual Meeting are moving along well. At this time, we have had acceptance from 17 editors (list attached) who will join us on that day.

We have made plans to have a luncheon for the press, a few of Harry Mann's key security analysts and people connected with the 8/I announcement, in the Clarendon Room of the Sheraton-Boston at 1:00 p.m. Originally, we had planned to make it a buffet affair but we would have had to guarantee a minimum of 50 people. We decided, instead, to make it a "sit-down affair" for 30-35 people at a cost of \$150. We will serve a pot roast dinner - the same menu that will be served for the Director's meeting.

We have had the room reserved for the afternoon so there will be plenty of time to mingle with the press during and after lunch and answer all their questions.

Along with the 17 editors and the few security analysts mentioned above, I would like to have the following people from the 8 group join us to answer questions at the meeting and at lunch:

Nick Mazzaresse  
Mike Ford  
Howie Painter  
Charlie Kotsaftis  
Bob Niro  
George Rice  
Ed DeCastro  
Bill Landis

Will you please let me know if these people can attend. All people mentioned above should try to be at the Sheraton-Boston (Independence Room) by 10:00 a.m. The meeting starts at 11:00 a.m.

The following is a list of editors who will attend the PDP-8/I announcement:

Angie Pantages-----Datamation  
Don White-----Boston Globe  
Philip Murphy-----Boston Herald  
Russ Adams-----Business Week  
Les Smith-----Wall Street Journal  
Bill Gannon-----Computer Design  
Neil MacDonald-----Computers & Automation  
Bond Blake-----Control Engineering  
Jim Britton-----Electronics  
Larry Ramsdell-----Electronic News  
Neil Sclater-----Electronic Design  
Dick Rimbach-----Instruments & Control Systems  
Joe Nowake-----Instruments & Control Systems  
Lucinda Mattera-----Electro-Technology  
Jim Peacock-----EDP Industry & Market Report  
Craig Marcroft-----Electronic Products  
Rudolph Ripp-----Data Processing Magazine

To: Ken Olsen  
Nick Mazzaresse  
Mike Ford  
Howie Painter

- 2 -

October 26, 1967

cc: Allen Kluchman

There will be a meeting for the above people at 3:00 p.m., Monday, October 30, in the conference room next to Ken's office to discuss press relations and what our pitch will be at the Annual Meeting.

Please let me know if you can make this meeting.

SDB/pgg  
enclosure

*Original to Dick to answer*

dec

INTEROFFICE  
MEMORANDUM

SUBJECT Peripheral Sales.

DATE 25th October, 1967.

TO Ken Olsen

FROM John Leng. *John*

Enclosed is a telex copy regarding what appears to be our policy on peripheral equipment sales to new computer customers.

I personally think it is foolish to turn down an order from IBM. They will sell their computer with or without our readers. We have simply turned down an opportunity to get part of their orders. If they want to produce a reader like ours I'm sure they could use our techniques without having to buy one from us to see how it works.

I would like to see us take an active and positive approach to selling peripherals to all customers. We don't mind selling computers to the competition so why not peripherals. After all they are just another systems building block.

Encl.

MSG NO %4214 10/20/67

TO HAROLD COFFEY  
FROM MARV COTHRAN CC JOHN LENG ✓

REF DECUK ORDER CS/67/431 FOR 2 PR68 A READERS CUSTOMER MURHEAD AND  
CO LTD.

ORDER SPECIFIES OFF-LINE SPARES BUT REQUIRES 10 FEET OF CABLE FOR EACH  
THERE ARE 2 OBVIOUS DISCREPANCIES:

1. IF THEY ARE SPARES, WHY DO YOU NEED CABLE?
2. IF THE CUSTOMER DOES NOT A TYPESETTING SYSTEM OR DEC COMPUTER  
OF ANY TYPE, WHAT ARE THE SPARES FOR?

YOU WILL ALSO NOTE THAT PP 68A READERS ARE CONSPICUOUSLY MISSING  
FROM STANDARD OPTION LIST FOR PDP-8. THE ONLY PRICE LIST IN  
WHICH THEY ARE LISTED AS OPTIONS IS THE TYPESETTING PRICES AND  
CONFIGURATIONS DATED JUNE 1, 1967. THERE IS AN OBVIOUS REASON  
FOR THIS: MOST TYPESETTING SYSTEMS USE CX READERS WHICH ARE  
EXTREMELY UNRELIABLE. THE PR68A WAS MADE SPECIFICALLY FOR PDP-8  
TYPESETTING SYSTEMS. WE HAVE CONTINUALLY TURNED DOWN  
READER BUSINESS FROM IBM 1430 CUSTOMERS. IN SEPTEMBER WE VERBALLY  
REFUSED AN ORDER FOR 500 EA PR68A READERS FROM IBM. WE ARE NOT  
INTERESTED IN SELLING TWO READERS TO A PRECISION ELECTRICAL  
INSTRUMENT MAKER.

YOU MIGHT ALSO CHECK THE TYPESETTING PRICE LIST FOR PRICES OF CABLE.  
WHEN ORDERING ADDITIONAL ON-LINE PUNCHES AND READERS THE TOTAL  
LENGTH OF CABLE MUST BE CHARGED AT THE RATE OF 1.50 DOLLARS PER  
FOOT. FREE 25 FOOT LENGTH OF CABLE ARE FURNISHED ONLY ON 2 READERS  
AND PUNCHES SUPPLIED WITH THE SYSTEM.

ALSO

dec

INTEROFFICE  
MEMORANDUM

DATE October 25, 1967.

SUBJECT MARKETING MANAGERS' TERMS OF REFERENCE

TO Ken Olsen

FROM Denny Doyle

c.c. Ron Smart  
Ted Johnson

Attached is a page taken from the PDP-8I Sales Notebook, in which the terms of reference of a marketing manager seem to be spelled out.

I disagree with them.

I hope that everyone else in the company disagrees with them. They fall far short of those discussed at the last regional managers' meeting at Maynard.

Specifically, the last paragraph is where the buck gets passed. The marketing managers obviously deny any responsibility for late deliveries, unkept promises made by the sales administration, and the most important support function of all - making the customer happy. The final stages of the process usually require the most support from the plant, and this is the source of much frustration in the field right now. The field certainly is in no position to do the things that the marketing support groups are leaving undone.

In my reply to the "peripherals" questionnaire I recommend that the marketing managers should be called to account for all unkept delivery schedules, and all bad customer relations and this is essentially what I am saying here again. If they don't have the authority to go with this responsibility, the good ones will soon see that they get it.

*Denny*

DJD/es

5.2

PDP-8/I Marketing Support Functions - October, 1967

The following is a breakdown of product line support people and their market specialities. Applications and marketing assistance is being provided in individual market areas in order that our overall sales effort may be more effective.

**WHAT THEY DO:**

Product line marketing specialists are essentially responsible for determining strategy. This means deciding who we are going to sell to and how we are going to sell. This includes product development, marketing research and forecasting. In addition, as part of their duties, they provide direct and indirect sales support. Indirect sales support consists of application notes, advertising campaigns, software development and in general the dissemination of information to the field sales personnel. Direct sales support is just that. When sales situations arise that require the unique marketing or technical ability of a marketing specialist, he can provide direct sales support. The calling in of this support is, of course, under the control of the field sales engineers.

**WHAT WE NEED FROM YOU:**

In order to effectively carry out these duties, it is necessary to keep informed on what is happening in the market. The best source of this information is the field sales personnel. By feeding back information on applications, market trends, competition, etc., marketing can more effectively support you.

**WHAT THEY DON'T DO:**

Customers and prospects are the prime responsibility of the Field Sales Offices. Marketing personnel have a variety of duties which do not allow them time to assume direct sales responsibilities. Direct sales support by marketing personnel cannot substitute for continuing customer contact and service required in the field. Routine questions and problems regarding pricing, delivery, quotations, and sales policy should be directed to the In-House Sales Support Group.



# INTEROFFICE MEMORANDUM

DATE: October 24, 1967

SUBJECT: BIOMEDICAL SALES

TO: Nick Mazzaresse

FROM: Mort Ruderman

cc: Ken Olsen ✓  
Win Hindle  
Howie Painter  
Mike Ford

In the past we have discussed how do we increase biomedical sales of the new PDP-8 at DEC. My plan for doing this is by offering more systems around the 8-I, LINC and PDP-9. At this time, I am able to identify more of these systems, around the 8-I, that are potentially large sales to this market.

1. Electrocardiogram diagnostic system with 8-I. The Public Health Service is sending out a request for quotation for three specially packaged 8 type systems in the very near future. It will mean we will have to do the programming, of which some has already been done, on the 160A, the LINC, and a PDP-8. I anticipate something like six months for program development, and then 25% of an individual's time to maintain this software. The market for this type of system is fantastic in that Public Health Service feels there is a market for 40,000 to 50,000 of these systems in the next five to ten years if done properly. The interesting thing is we will be given the opportunity to quote on three of them initially.
2. Experimental Psychology: We now have sold to three out of the four major suppliers to the experimental psychology market. The four are Foringer, Lehigh Valley, Grason-Stadler and BRS. We have sold an 8/S to Lehigh Valley; two PDP-8's to Grason-Stadler, and a LINC-8 to BRS. All of these people anticipate buying somewhere in the vicinity of 3 to 6 more systems this fiscal year. This is an easier market, and I do believe that we have to take both approaches in this market, servicing the OEM and going after our traditional customers - do-it-yourself types. I think, in the next three years, this market should be good for at least 100 to 200 "family-of-8" type machines. Applications programming assistance, here, is the number one requirement.

3. Radiation Scanning: Off-line application to trace X-Rays of tumor density so that the computers can calculate the control and intensity of beams now used to control growth of these tumor areas. This is presently being done at Washington University. We are talking with Jerry Cox about the possibility of coming up with a special package, either the LINC or the 8-I, to do this. I anticipate that if we can do this, a market within the vicinity of 100-200 systems annually. Again, applications programming to assist in writing the first basic package and then the maintenance and the continuing modification.
4. Patient Monitoring or Intensive Care Unit: This is a PDP-9 type application. We have sold 2 or 3 of these systems to date. The users will be doing the total system concept themselves. If the 9 people choose to stay very close to these installations, with an Applications Programmer, then I think in about a year's time we ought to be able to offer a patient monitoring system built around a PDP-9 with one or two 8 type machines as satellites.
5. There are various areas in the Clinical Chemistry Laboratory that total system concepts can be applied. We know we have to aggressively go after this market right away. Other applications in the same environment, i.e. gaschromatography, which Brad Dewey is staying very close to. Then, there are enzyme systems around an 8-I, including the total software package. Electrophoresis calculations, atomic absorption instrumentation, all to be tied to the same computer and another independent program, but all typically off-line, can be serviced by one computer.

To go after this market, we need a group of applications programmers and marketing people across product lines to infiltrate individually these applications, with total responsibility given to these people. The company must schedule the appropriate hospital type exhibits, that we have never gone to, i.e. Clinical Exhibits, Psychological Exhibits, with meaningful demonstrations.

I reemphasize, I feel all of these people should be in one group attacking the total market from a system's concept. The first

six or nine months would entail a lot of software development. We can look at each independent system over the life of the system and guarantee the company percent profit or better.

I feel that we must immediately embark upon establishing this group and concept as soon as possible.

Mort

djc

dec

INTEROFFICE  
MEMORANDUM

DATE October 24, 1967

SUBJECT RESIGNATION OF KALB AND SCHNEIDER FROM RECRUITMENT ADVERTISING  
ACCOUNT (Reference Jonah Kalb's Letter to Win Hindle)  
TO Win Hindle FROM Bob Lassen

cc: K. H. Olsen  
S. C. Olsen  
N. Mazzaresse  
A. Kluchman

In response to the letter you received from Jonah Kalb, I feel I should point out some things which date back prior to Graydon's arrival.

Several months before Graydon's involvement, I became concerned about the deteriorating quality of our employment advertising. During this period the only campaign of any continuity and creativity initiated by Kalb and Schneider was the old-fashioned woodcut theme. Although we were somewhat leery of this approach to advertising, we accepted their expertise. After a trial period, I concluded that these woodcut ads were not very effective and decided to stop putting additional money into this sort of campaign. I further concluded that cliches, gimmicks and funny pictures were not the most effective way to attract engineers, programmers et al.

At that time, I called a meeting with Jonah, Ken Gold, Bob Savell and others to tell Jonah that we wanted our ads to tell the professional prospect of the many exciting things we are doing in the computer field and to emphasize the outstanding professional environment we have to offer.

After a brief period of improvement, the ads began to regress again to the cliches, pictures and gimmicks. It was at this point that Graydon joined us.

One of Graydon's first assignments was to review the effectiveness and appropriateness of our professional advertising. At that time I advised Graydon of my serious concern of the quality of our employment advertising.

After reviewing our previous ads and after becoming acquainted with the company and discussing professional recruiting needs and techniques with many of our senior people, Graydon held a meeting with members of the staff of Kalb and Schneider and Ken Gold to begin giving them an understanding of the recruiting appeals and objectives we felt were needed for the future. The statements in Jonah's letter about "making inquiries about the possibility of terminating us" and overt "harassment to kill" are untrue and unfounded.

The meeting was held early in May, and at the conclusion of the meeting Graydon felt that both parties had a clear understanding

October 24, 1967

of the direction we should go. We did not hear from Kalb and Schneider after that.

Graydon again took the initiative and suggested to John Lamb that it would be desirable to have weekly meetings with him in order to plan advertising and insure that Kalb and Schneider was kept informed. Mr. John Lamb had been servicing our account since Ken Gold's departure.

In August, Graydon reminded Mr. Lamb that we were still waiting for the new advertising plan which was requested in May. Mr. Lamb admitted that nothing had been done and said he "would see if they could come up with something."

In early September Graydon received a 5 or 6 page brochure entitled "Digital's Recruiting Campaign." This was the "advertising strategy and tactics" Jonah referred to in his letter. Graydon and I felt that this outline consisted primarily of frequently belabored premises about the professional employment market in general and that it offered very little in the way of constructive advertising approaches, media analysis, suggested themes or even projected costs and schedules.

Graydon then advised Mr. Lamb of our feelings about the outline (Jonah states that "no word came back"), and Mr. Lamb assured us that the specifics would be introduced during the formal campaign presentation.

The presentation was attended by Win Hindle, Ted Johnson, Allen Kluchman, Graydon Thayer, Paul Chambers, Dick Reilly, Bob Savell and Bob Lassen. In brief, we felt that this proposal placed far too much emphasis on the "frustrated man" theme and that the \$100,000 cost was too excessive. It did not begin to reach the many markets we are trying to communicate with nor did it effectively tell our story. In addition, we were back to the cliches, funny faces and gimmicks.

Contrary to Jonah's statement that we rejected the proposal without explanation, Graydon held a meeting with Jonah and clearly pointed out our reasons for rejecting the \$100,000 program.

During the entire series of events, Graydon consulted with me, and I advised him accordingly. As a matter of fact, I personally withdrew the \$1600 college ad because it was in extremely poor taste (picture of a big mouth and an even bigger cigar).

There are many other cases of substandard ads some of which we were forced to use because there were no alternative proposals; others were rejected. Examples are: "Gather Ye Rosebuds While Ye May", "Our Hearts Are Young and Gay" and the backward printing of "Turnabout is Fair Play" which could be read only by using a mirror.

October 24, 1967

I regret that Jonah chose to write such a vindictive letter to you because, in my opinion, the breakdown in communications claimed by Jonah was his own doing.

In summary, I feel we did continuously convey out thoughts to the agency; the ads were deteriorating very rapidly; we took most of the initiative; we were critical but always courteous; there was no planned attempt to kill, and I support Graydon Thayer 100% in this matter.

Bob

jfr

Dear Ken

Oct. 21, 1967

I just received a copy of the paper "A Low Cost Graphic Display for A Computer Time-Sharing Console" by Stotz and Cheek. ESL TM-316, July 1967. If you don't have it, I suggest a call to John Ward at ESL to get it.

I've thought that Stotz should be hired for some time now, and if there's anyone at DEC who knows him better than I, it might be worth their trying...otherwise I'll continue in my course to do it.

How's the Tape Unit coming..I hope to see it on the S-i?

about

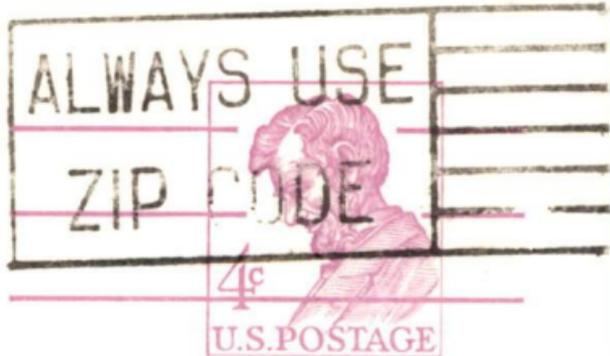
Am beginning to get ideas ~~to~~ the computer to build after the X, but sort of want to watch how easy the X is to make, first.

Gordon

Just heard about the Si announce date. Couldn't you just announce that you're going to announce without hurting sales.

I hope that someone can take over the engineering of the Si' after Ed goes to the X because I still believe there are several more computers like PDP-5, 8, 8S, Si, ... 8, etc. to build and it takes some good ideas, engineering, etc.

gBell  
553 Buena Vista  
Pgh Pa 15221



10/25  
cc: SCO  
NM  
WGH

THIS SIDE OF CARD IS FOR ADDRESS

Memo to

K. H. Olsen  
D. E. C.  
176 Main St.  
Maynard  
Mass.

K. H. OLSEN

10/27/67

Win Hindle

Harry Mann

*KS*

Should we do anything about this?

Ken

**digital**

INTEROFFICE MEMORANDUM

DATE: 20 October 1967

SUBJECT: Tariff threat to DEC foreign sales

TO: Ken Olsen

FROM: Harold Leaman

In the news media recently there has been a great deal of discussion of the relative likelihood that sweeping tariff increases and rigid import quotas will soon be imposed by the U.S. Congress. This is paradoxical in that the Kennedy Round of tariff negotiations only a few months ago produced agreement on the most significant import duty reductions in many years.

Of course we as a company are concerned very little by foreign imports into the U.S. What we are concerned about, however, is the 25% of our total sales which are forecast for this year (21% last year) from outside the U.S. Needless to say, any sweeping increase in U.S. import duties or quota restrictions would be followed by swift retaliation on the part of our major foreign customers - the U.K., Germany, France, Sweden, and Japan.

The thought occurred to me that some of the largest U.S. companies, which have the least to fear from competition with relatively small foreign companies, are often the first to organize extensive lobbying activities in Washington in order to restrict imports. On the other hand, small companies like our own which are heavily dependent on exports, often fail to protect their legitimate interests by promoting freer trade, or at least by vigorously opposing new restrictive measures.

Perhaps you might want to consider making DIGITAL's position on this issue known, especially in view of the company's increasing importance to the local and Massachusetts economy.

  
Harold Leaman

cc: Mort Ruderman  
Ted Johnson

**digital**

INTEROFFICE MEMORANDUM

*file*

DATE: 10/20/67

SUBJECT: Some thoughts on displays

TO: Ken Olsen

FROM: David Brown

cc: Stan Olsen  
Nick Mazzaresse  
Pete Kaufmann  
Stu Ogden  
Pat Greene

Enclosed are several comments relative to Digital's position in the graphic terminal market. Some may seem obvious, others presumptuous. A few may even be pertinent.

Recently we have been discussing possible new display systems for the various product lines. Two of the product lines, during the next three years, will produce and deliver several thousand computer systems.

The opportunity now exists to design and develop a moderately priced display peripheral to interface to the new computers.

Presently we are not set up to manufacture and test display peripherals in large quantity. (Display controls are checked out by several experienced technicians, each of whom can complete only one or two systems per month.) If we decide to build a new family of display peripherals, we must change our manufacturing and checkout methods quite drastically. To deliver displays in sufficient volume so that system delivery is not seriously lengthened, the displays must be simple, modular, easily manufactured and tested, and supported by adequate production and test facilities, including off-line testers.

If such an approach to display manufacture were taken, we could certainly deliver large quantities of reasonably priced, general purpose graphic display controls, together with appropriate computer interfaces.

Unfortunately, the building of control logic is but one of several areas of concern in the construction of graphic display

terminals.

Our present analog section (tube, yoke, amplifiers, etc.) is not suitable for the next generation display system. It simply costs too much. It is hoped that the effort now underway in Pat Greene's area will result in considerable saving in cost without objectionable degradation of picture quality. The alternative is to O E M the analog section, which would increase system cost.

The other critical area in the display terminal business is console design. Customer resistance to rack-mounted displays is increasing, and will continue to increase as long as our competitors build clean, modern consoles. Only the lowest priced systems will be accepted in the rack-mounted configuration.

During the past several years, two types of display systems have been successfully marketed which differ significantly from those manufactured by Digital. I refer to the remote alphanumeric terminal, seen in ever-increasing numbers, and the stroke vector, stroke character graphic terminal typified by the Control Data Digigraphic system.

I feel that we could enter either of these market areas only at great risk, since our competitors are several years ahead of us in development and marketing of these particular devices. If, however, we were to consider either of the two "new" areas, I would strongly urge that it be the stroke vector development. Without this technique, our (remaining) years in the graphic terminal business can be numbered on one hand. (The stroke

technique is applicable to medium priced systems). At the moment, however, the market is wide open for low priced (\$10 - 15K) graphic peripherals. With our computer lines, we could be the supplier of these devices.

The engineering capability is in the house.

The engineering capability is being added to.

The engineers have no large projects now.

We talk and talk about displays. It's time we built some.

**digital**

INTEROFFICE MEMORANDUM

*File*

DATE: October 18, 1967

SUBJECT: TYPE XX DISPLAY

TO: Operations Committee

FROM: Patrick J. Greene

The attached tentative specifications describe a new analog "front end" to replace the type 30, 34, and Linc displays. A complete front end contains the following:

- 1) C.R.T.
- 2) Def. Amps
- 3) Pre-amp (interface)
- 4) Intensity Amp.
- 5) Tube and Logic Power Supplies
- 6) 19" Cabinet Housing

A block diagram is attached to indicate the connection of the above parts.

The cathode-ray-tube will be a 16" diameter round tube manufactured by the Rouland Company. It will be mounted in a much simplified fashion than is presently used in the 338 system, because of the use of electrostatic focusing and integral implosion shield.

After discussions held with our product line marketing people, it was decided that each computer line using this display would provide their own digital control and D/A circuits, since they are presently designed and available along with their software packages. The D/A outputs will be brought over to the new display to provide the analog X, Y inputs for beam positioning information. In addition, video intensity information (blanking signals) must be provided. No logic control will be contained in the new product.

October 18, 1967

At a later date, a character generator will be proposed to interface and provide hardware generated alpha numeric capability.

Estimated manufacturing costs (approximately \$1,400.) are included in the attachments giving a breakdown of the components and their prices. (10 - 100 price breaks were used). A light pen option is not included in the pricing but can be used with the system because of the external control.

Development costs are spread out over a six (6) month period, the time required for completion of this project. The attached development schedule spells out in detail the specific times with appropriate check points.

The proposal is to design and build the specified display for use over all computer product lines with their individual controls. Essentially, we are going to build a 16" tube and deflection system to replace the small screen CRTS presently in use. The deflection system will be standard to drive other size tubes in future products.

/ds

Distribution: Ken Olsen  
Stan Olsen  
Harry Mann  
Win Hindle  
Nick Mazzaresse  
Ted Johnson  
Pete Kaufmann

Enclosures

TENTATIVE SPECIFICATIONS

Type XX Display

## OPERATING SPECIFICATIONS

Input Power	115 ± 10 volts, 60 cycles, single phase.
Ambient Temperature	50°F (10°C) to 110°F (43°C)
Cathode Ray Tube	R-6302-L. High contrast, flatface.
Raster Size	9-3/8 inches by 9-3/8 inches, containing 1024 points by 1024 points.
Pincushion Distortion	Less than 3/32 inch per side when viewed from a point on the CRT axis 2 feet from the surface.
Deflection	Magnetic.
Focus	Electrostatic.
Resolution	1250 lines on full raster.
Stability	±0.05 inch in 8 hours at constant temperature (±3°F).
Repeatability	±0.05 inch regardless of the location of the preceding point.
Timing Sequence	2.5 microseconds for address transfer, 5 microseconds for deflection setup, and 200 nanoseconds for spot intensification.
Intensification	Normally preset. Circuits exist to allow the intensity to be controlled by logic.
Inputs	Differential X and Y inputs at ±3V levels. Z input matches any positive and negative logic level. Selector switch for multiplex system operation.
Outputs	X, Y, and Z outputs are provided to drive a monitoring oscilloscope.

Estimated Manufacturing Costs

1. Mechanical Housing

A. Cabinet ----- \$200.00

B. Assembly ----- 100.00

2. Modules

A. Pre-amp ----- 68.00

B. Def-amp ----- 120.00

C. Int.-amp ----- 15.00

D. Bias Control ----- 37.00

3. Tube

A. CRT ----- 190.00

B. Yoke ----- 192.00

4. Power Supplies

A. H.V. & Focus ----- 175.00

B. Deflect. ----- 220.00

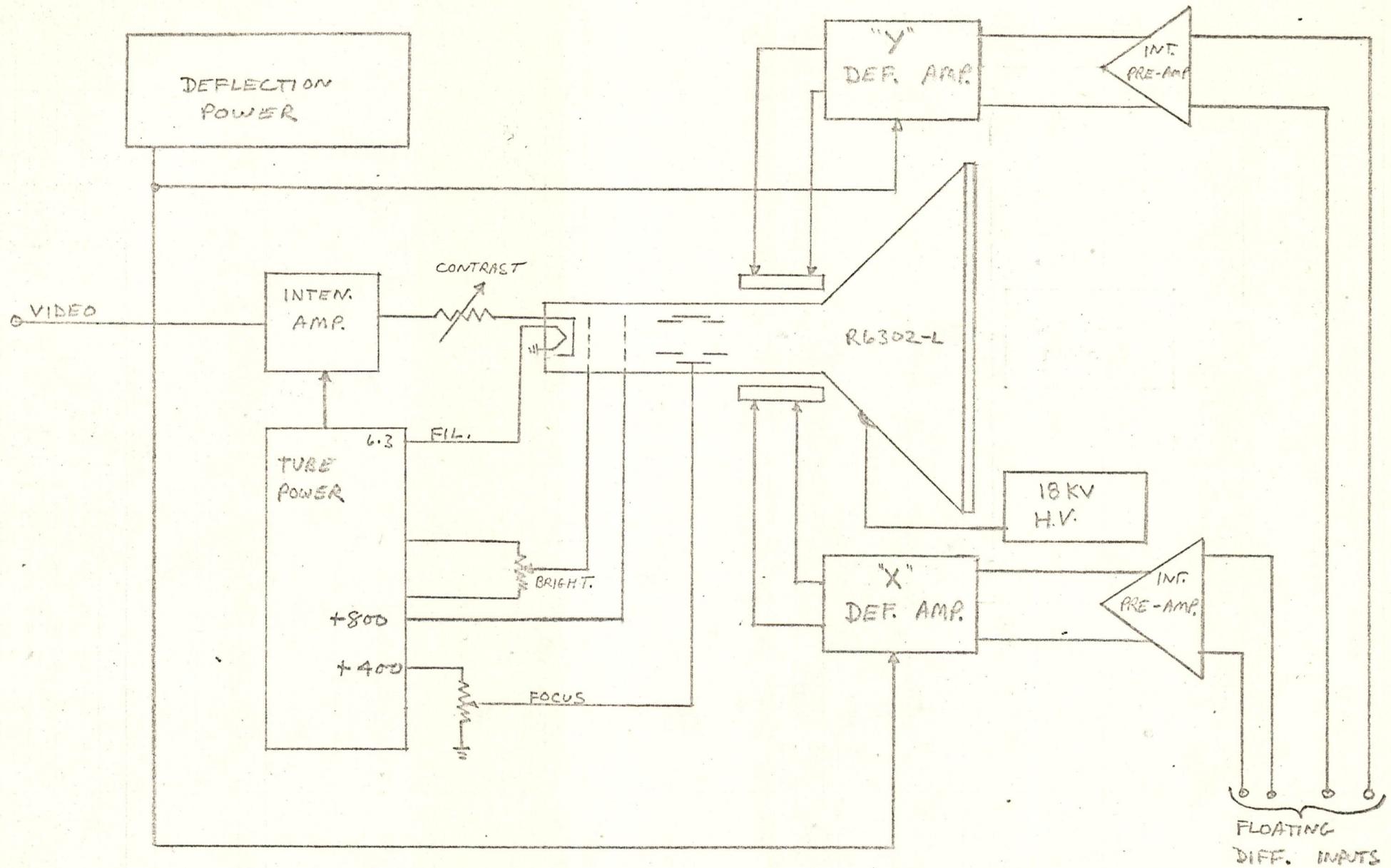
5. Checkout ----- 100.00

Total \$1,417.00

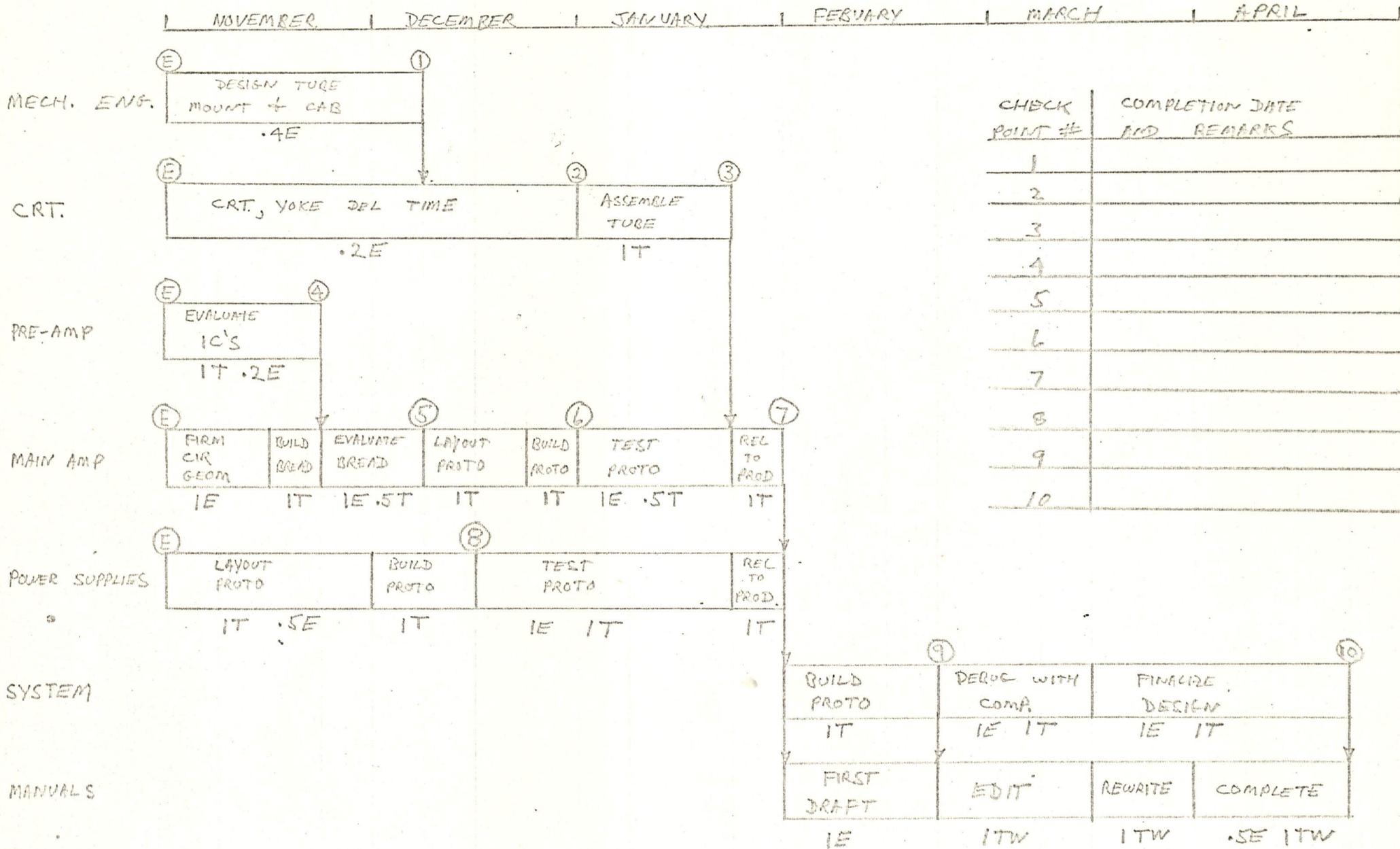
Development Costs

(000 omitted)

	<u>Q1</u>	<u>Q2</u>
Product Line Engineering	42	42
Drafting	5	10
Mechanical Engineering	1	1
Manuals	-	7
	<u>48</u>	<u>60</u>



BLOCK DIAGRAM "SUPERSCOPE"



DEVELOPMENT SCHEDULE - TYPE XX DISPLAY

#### FURTHER NOTES ON THE CHEAP TAPE

The cheap tape seems ideal for program and library storage and as a tool in program editing. The main disadvantages of the system are the lack of reversing and fast winding facilities. However, the lack of these facilities keeps the price extremely low and minimizes development time. It is my opinion that the three aforementioned applications justify the small development expense. It is the type of system that a computer user can buy without the rigmarole of raising a large capital sum.

Lewis Illingworth  
18 October 1967

## CHEAP TAPE SYSTEM

The tape system uses cartridge tape units similar to those employed in automobile stereo tape players. The cartridge is cheap, rugged, and extremely simple to use.

An endless loop of tape traveling solely in the forward direction limits the system flexibility and necessitates an operating procedure more in harmony with a very large slow magnetic drum than a conventional tape.

The storage format suggested by Gordon Bell splits the tape into blocks of 1,000 words plus addressing and title. A tape with 8 tracks and 8 blocks stores 64,000 words with an average access time of 20 seconds. The required block is interrogated by a six bit signal containing a track and block address. A seventh bit indicates whether information is to be read or written into the block. On reading the correct address a ready signal from the tape unit starts the tape to computer transfer, one bit being read or written every 435 microseconds. When reading and writing, the tape appears just like a teletype and operates with 8 level ASCII code. An operating condition is that a complete block must always be written.

The system described does not have a library track, which is so convenient in the DEC tape system. One track could be used for library information but here the average access time of 20 seconds would be inconveniently long.

The lack of a reversing, fast forward and fast rewind facility preclude normal tape practice. Gordon Bell and Roger Pyle suggest

*Lewis Ellingworth*  
*18 October 1967*

that the system is excellent for program storage and editing. For program storage the location of the programs can be catalogued on the tape cartridge in much the same way as the stereo recordings are listed. The operator then has to manually select the track and block position. A simple switching arrangement could allow different programs to be read from the tape sequentially.

The tape is excellent for library storage due to its ruggedness and ability to store a million characters on a 10 minute tape loop.

In conclusion, the proposed tape system, while being cheap, is also limited in its applications. Its main uses seem to be in program and library storage, and as a tool in program editing.

## SUGGESTED TAPE FORMAT

The 8 track tape is split up into 8 blocks of 1,000 words plus address and title. Each block is separated from its neighbors by metallic, reflective, or oxide gap marker.

Recording sequence:-

- marker - address - space for read write switching - title -  
- 1,000 information words - safety space - next marker -

A marker length of 1/2" will take 120 milliseconds to pass the head.

Two characters suffice for the track number and block number of the address. One character space suffices for read write switching. The title could be 32 characters followed by the block of 1,000 words to be stored. Due to tape speed and writing frequency tolerances, a dead space of 5% of the block must be left at the end to prevent possible overrunning. The total tape length required including the marker is 18.1 inches taking 4.8 seconds, and the total time for all eight blocks is just under 40 seconds.

## TAPE HEAD POSITION CONTROL

It may be convenient for the system to know which track is selected and which block is passing the head. This may be achieved by filling two registers with the last three information bits of the track and block address characters every time that a block marker is passed. In order to change track, the head position is changed by pulsing the electromagnetic mechanism, and at the same time the register storing the track number is incremented. The head mechanism is repeatedly pulsed until the number in the register equals the required track number.

The equipment required is as follows:

- 1) A 3 bit register storing the required track number
- 2) A 3 bit register storing the block number
- 3) A 3 bit counter storing the actual track number
- 4) Controlling gates and inverters

An extra control flip flop is required to prevent the tape operating until the next block marker following a head change is reached, in order to prevent the system starting in the middle of a block.

Rec'd 10/17/67



# INTEROFFICE MEMORANDUM

DATE: October 16, 1967

SUBJECT: JAPANESE MARKET AND TRIP PLANS

TO: Operations Committee Members

FROM: Ted Johnson

cc: Pat Greene

I now plan to visit Japan with Jack Shields. We will meet with Rikei and try to evaluate their effectiveness, but also hope to explore other opportunities.

The prospect of licensing a Japanese manufacturer to build and sell some of our computers does not seem to offer enough advantages to outweigh the difficulties and long-term instability. Instead, I would like to explore the possibilities of a joint venture, possibly with some reciprocity of product sales, or straight OEM arrangements.

Some thoughts that have occurred to me are:

1. Would it be reasonable to explore the prospect of buying our memories from a large Japanese manufacturer, probably at attractive prices, and in this way lever them into effective sales of PDP-8, 8/S computers?
2. Are there other Japanese products (CRT tubes, instruments) that might be saleable by us over here?

The second largest Japanese manufacturer, Toshiba, is a competitor because of the computers and capabilities in our fields. (PHAs, X-ray diffractometers, accelerators and associated equipment, biomedical instrumentation, communications equipment, etc.) They are approximately \$1B annual sales and licensed by GE for the 400 series. They aim for the large computer market (basically EDP) and represent little threat in the small computer area I would think. I would like to explore possibilities with them and others, either as a customer or as a partner.

If there is a reasonable hope to substantially increase sales through more effective technical sales or some new arrangement which will ease or eliminate the political restrictions on importing, I propose sending a good man over there for at least 6 months, with definite benchmarks, within the next 2 - 3 months.

I have some interesting reading gathered at your convenience. Did you know both CDC and Honeywell are bargaining to import Japanese computers for sale here?

mr

Rec'd 10/17/67

**digital**

INTEROFFICE MEMORANDUM

DATE: October 16, 1967

SUBJECT: Continental Finance Corporation of America

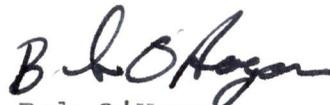
TO: Ken Olsen

FROM: Bob O'Hagan

I have tried to find the company listed in Poores, D & B, and Moody without success. So I called via Watts line to Mr. Fred G. Jager, and this is what he really has and wants.

1. They are worth 14.2 million.
2. They expect to be listed in the American Stock Exchange shortly.
3. They want to diversify by acquiring an oceanographic equipment company. They are willing to invest about one million dollars.
4. They want to make it a "joint" acquisition with a company such as Digital.
5. I have asked him to send to us a dossier of his company which he will do.
6. I have suggested to him the company "Geodyne" of Waltham that was for sale about three months ago.
7. May I suggest that you wait until you receive the dossier before replying negatively. However, I think that if we wanted to start our own company we wouldn't need him.

BOH/dm

  
Bob O'Hagan

*c-Bob O'Hagan 10/10*  
*How to ads*

CONTINENTAL FINANCE CORPORATION OF AMERICA

CONTINENTAL BANK BUILDING, 18TH AT CALIFORNIA STREET  
POST OFFICE BOX 659, DENVER, COLORADO 80201  
TELEPHONE: 292-3330

October 6, 1967

President  
Digital Equipment Corporation  
146 Main Street  
Maynard, Massachusetts 01754

Dear Sir:

Your name was recently given to us by a mutual acquaintance in the Marine Technology Society as an organization dealing in the broad area of oceanography.

Here are the circumstances which prompt this inquiry. Continental Finance Corporation of America, a multi-million dollar group, has been in the consumer finance field for 19 years. Throughout this time we have steadily expanded in the states of Colorado and California. Recent research indicated to us, however, that our growth would be proportionately limited if we remained solely in this area. Hence, in March we launched a successful active diversification campaign via both acquisition and development into growth industries.

We have, as a result, established in recent weeks a company specializing in the full-range of computer services, and an educational film company. We are also currently negotiating with a film production facility, an air/water pollution control entity, and a large commercial bank. Next we seek an involvement in this oceanography field . . . and this brings us to you.

We would like the benefit of your experience and thinking on how we might best acquire or develop an entity in the oceanography industry. Naturally your comments will be treated totally confidentially. Please include in your response a complete fee schedule.

Admittedly this is an unorthodox, and perhaps blunt, approach but we are most sincere, and anxious to make a category contribution. Hence we look forward to your response.

Sincerely,

*Fred G. Jager*  
Fred G. Jager

FGJ:ms

Rec'd 10/18/67



**INTEROFFICE  
MEMORANDUM**

**DATE** October 16, 1967.

**SUBJECT** FURTHER INPUTS ON THE PROBLEM OF SELLING PERIPHERALS

**TO** Ken Olsen

**FROM** Denny Doyle

c.c. Ted Johnson  
Jack Shields

We have just gone through an agonizing experience in selling a disc to a PDP-8 user. Since he had a table-top PDP-8, he wanted to mount the disc in an adjacent table-top cabinet. Field service advises me that in addition to the normal field installation charge (\$400 under the new scheme), a \$500 fee would be charged for installation in a non-DEC cabinet. The sum of these two "extras" amounts to 15% of the list price of the unit!

Based on this experience I have two recommendations to make:

1. F.S. should draw up a salesman's "checklist" so that all of these embarrassments can be uncovered at the time of the sale.
2. We perhaps should take another look at the income guidelines that field service uses to justify manpower (400- \$600 per month per man). When one examines the costs (hidden and otherwise) of installing a DEC peripheral, one would suspect the F.S. organization of using the peripheral market to build up its income per man. Even without the \$500 "cabinet penalty", our most popular peripherals carry an extremely high installation charge - e.g. 14% for a PC02 paper tape reader.

We may be killing the goose that laid the golden peripherals!

DJD/es

*Copies to Operations Committee members and Mr. Ford 10/19/67*

DATE: October 12, 1967

SUBJECT: BLOOD ANALYZER OPPORTUNITY

TO: Mort Ruderman  
Nick Mazzaresse  
Ron Smart  
Bill Sewalk  
Ken Olsen ←  
Win Hindle  
Mike Ford

FROM: Ted Johnson

The district managers in the MidWest are extremely fired up by the opportunity in the blood analyzer business. I would like this memo to emphasize the need to establish a high level of urgency to do what is necessary to capture this market.

1. There are two key markets: Clinical Pathologist (clinical labs.) and Analytical Chemistry. In case one, we are aiming for penetration in this market anyway. We didn't know how to exploit the LINC-8 in the clinical lab but now I feel the salesmen are teed up to move. Here's a huge market that needs help NOW. Analytical chemistry (big drug companies) is another area we have wondered about, searching for a door-opener. Here it is.
2. Spear is already attracting attention. Their system is \$40K plus \$20K for the software. BSL is \$90K and not at all favored by the pathologist market (better received in the other). We have a LINC-8 approach (which could extend the life of the LINC-8, and a long-term, huge and extremely favorable position with the 8/1. If we had a package, people are ready to buy now. Technicon's device is \$10 - 15K. We have the right size equipment, it would seem.
3. Technicon is questionably motivated to hook on a computer. Why are they stalling? Do they want the risk of committing to one approach? Will they not be getting more competition in the future?
4. Many potential users feel BSL won't fly. Even if they do, they would not necessarily lose by our entry. They can still hit a specialized market. They don't have a sales force. If we want to worry about hunting OEM's, we should look at cases like Real Time Systems (gas chromatography).
5. The MidWest people feel we can get a good average sample of potential users in each market and tailor software to that. Result: the majority of today's market.

6. They feel the best approach is to:
  - A. Put a top, clever applications programmer to work, preferably at a test hospital on a test system.
  - B. Have a marketing man in parallel survey through a large number of potential users, getting their requirements and influencing the software in parallel with developing an instant market.
7. If the potential is as great as indicated, it certainly seems that we would be extremely foolish to let this slip by and not put top priority and a strong effort into doing a good job. I doubt that a compromise approach without significant development and creativity on our part will succeed.
8. I propose we short-circuit Technicon and move quickly. This market would swamp TYPESETTING in volume and overall worth to the company. (And I think typesetting is great.)

CAN WE SEE SOME ACTION!?!?

mr

**digital**

INTEROFFICE MEMORANDUM

DATE: October 11, 1967

SUBJECT: Engineering Reporting System

TO: Operations Committee

FROM: Harry S. Mann

Several weeks ago, I was asked to document the manner in which we handle our engineering accounting. The attached report attempts to provide this information.

As I reviewed all of the details that we had worked out on this system during the past two years, I became more aware than ever of the fact that we have an unusual and very effective system at work.

HSM/ml

Encl.

## ENGINEERING REPORTING SYSTEM

Engineering expenses are collected and reported in six categories for each product line as follows:

- Product line engineering
- Programming
- Drafting
- Mechanical engineering
- Manuals
- Computer test engineering

For each of these categories, the cognizant product line manager prepares a budget on a quarter-by-quarter basis for the year and revises the budget each quarter to reflect major changes. Actual direct material and labor charges are identified by product line for each of these six categories. These direct charges, plus the appropriate overhead rates of the centers providing the direct labor, are accumulated monthly and reported on the Statement of Operations.

To provide some reasonable control and fix responsibilities, only certain designated cost centers are permitted to make charges which will appear as part of the expenses on each of the six lines of the statement. In the case of programming, only two centers (namely, computer programming center 360 and program library center 365) may charge to the programming activity code. Hence, all variances from budget that occur in programming can be identified as the responsibility of Larry Portner. Only the Drafting Department (center 325) is authorized to charge expenses to drafting. Hence, in this case, Roger Melanson is totally responsible for these charges. The only center permitted to make charges to mechanical engineering is the Mechanical Engineering Center 330 under Loren Prentice. Computer test engineering expenses are limited to charges made by center 373 under Ed Harwood. By limiting charges in this manner, the product line managers are able to quickly relate a budget or cost problem to a given functional manager. The functional manager in turn is able to provide backup information on his expenditures to the product line managers as requested.

The only overheads added to direct labor charges are the ones directly assigned to the cost centers making the charges. In other words, taking drafting as an example, the overhead labor, occupancy costs, fringe benefits, supplies, etc., relating to drafting are the only items included in the drafting center's overhead and, hence, the charges are on a very direct and meaningful basis. Direct labor is the base on which overheads are

calculated and distributed to product lines. We are dependent, therefore, upon careful and accurate reporting by the draftsmen as to the time they spend on various product lines.

There are also occasions when materials and equipment are purchased outside or produced within our own shops for a particular engineering project. For example, mechanical engineering may purchase some item from a vendor which is being used for the development work on a given product line. This is not dealt with as general overhead of mechanical engineering but as a direct charge to that product line as part of the mechanical engineering expense. In like manner, if the mechanical engineering department requisitions some substantial DEC produced equipment from the stockroom, this would likewise be identified as a direct charge to a product line. This contrasts to normal small supply items which may be drawn from our stockrooms or purchased from outside vendors.

The question has been raised as to work performed by manufacturing in building equipment for engineering groups such as mechanical engineering. In this case, the charges are accumulated during the construction process against a standard M-type factory job order. While the work is being done, it is charged to this job order and temporarily becomes part of in-process inventory. When the work is completed and the job is closed out, the equipment is turned over to the engineering department and the cost that has been accumulated in the inventory account is transferred to engineering expense. In most instances, this equipment is relatively large in value and is once again treated as a direct material charge to the product line being benefited. In this case, as well as in other cases, the charges become part of that line on our statement which is known in this example as Mechanical Engineering.

In respect to the line on the statement called "Product Line Engineering," similar rules are followed. There is a more complex relationship, however, in that there are a number of centers which can charge time, overheads and materials to Product Line Engineering. These centers are as follows:

Medium Computer Engineering	323
Model Shop	324
Printed Circuits	331
Module Engineering	357
PDP-10 Engineering	359
Small Computer Engineering	363

Digital Test Engineering	375
PDP-9 Engineering	377
LINC Engineering	380
PDP-8 Engineering	381
Module Development	382

Generally speaking, most of these centers are identifiable with a particular product line and, hence, the bulk of their charges are made to the product line which they directly support. This, however, is not universally true and sometimes one engineering group does work for another product line and cross-charges of this type are provided for in the system. The method that is used in each of these cases is simply to have the engineers indicate for direct materials and their direct labor the product line which is being benefited and the appropriate charges with the applicable overhead rates find their way into the proper product line statement.

#### Discrete Projects

As an off-line type of accounting function, there are certain projects which are identified as discrete projects. These are relatively few in number and represent in the aggregate only a portion of the total engineering dollars to be expended by any product line. There are two reasons for discrete projects:

(1) for those projects where by prior agreement more than one product line shares the costs, we then use a discrete project through which mechanism we accumulate the total costs each month and then on the percentage distribution previously agreed to, we divide the costs between product lines. (2) The other type of discrete project is where it is the desire of the product line manager to accumulate costs on some major piece of work he is doing within his product line. At his discretion, a discrete project is then issued. Costs are accumulated against it and charged off monthly as incurred through the various lines on his operating statement as described above. Expressed another way, this is a method by which part of our engineering costs are further identified over and above the identification in the Statement of Operations. Discrete projects often require support from many different cost centers and charges made to them may, therefore, become part of several lines on the Statement of Operations.

It should be clearly understood that no attempt is made to build up our budgets for engineering in each product line by adding up all amounts planned for discrete projects. We believe this would be an undesirable thing since it would eliminate flexibility on the

part of the product line managers to embark upon other types of engineering activities. As a consequence of our approach, there is considerable flexibility within each budget for the product line managers to do other engineering jobs which are not well defined at budget time. In addition, this approach provides funds for the so-called day-to-day support effort which invariably goes into sustaining product lines and handling minor changes, improvements, and adjustments for new applications.

#### Prototype and First-Run Production

Another area of misunderstanding relating to the accounting for engineering activities is in the field of manufacturing support and prototype production. When the engineering budgets are prepared by the product line managers, they anticipate there will always be a certain amount of engineering manpower and related overhead that will be required to support existing products in manufacturing or introduce into production new products that are well along the way in the engineering cycle. Time charges for this kind of work, therefore, are appropriately reflected as part of engineering expenses. In the case of building prototypes, the entire cost is deemed to be a part of engineering expense. For the first few machines that will be delivered to customers, it is anticipated that some engineering labor will be expended on these machines. Probably a portion of this labor is productive and results in saleable product. Therefore, some portion of this might be categorized as direct production labor. It is always difficult to know precisely how much of it falls in this category since there is generally a great deal of backing and filling that has to be done on the first machines and, therefore, only a fraction of such labor is productive. Furthermore, we do not want these people to have the flexibility to charge production for their time because it then would follow that the manufacturing manager would lose control of charges to the cost of goods sold and, hence, would not be able to fully control the cost of goods sold figure which he does currently.

There have been problems in the past due to the fact that modules and other expensive material have been drawn out of the stockroom by engineers and have been improperly requisitioned by them. As a result, sometimes charges for these materials have found their way into engineering costs. This type of thing is not a fault of the system as much as it has been either oversight or lack of understanding on the part of the engineers. The system that should be followed is to have the appropriate production control people in manufacturing requisition out of the stockroom the necessary materials for the first production type units and to

supply those materials to the engineers. It then will follow that those materials will be charged to a job order and will find their way into the cost of goods sold rather than into an engineering expense. If the engineers do not follow that system but simply requisition the materials themselves, they will find their way into engineering expense. This distinction is, I believe, now understood by everyone at the operating level.

In summary, I feel that we have achieved all of our major objectives of fixing responsibility and assigning expenses to the proper category of expense and the product line by the system which we are using. Furthermore, we have not put a straight-jacket onto the product line managers to restrict their ability to do a good engineering job and to do some innovating without a lot of red tape. Our accounting system for engineering is, I believe, unique to us and affords many advantages that other systems do not provide.

HSM/ml

digital

INTEROFFICE MEMORANDUM

DATE: October 10, 1967

SUBJECT:

TO: Harry Mann

FROM: Pete Kaufmann

cc: Ed Simeone  
Jack Smith  
✓ Ken Olsen  
Bill Hanson  
Henry Crouse

Due to a number of changes in our production plans and marketing forecast, it is felt that the quarterly inventory budget for the year will have to be raised.

The new production requirements that we are exploding this month requests increases in the Linc, Basic 8's, 9's and all peripherals. The 8I, 8S and PDP 10 requirements are as originally planned.

Will attempt to quantify these changes into realistic dollar inventory levels during the next couple of weeks. By copy of this memo, am asking Bill Hanson for Modules and Jack Smith for Computers to project the inventory requirements for the remainder of the fiscal year based on our new production requirements. Request that Ed Simeone assist me in reestimating the resulting effect on the other inventory accounts.

This change in requirements will obviously have some effect on our direct labor and overhead budget but would like to operate during the second quarter from our original budget. It is most likely that in December we will want to rebudget for the last two quarters of fiscal 68.

Pete

jb

C-General Dorist <sup>10/12/67</sup>

**digital** INTEROFFICE MEMORANDUM

DATE: October 10, 1967

SUBJECT: Raytheon - Andover

TO: Ken Olsen

FROM: Win Hindle *WH*

cc: Ted Johnson  
Roger Handy  
Bob Savell  
Bob Lane

We have just lost a very nice PDP-10 order at Raytheon's Missile Systems Division in Andover. The circumstances surrounding this loss concerned me and I thought I should report them to you for your comments.

The PDP-10 system would have been used by Raytheon's Quality Control group in their Hawk Improvement Program (HIP) to collect and record quality information on all parts of the Hawk Missile. The time-sharing features of PDP-10 were a strong advantage in this application and the Raytheon engineers making the procurement proposal were solidly sold on our proposal. I visited Andover in August and met with Mr. Harry Loebel, Plant Manager, and shortly thereafter it was reported that he was convinced that PDP-10 was the correct choice. We were promised that a decision would be made before September 1.

We received no more formal information until October 2 when we were informed that PDP-10 had not been accepted. The "grapevine" reports we received during September indicated that the Raytheon Computer Division had objected strongly to Raytheon-Andover selecting a PDP-10 rather than one of their machines. The decision by Raytheon-Andover to use PDP-10 was apparently appealed at higher levels of Raytheon management and the decision for PDP-10 had been reaffirmed until Mr. Thomas Phillips, Raytheon President, decided in favor of Raytheon Computer. I cannot verify all of the facts, but the one month lapse of time in making a final choice lends credence to the information we have heard informally.

My concern is that we all spent so much time selling a system where the customer was apparently "locked in" to purchasing one of its sister division's computers. It reflects poorly on Raytheon's procurement practices, in my view, and I expect the customer for the Hawk would be quite concerned if this sequence of events were known to him. I do not propose that we take any further action, but I am going to be very cautious about expending selling effort at Raytheon in the future unless we are assured that we have an equal opportunity with Raytheon Computer to make the sale.

bwf

OCT 11 REC'D

digital

INTEROFFICE MEMORANDUM

DATE: October 10, 1967

SUBJECT: Raytheon - Andover

TO: Ken Olsen

cc: Ted Johnson  
Roger Handy  
Bob Savell  
Bob Lane

DO WE HAVE ANY WAY TO MAKE  
OUR PT. KNOWN? I don't  
have any ideas  
FROM: Win Hindle *WH*

*discuss with  
KH Olsen*

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bwf