

dec

INTEROFFICE
MEMORANDUM

DATE December 1, 1964

SUBJECT Salary Review Committee Meetings

TO Kenneth Olsen
Harlan Anderson ✓
Stanley Olsen
Dick Best

FROM Win Hindle

The Salary Review Committee will meet on the following nights:

Tuesday	December 8	8 p.m.	Harlan Anderson's home Rollingwood Lane Concord
Thursday	December 10	8 p.m.	Ken Olsen's home Weston Road Lincoln

Win Hindle

WH:ns



INTEROFFICE
MEMORANDUM

DATE December 1, 1964

SUBJECT Progress of PDP-7 for Bell Telephone Laboratories

TO Computer Guidance Committee FROM J. Smith

Memory has been installed and is currently undergoing checkout. Reader-punch logic construction is complete. Device selector will be ready Friday. Central processor logic will be installed Friday. All cables are currently under construction. Power wiring has been completed. All modules will be available by Friday. Looks very promising; Ron should begin checkout December 7, 1964.

Distribution:

K. Olsen
H. Anderson ←
S. Olsen
R. Beckman
G. Bell
R. Best
W. Hindle
N. Mazzaresse
H. Morse
D. Packer

END OR GA PLS

DIGITAL MAYN

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DIGITAL MAYN

DIGITAL CARPL

MESSAGE 203

TO H. ANDERSON

KEN OLSEN

FROM D. DOYLE

RECEIVED
1964 NOV 31 AM 8:24
DIGITAL EQUIPMENT CORP.
SALES DEPARTMENT

THE PEOPLE FROM COMPUTING DEVICES OF CANADA WILL BE IN BOSTON TODAY, AND YOU CAN PROBABLY EXPECT A CALL FROM THEM WITHIN THE NEXT HOUR. THEY WILL BE COMING OUT TO TALKABOUT MICROTAPE THEIR NAMES ARE NORM HARDING, AN ENGINEER, AND DOUG BASSET, A PURCHASING MAN. ANDY HAS THE BACKGROUND, BUT IF THERE ARE ANY FURTHER QUESTIONS, I WILL BE IN THE OFFICE ALL DAY.

END OR GA PLS

END@OGMU9



INTEROFFICE MEMORANDUM

DATE December 1, 1964

SUBJECT Follow-up of computer and computer peripheral equipment
purchase orders.
TO All Project Engineers FROM Tom Whalen

Previously, there has been some difficulty in determining whether systems are going to be delivered on time or not until they appear on the overdue list. In order to get the proper feedback before it is too late, we have established a series of check points to be used during the scheduled cycle of each order.

We must first make up schedules for each item in our present backlog. When this is accomplished, we can easily maintain the system as the orders come in. The importance of this system can't be over-emphasized. One of our main selling points is accurate delivery information. Our reputation suffers everytime we miss a quoted delivery date.

The checkpoints to be used in this system are:

1. Design completed
2. Drafting completed
3. Parts arrival
4. Programming available
5. Production complete
6. Off line checkout
7. On line checkout
8. Acceptance test

All of these checkpoints will not be applicable for each system ordered. The schedules should show only those checkpoints which do apply to the equipment ordered.

A sample schedule has been included. Copies of each schedule should be sent to Ken Olsen by December 11, 1964. When he has reviewed them, he will forward them to me to be posted on the master chart which will be available in my office for your inspection at any time.

TW/jss

PROJECT: NASA - Europe - PDP-5 (Standard)

PROJECT ENGINEER: Joe Smith

MONDAY → 11/2/64 11/9 11/16 11/23 11/30 12/7 12/14 12/21 12/28 1/4/65 1/11 1/18 1/24 2/1 2/8 2/15 2/22 3/1 3/8 3/15 3/2 3/29 4/5 4/12 4/19 4/26 5/3 5/10 5/17 5/24

ABSOLUTE SCALE → 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Production Complete

On Line Checkout
Acceptance Test

MATERIALS ESTIMATE BY MONTH → 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
NOVEMBER 1964 DECEMBER 1964 JANUARY 1965 FEBRUARY 1965 MARCH 1965 APRIL 1965 MAY 1965

NASA - Europe - PDP-7 with Special Interface

PROJECT: **Joe Smith**
PROJECT ENGINEER:

MONDAY → 11/2/64 11/9 11/16 11/23 11/30 12/7 12/14 12/21 12/28 1/4/65 1/11 1/18 1/24 2/1 2/8 2/15 2/22 3/1 3/8 3/15 3/22 3/29 4/5 4/12 4/19 4/26 5/3 5/10 5/17 5/24

ABSOLUTE SCALE → 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

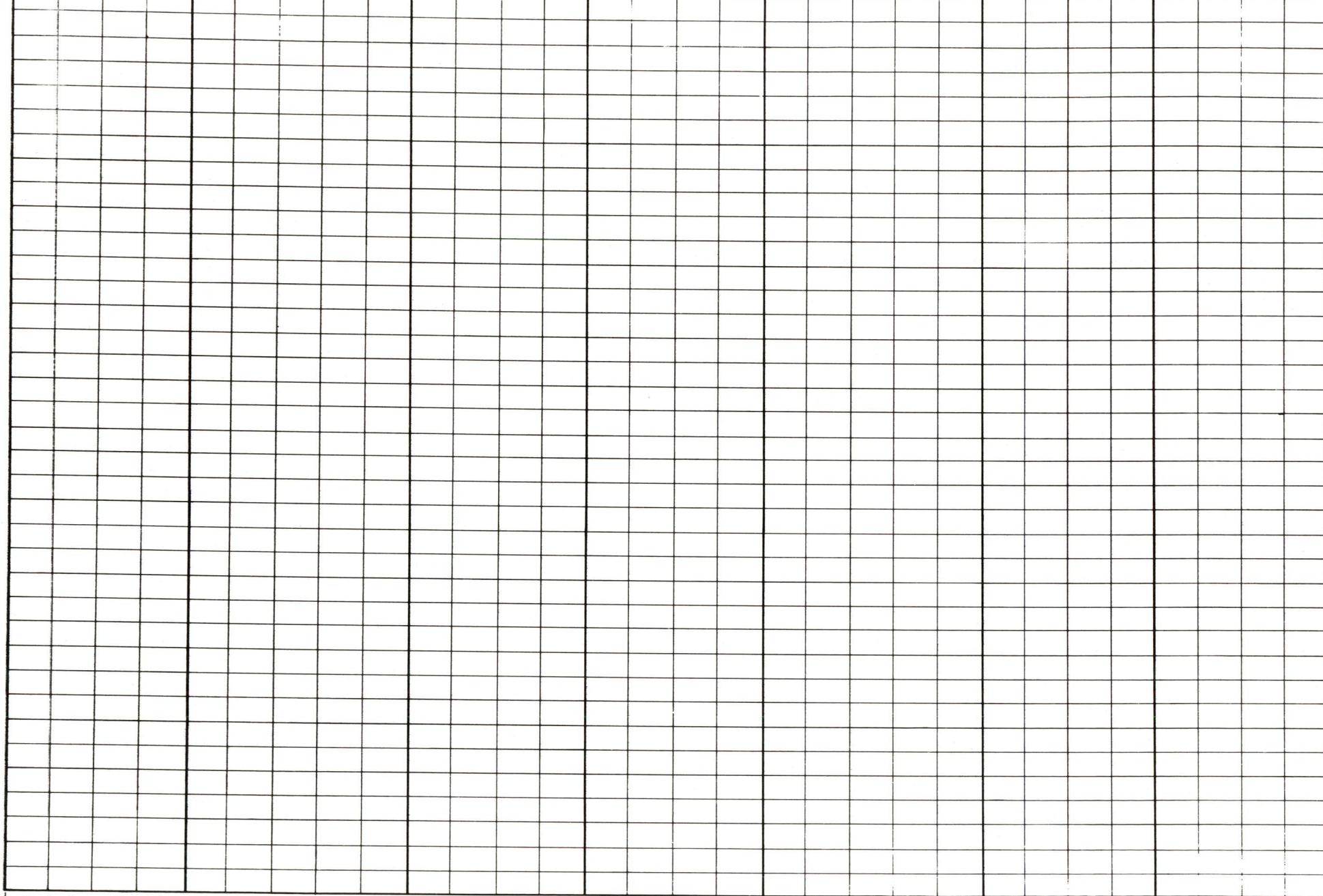
Design Complete
Drafting Complete
Parts Arrival
Prod. Complete
Line Check-out
Acceptance Tests

MATERIALS ESTIMATE BY MONTH → 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
NOVEMBER 1964 DECEMBER 1964 JANUARY 1965 FEBRUARY 1965 MARCH 1965 APRIL 1965 MAY 1965

PROJECT:
PROJECT ENGINEER:

MONDAY → 11/2/64 11/9 11/16 11/23 11/30 12/7 12/14 12/21 12/28 1/4/65 1/11 1/18 1/24 2/1 2/8 2/15 2/22 3/1 3/8 3/15 3/2 3/29 4/5 4/12 4/19 4/26 5/3 5/10 5/17 5/24

ABSOLUTE SCALE → 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30



MATERIALS ESTIMATE BY MONTH → 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
NOVEMBER 1964 DECEMBER 1964 JANUARY 1965 FEBRUARY 1965 MARCH 1965 APRIL 1965 MAY 1965



INTEROFFICE MEMORANDUM

DATE December 1, 1964

SUBJECT Discfile for Adams

TO H. Anderson
G. Bell
H. Crouse
N. Mazzaresse
R. Savell
R. Beckman

FROM D. Kuyamjian

Reference is made to my memo of November 18, 1964 concerning the Data Products discfile for Adams.

Via today's telephone conversation, Mr. Collins, Marketing Manager at Data Products, granted us a two week extension for issuing a firm order; this extension will not affect the February 1 delivery.

Collins neglected to send copies of their standard warranty and field service policies, but promised to do so this week. In discussing these policies, an apparent misconception of their field service policy was uncovered. It is not as represented in my previous memo. The field service provided with the 5024 is confined to the two-week installation period. No field service and installation assistance is provided with the 5022.

Assistance from Data Products field service personnel carries a \$120.00/day charge even for in-warranty non-functioning equipment. Parts will be replaced at no charge, but labor must be provided by customer personnel in order to avoid field service costs.



INTEROFFICE MEMORANDUM

DATE December 1, 1964

SUBJECT

TO K. Olsen
H. Anderson ✓
R. L. Best
N. Mazzaresse
E. Harwood

FROM Arthur Hall

As we have discussed before, option numbers for certain categories, particularly Primarily Logic Options are running out. We can't reasonably use 4 or 5 digit numbers because of conflicts with module numbers and numbers greater than 5 digits won't fit into the format for charge numbers.

With the proliferation of options (172 at last count not counting A, B, etc., models or modules, power supplies, etc.) it is convenient enough to separate them into categories that we would like to maintain the categories.

Therefore I propose the following prefixes (to a 3-digit number) for categories of options.

- AD Analog-Digital equipment (except modules)
- AP Arithmetic Processors (including H.S. Multiply and Divide, Indexing Registers, etc.)
- CP Card Punch and Control
- CR Card Reader and Control
- DC Data Communication Equipment (#630 systems, Dataphone, etc.)
- DF Disc-Files and their Controls
- DI Displays: CRT or lights (including light pens)
- DR Magnetic Drums and their Controls
- ME Memories and Memory Controls, Extension Controls, Parity, etc.
- MT Magnetic Tape Transports and Controls (including DECTape)
- NL Non-Logic options (Vertical frames, Power Interruption Protection, Door locks, special cables, display cameras)
- PL Plotters and their Controls, Character Generators)
- PR Printers (Line Printers, Typewriters, Teleprinters w/& w/o tape equipment)
- SI Special Interface Logic (High Speed Data Lines, Real Time Options, Program Interrupt Logic, Computer Duplexing equipment, Computer to Peripheral Equipment, Peripheral Equipment to Peripheral Equipment)

Page Two

TP Paper Tape Punch and Control

TR Paper Tape Reader and Control

There are several advantages to this system:

- 1) Each category can have 1000 entries.
- 2) Any current number may have the prefix added (if desired) without changing the number.
- 3) It is even easier to know what the equipment is by looking at the #.
- 4) The number fits the charge number system.

Disadvantage: Charges may not be made to different models of the same option.

Unless there are objections or suggestions for further review of this system I will start assigning option numbers by this system.

AH/mro



INTEROFFICE MEMORANDUM

DATE December 3, 1964

SUBJECT

TO H. Anderson
S. Olsen
N. Mazzaresse
H. Crouse
R. Lane
R. Best
J. Smith
R. Beckman

FROM D. Kuyamjian

Attached are contract and delivery schedules
of all contracts for major components.

ORDER	RELEASES	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
G.I.-Magne-Head Memory Drum Qty: 4 Contract: 9-64/ 12-65 Price: 1st unit \$29,500.00; bal. \$27,750.00 Dlvy. Cycle: 4 mos.	Release #1-one unit	14th									
Anelex Printer 5-600 Price: \$17,975. Qty: 10 Contract: 11-64/ 3-66 Dlvy. Cycle: 5 mos.	Release #1-ten units, 600 lpm, ASCII code, 120 co.	15	15	15	15th 600 lpm	15th	15th	15th	15th	15th	15th
<p style="text-align: center;">SPEED AND CHARACTER SET CANNOT BE CHANGED AFTER THESE DATES WITHOUT CANCELLATION CHARGES</p>											
Vermont Research Memory Drum 20 Qty: 5 Contract: 7-64/ 7-65 Price: depends on number of heads Dlvy. cycle: 4 mos.	Release #1-one unit \$10,910.00	14th									
									7th Contract Expires		

ORDER	RELEASES	DEC.	JAN.	FEB.	MAR.	APR.	MAY.	JUNE	JULY	AUG.	SEPT.
Vermont Research Memory Drum 10" Qty: 10 Contract: 5-64/ 5-65 Price: depends on number of heads Dlv. Cycle: 3 mos.	Release #1 - 1 unit, 64K \$5900.00		1								
							28th Contract Expires				
Midwestern Transport 570 Price: \$8312.00 Qty: 50 Contract: 11-63/ 5-65 Dlv. Cycle: 3 mos.	Release # 1-ten units received. Release #2-ten units	6	4								
							8th Contract Expires				
Teletype 33 ASR Price: \$652.00 Qty: 150 Contract: 8-64/ 6-65 Qty: 1000 Contract: 11-64/ 7-67 Dlv. Cycle: 6 mos.	Release #1-150 units Release #1-1000 units	50	10	10	20	20	20	20			
						6	20	20	40	40	40

ORDER	RELEASES	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
Digitronics 2500 Reader Price: \$714.00 Qty: 35 Contract: 3-64/ 8-65 Dlv.Cycle: 6 wks.	Release #1- 20 units; 10 rec'd	3	4	3						24th Contract Expires	
Datamec Transport D2020 Price: \$3689.00 Qty: 51 Contract: 10-64/ 4-66 Dlv.Cycle: 3 mos.	Release #1-one unit; received										

ORDER	RELEASES	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
Teletype 33 KSR Price: \$460.00 Qty: 120 Contract: 8-64/ 6-65 Dlvy. Cycle: 6 mos.	Release #1-120 units-30 rec'd		10	10	20	20	20	10			
Teletype 35 ASR Price: \$2313.00 Qty: 6 Contract: 7-64/ 1-65 Qty: 72 Contract: 11-64/ 6-66 Dlvy. Cycle: 7 mos.	Release #1-6 units Release #1-72 units		6					6	6	6	6
Teletype 35 KSR Price: \$1476.00 Qty: 5 Contract: 7-64/ 1-65 Qty: 60 Contract: 11-64/ 6-66 Dlvy. Cycle: 7 mos.	Release #1-5 units Release #1-60 units		5					5	5	5	5



INTEROFFICE MEMORANDUM

DATE December 3, 1964

SUBJECT

TO *Harlan Anderson*

FROM Mort Ruderman

At 8:30 Friday morning (Dec. 4) in Building #5, a demonstration of the Utility Programs available with the LINC Computer will be demonstrated. Also, a sample of some of the Users Programs will also be demonstrated at the same time.

INTEROFFICE MEMORANDUM

DATE December 3, 1964

SUBJECT

TO Computer Guidance Committee FROM J. Smith

cc: D. Smith

Tuesday I met with D. Smith to discuss the integration of the 630 Data Communication System into Production. Also, of what immediate assistance we could be in helping him to meet existing customer commitments.

Attached, you will find a sheet I have constructed noting the status of all open orders for 630 Data Communication Systems. As can readily be seen, there are a number of items still not released. I feel some thought should be given as to the priority Don should follow for the remaining unreleased units. For example, with the release of the 631B, two customer orders could be completed - Dupont and Fischer & Porter. The 631B is a relatively short job and should not take too much time away from the Adams systems, which it would seem should have top priority, if we consider only delivery dates.

I intend to issue a weekly report to this Committee on the progress of the shifting of responsibilities from Don to Production. The construction of the released units has been given top construction priority, and we should see some very tangible results within the next couple of weeks.

We have, at this time, assumed all construction and checkout responsibilities for all released units and will work very closely with Don to see that the remaining unreleased units become available.



INTEROFFICE MEMORANDUM

H. Anderson

DATE 4 December 1964

SUBJECT FLIP CHIP connectors

TO K. Olsen FROM D. Smith

Mr. John Hitch of Hitch Associates, called last night. Mr. Hitch is interested in proposing that a number of our PDP-8 computers (approximately forty two) be used in a large switching center. One of the criterias of the job is reliability and this is one of the reasons we were chosen.

About three (3) weeks ago, John was here and I gave him a FLIP CHIP connector block and a couple of etched FLIP CHIP boards, one of which had the gold plating on the contacts. The connector had our name placed on it so it was somewhat to our specifications although, I am not sure exactly how well it met them. I obtained the connector from Ron Wilson. The reliability of the connector is worth considering because a large number are used in the systems. John is also planning to use our modules for special circuits. He ran an evaluation on the connector and feels that he needs a somewhat more reliable one for his particular application. John has had quite a bit of experience with connectors and came up with some very good suggestions that we might consider using as a basic standard for evaluation:

1. An average of 250 grams of contact pressure (with a minimum of 160 and a maximum of 310 grams).
2. The plating on the board be $\frac{3}{4}$ of one per cent cobalt gold alloy about .001 inch thick with a knoop hardness of about 160.
3. The base metal of the gold button on the contact should be about 80% copper and about 20% nickle.
4. Spring material be made of grade A phosphor bronze.
5. That a lubricant should be used.

The above criteria will permit about 500 insertions for the connector, about 200 insertions for the card, without fail. Actually, one could expect 2000 insertions for the connector and 800 insertions for the card, under the above conditions. This would be designed to last about 40 years, with good reliability.

The criteria which controls all the other items is the contact pressure. It has to be great enough to overcome the impurities that are on the card and the contacts. The impurities are gold oxidation, pieces of board material dust, and other dust impurities in the surrounding area. When the card is inserted, gold particles tend to come off and these small particles oxidize. The oxidized particles then are a form of a resistance. In some tests the card is inserted many times during a short period of time; however, this does not permit the gold to oxidize, even though some is rubbed off upon its insertion. Inserting a card once every two years, over a period of years, would allow the oxidized gold to get under the contact and tend to cause poor contact.

The spring pressure should be somewhat constant. The contact should be molded in the block because wiring on the back side of the connector, tends to cause different contact pressures. The contact material should be made from a round wire. The stress relaxation pressure is four times better for a round wire than for a rectangular wire. The other end of the round connector can be made square by coining or there is such a thing as a round knurled wire-wrapped connector that is acceptable.

We bevel the board on the etched side. This causes the contact pressure to be applied to the board itself, this action wipes off the insulating material onto the contact. Then pressure is applied to the end of the laminate. The pressure applied on the end tends to remove the laminate by peeling it off. The laminate peeled off on one of the boards John was testing. He suggests that the tip of the board be BLUNT and that the board be beveled on the opposite side of the lamination. A ramp should be built under the contacts on the opposite side of the contacts. When the board is inserted, the lamination should be under the contact before pressure is applied. The board would then come in contact with a ramp which would force the board against the contacts and pressure would be applied.

The lubricant prevents cold welding which would result with the specified contact pressures. John suggested that a good grade of micro crystalline wax should be used as a lubricant. There is a wax called Carvona Wax that is made in Brazil. This wax was diluted in trichothylene of about .5% wax by weight. The result is a good lubricant that will not collect dust and that can be sprayed or dipped on the module.

Further points about connectors are as follows:

1. Prevent the circulation of air over the contacts. The dust and oxides tend to collect on the contacts when stirred up. This step alone tends to double

the reliability. Our connector is good in this respect as the contact area is somewhat protected from circulating air.

2. Bifurcated contacts do not improve reliability on connectors. They are for moving contacts such as relays.
3. In order to get the higher contact pressure required the contacts will probably have to be made longer.

In the evaluation of our connector John compiled the following information:

1. Wide variation in contact pressures.
2. The gold button was not on the knee of the spring. The pressure was somewhat on the side of the button. It wore away rapidly and the spring made contact after about 40 insertions.
3. After about 50 insertions all the contacts were contaminated.
4. The edges of our board wears easily. The glass board dust was on the contacts (good insulator).
5. The contact and connector are soft gold.

The circuit that John wishes to put on a double FLIP CHIP board is very dense and requires 37 contacts. He uses two double boards to each connector block.

John suggests that if we redevelop the connector that we have 1 or possibly 2 (19+19) extra contacts designed into the connector in the key area. Our connectors could be made by the manufacture by inserting a blank in place of the two contacts. By removing the blank they could build the type he requires.

He also suggests that possibly we could investigate the possibility of using a connector that only one double board could fit in. The connectors could then be spaced dependent upon the depth required for the components mounted on the boards. Another suggestion was that possibly the board could be guided on the ends instead of using the center.

John feels that he must use a better connector than the type he evaluated.

He suggested that we could possibly get a re-evaluation on our present connector. The connector manufacturer would possibly supply experimental ones at a low cost. He suggested that the most connector manufactures supply the mold without change in order to get the overall business. The mold tends to be prorated over a number of connectors.

John thought perhaps he could discuss the connector design and testing procedures with the person in charge here. He also suggests that information might be useful to our quality control department.

I think that this evaluation of our connectors indicates Mr. Hitch's extreme desire for our products and is an attempt to improve our reliability to a point where he can feel completely free of any qualms in recommending that our equipment be used in his proposal. The evaluation of this connector certainly took quite a bit of effort and time on his behalf.

cc: S. Olsen
C. Kendrick
L. Prentice
P. Backholm



INTEROFFICE MEMORANDUM

DATE December 7, 1964

SUBJECT 43rd Meeting of the
Test Equipment Committee

TO Richard L. Best

FROM Russell Doane

Members of the Committee:

Robert Hughes, Chairman
Russell Doane, Secretary
George Gerelds
Jim Cudmore
Steve Lambert
Larry White
Ed Harwood
Jack Shields
Bill Titelbaum

1. Bill Titelbaum will check with Tektronix on the expected selling price of our 321 and 515, which we can advertise in a Tek publication that has a section for the purpose.
2. We discussed the flat-spots that grow on the jewels of our panel-mounted multimeters, causing sticking of the movement and thereby loss of accuracy. The Triplett man attributes the flat spots to the vibration present in our test set-ups that is produced by oscilloscope fans. We decided that the present meter life, which is as low as a few months in some cases, merits paying \$11 more for taut-band replacement meters the next time we buy replacements. We'll also clean the blades of the cooling fans to improve the balance and perhaps reduce the vibration, although the oiling that is required to prolong fan motor life will unbalance the blades again in time.
3. A 50 cycle Variac is being installed in power supply test so the test technician won't have to walk all the way to the generator for each line voltage adjustment and so the line voltage can be stepped up to the full maximum voltage specified on 50 cycle test data sheets.

Loren Prentice will be asked to review precautions to prevent one user of 50 cycle power from turning power on while another user somewhere else is across the line. 230 volts can be fatal.
4. Bob Beckman has obtained a 545B 'scope for his training classes through Sales.

5. Dave Pinckney needs a Dalayed Sweep 'scope for PDP-8 development and Special Systems needs two 85Mc 'scopes for circuit development and systems checkout work, with a 543 in Systems being made available for other work. The PDP-8 needs are met by a HP175A, which can be converted to Delaying Sweep later when the Multiply-Divide system is installed. The committee decided to request three 581 'scopes to meet these needs, with the Special Systems 543 probably filling the Model Shop's need for a 25Mc 'scope in addition to the 581 the committee has already requested.
6. We decided to purchase two tilting 'scope carts at \$120 each for our two 547 'scopes. These 'scopes are used in PDP-6 checkout where at present the 'scope must be lifted off the cart and placed on the floor for observing logic in the lower bays of logic at low rep. rates where trace brightness is scant. We decided not to do the same for the 647's in PDP-6 checkout, since they are lightweight enough to be moved easily. The tilting carts are rather expensive, but Technibilt doesn't make a cheap version of this item.
7. We discussed wattmeters. At present we don't own one. We will discuss the need again next meeting, since the need is not so urgent as for 'scopes and test equipment money may be freer later.
8. Paul Gadaire reports that he borrowed a 'scope from Tektronix for a show on 1 day's notice, in spite of the 2 weeks normally required.
9. We discussed a 10 week calibration interval for multimeters, but decided to stick to 6 weeks.

The next meeting will be January 11, 1965 at 1:30 p.m. in Bob Hughes' office.



INTEROFFICE MEMORANDUM

DATE December 8, 1964

SUBJECT FIRST FLIP CHIP R201

TO Bob Hughes

FROM Jim Cudmore

The first Flip Chip R201 was tested by QC on December 7, 1964. When received, the direct inputs and two of the five DCD gates functioned. One of the three remaining DCD gates worked marginally. Chips were swapped from another module provided by T. Stockebrand and then the module functioned completely. The lower levels and triggering sensitivities of the DCD gates failed existing specs. The lower level spec could probably be relaxed but I would hesitate to suggest relaxing the triggering spec. The low sensitivity (large signal required) may be due to high forward voltage drop in the diodes. I think a reasonably small number of chips (1000) should be made until the cause of this defect is determined.

cc: Dick Best
Ken Olsen
Harlan Anderson ✓
Maynard Sandler
Jack Smith
Tom Stockebrand

INTEROFFICE
MEMORANDUM

DATE Dec. 8, 1964

SUBJECT Memory Test Business to Date

TO Works Committee

FROM P. J. Greene

The financial situation for the Memory Test Systems has been the following:

Since last March, total volume shipped -----	\$403,000
The computer systems shipped-----	62,000
Memory Test orders in process now -----	330,000
Computer systems in process now -----	68,000
(only special portion)	
Memory Exercisers to DEC -----	65,000
(estimated cost, ie estimated selling price, 3 machines)	
The approximate annual income for high current pulse equipment is estimated at -----	200,000
(for the year 1965)	
New Memory Test orders since March -----	608,000

Our gross profit margin has been running approximately 50% for the year. As far as the future is concerned, the prospects for sales in the Memory Test area look very good. There are many opportunities opening up and I am sure that now that we are serious about staying in the Test Equipment business, we will get our share of the market.

I would like to point out that in the above figures there is a lag of a few months from March on, in which we did very little business and shipped very few systems. This was a result of us not being known to be actively engaged in Memory Test work. About June and July our work in the field and sales effort started catching up with us and this was evidenced by the insurgence of business at this time which has been progressively better.

On my return from the Magnetic Show in Minneapolis, I had Dick Endres President of C.T.C. for a seat partner in the plane. We had a very sincere discussion as to the future of this business and we both agreed that the market is there and will be there for the next couple of years. There has been no promising replacement for the ferrite core to date. Lately, we have been giving C.T.C. a hard time by getting orders that they have also bid on. This is a small family of customers and both Dick Endres and I know all of the customers and machines that are put out for bid. So if we had bid on a particular machine, and we do not receive the order, automatically we know that the order has been acquired by C.T.C. and vice versa.

Technical Developments

We are now engaged in the redesign of our test equipment and testers to make full use of the flip-chip modules in order to reduce our costs and also increase our profit margin. Work is now being done for the following projects:

1. The new solid state current driver: Expected to go into production and delivery will be the end of Feb.
2. A new switching system is necessary in order to meet the requirements of the 20 mil cores. Price is no factor here if we can provide performance. The orders of magnitude are 20 nanosecond rise through a 4K mat.
3. Documentation and Technical Publications has been improved greatly and we will continue to put effort in this area.
4. Sense Amplifier: Design is just about complete, but we must keep ourselves sensitive to customer's needs as they change. This could mean a continuing development on the analog portion of our systems.
5. Discriminator: Discriminator is just about finished and will be supplied in all new equipment.

Our application notes are being faithfully distributed each month and now we are working on No. 8. It is interesting to note that requests from individuals for reprints of these notes are received from time to time. We are very enthused about our product and its future and hence we are putting full effort on the areas in which we are deficient at the present. This of course is due to the lag in the current driver and analog portions of the system which brings about our next topic for discussion - personnel requirements.

We are at the present using Joe Sutton part time; 75% of his time for development of the solid state current driver. Our competition has an equivalent engineer working 100% of the time. They also have other circuit people working on such things as the sense amplifier, etc. This load is being shared by Ulrich Skowronek with Ron Evans as a technician working with both Joe and Ulrich. I feel that in the future that I have enough work to keep Joe, Ulrich and Ron busy 100% of their time, plus one more technician. In other words, my needs at the present, and have been for the last several months, such that we require a full time circuit group.

I am requesting at this time that I be allowed to use Joe Sutton full time.

I had him go to the show in Minneapolis and size up the competition and since then he has been very enthusiastic about competing.

Since we have many Memory Testers in progress at the moment, I am forced to give Paul O'Malley more technical help in the form of Jim Hogan. This leaves a need for a first rate technician in the Core Test and Programmable Pulse Generator area. I have already talked with Mel Arsenault and he would like very much to have the opportunity to do this. I also stated my opinion as to the use of his capabilities at the present moment and I felt that he was not being used to his full capability in the development of the PDP-8. Both Mel and myself agree that someone with less talent could carry out the leg work in the development of the PDP-8 and release him for more responsibilities commensurate with his ability. Again, I would like to make this a formal request to get Mel over to assume this new position as soon as possible.

Our plans for the future will be to make a concentrated sales effort when we have the new current driver in production. This will mean building up a small demonstrator to take the current driver around and show it to the various customers for their comments. This has paid dividends in the past and I am sure that it will pay dividends in the future.

H. Anderson



INTEROFFICE
MEMORANDUM

DATE 8 December 1964

SUBJECT FLIP CHIP connectors

TO K. Olsen

FROM D. Smith

I called John Hitch on Friday night, December 4, 1964. John has given us some additional information pertaining to the connector and some corrections to my memo of the 4th of December on the connector.

1. Page one, Item 1: The contact pressure should be a nominal of 250 grams; minimum of 190, maximum of 300 at manufacturer time. ⁵The initial force would decrease about 40% over a period of 40 years due to stress relaxation.
2. Page one, Item 2: The gold alloy should be about .0001 thick.
3. Page one, Item 3: The last word is nickel.
4. Page two, first : paragraph, second sentence It has to be great enough to plow through the impurities that are on the card and the contacts.
5. Page two, : first paragraph, last sentence Inserting a card once every two years (in the field and under other than laboratory conditions) over a period of years....
6. Page two, second: paragraph, last sentence The other end of the round connector can be made square by coining it flat and it may be serrated, if desired. (The rough edges tend to make the wire wrap a little better. The round kurrled wire wrap requires special tooling and probably we would not care to investigate this.)
7. Page two, fourth: paragraph The Carnuba wax is not a micro crystalline wax but we should be able to find a micro crystalline wax.

Following are various points concerning connectors:

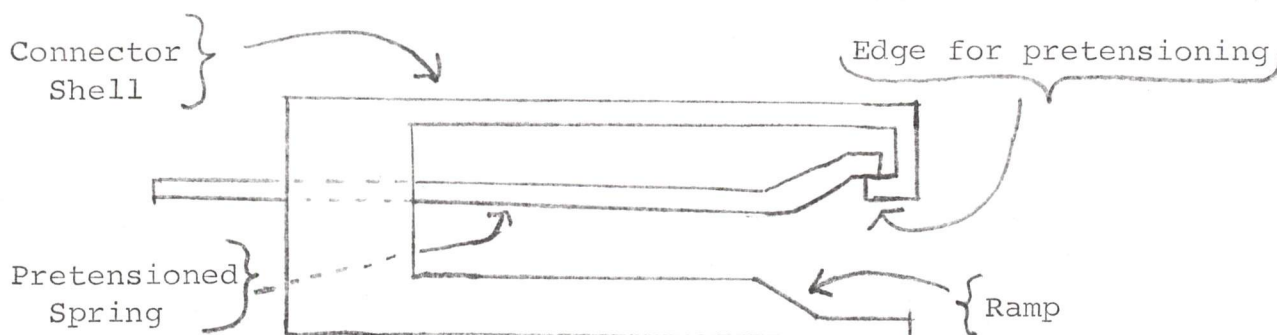
1. Spring pretensioning:

The reason for pretensioning; is that softer, more compliance springs (which result in more uniform pressure)

may be used. In about 1/16 of an inch (thickness of our boards) the spring pressure must go from \emptyset to 250. It must be a strong spring.

If the spring is pretensioned at about 195 grams there would be less tension buildup (from 195 to 250 grams). Pretensioning also permits the board to be more easily inserted.

The connector shell would require an edge at the end of the spring to hold the spring in a pretensioned position



2. Subject: Spring length.

The reason for a longer spring is that it does not relax as easily as the short one. (Stress relaxation is caused by aging under tension.) The longer spring exerts a relatively constant pressure over a period of years.

3. Oxidation and spring pressure:

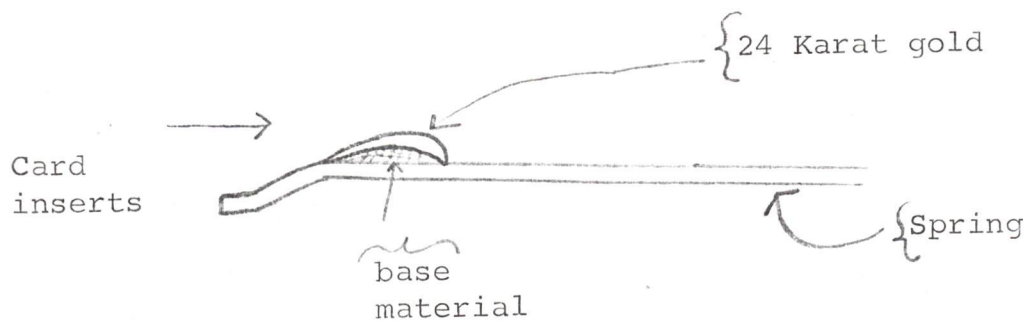
The oxidizing surface (tarnish film) is hard and brittle but it is not tightly bonded to the metal. It can be found on both the contact and the board. Once it is cracked or fractured (by sliding and pressure of contact) it is easily removed (sliding and plowing action). (Both sliding and pressure are required to fracture the oxide film.) When a card is pulled out, (after a couple of years) the oxidize surface will be fractured. The resultant broken fragments will be floating around in the contact area. When the board is re-inserted; a force great enough to plow the debris out of the way, must be available. When the board goes back a little bit deeper, the contact must break away new oxidizes to make good contact. John suggests that failures may occur (five insertions) after a couple of months under high humidity conditions.

4. Solid Gold button

The reason for the solid gold button is that it is cheaper than electroplating a low porosity gold surface. Solid gold is dense (not very porous) and thus, corrosion does not occur as rapidly as it would if the surface was porous.

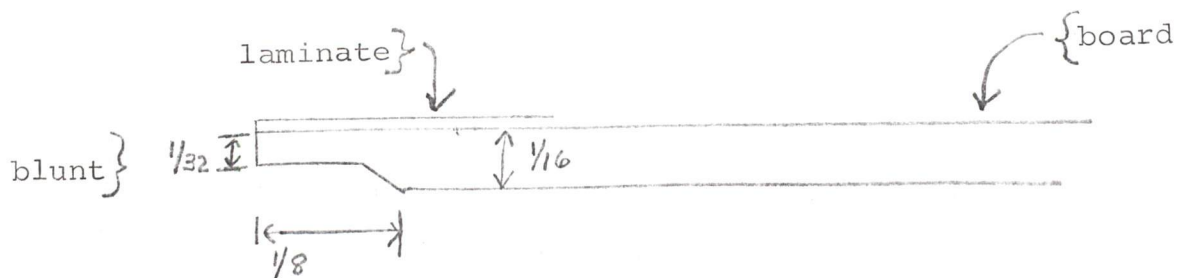
The button should be made of 24 Karat gold bonded to a base material (80% copper, 20% nickel). It should be rolled in a half tear drop shape (cross section). The gold should be about .003 thick. The base is resistance-welded to the phosphor bronze spring. A reaction would occur if the gold was applied directly to the phosphor bronze spring.

A company, named Handy and Harmon, can make the button wire and supply it on a roll.



5. Beveling the end of the board

A suggested method of beveling the board is shown



6. Board warpage and loose fibers

John noticed some warpage in our boards. He suggested that the board be stamped out so that the grain or weave of the fiber cloth is parallel to the shortest dimension. ($2\frac{1}{2}$ inch side on FLIP CHIP.) Warpage is perpendicular to the grain.

There is a manufacturer of modules that are 4" X 8" X 3/32 that requires no support bracket to prevent warpage.

If the edge of the board is examined under a microscope a number of long fibers can be seen. The fibers break off and contaminate the connector (poor contact).

A better stamping tool or method of stamping might resolve the problem. Cutting on the bias (diagonally) eliminates the fibers but contributes to warpage problem and also tends to be wasteful of board material.

7. Connector Design

The connector should be made of 2 pieces.

1. The springs should be molded into a block. The springs should leave the block at the same relative point. (The springs in our connector leave the connector at two different points. This means that although they start out with the same tension; in a few years they will have different tensions due to the fact that the stress relaxation curve is different for differently formed springs.) The blocks should have locating or reference points on them.
2. The shell of the connector should be the second piece. It should also have locating points.
3. The reference points on both pieces permit easy assembly.
4. The connector may be revited together.
5. A two-piece connector is usually much simpler and cheaper to make because the mold does not have to be so complex.

8. Printed circuit board leakages.

Printed circuit conductors are generally closely spaced. A small amount of moisture (high humidity) can cause leakage. John suggested that the wiring side of the board (except gold contacts) be sprayed with thermo plastic acquallic lacquer after the components have been soldered. This will prevent leakage and corrosion due to fingerprints. The plastic evaporates when heated (board repaired).

9. Connector Reliability

The weakest link in a system tends the connector (possibly 1/10

as reliable as all the other components). The telephone company, until recently, made all connections by hard wire due to the poor reliability of connectors. The systems must last many years due to the large investment in them. They must be reliable over the entire span.

There are six to seven thousand contacts in a PDP-8. This is the largest number of any one item in the computer, and yet, it tends to be the least reliable. It is more susceptible to failure due large numbers and reliability. The smaller cards tend to compound this; less logic on small cards, more cards must be used, the more used requires more contacts which means earlier failures.

The quality control of the connector and the wire wrap are an extremely important part of the system.

The general connector specifications that have been presented would result in a connector much better than any commercial grade available. John suggests that if we write specifications, based on this information, that we keep it proprietary. We can have one of the best connectors on the market. In a number of years, when other manufacturers are having difficulties due to connector failure, we will be in the lead with good reliability. There will be no costly venture before or after connector manufacture.

John mentioned that one of the reasons that CCC has had such good luck with NASA, is their reputation for reliability. He estimates that about 20% of CCC's module production goes to NASA (sold on a sole-source bid).

John feels that he could do a detailed connector design in a few days (dimensions, drawings). He would also talk to the connector manufacturer. After the connector manufacturer evaluated the proposal; a couple more days would be required on John's part. In general, he said that he could consult for us for about 5 days of his time and come up with a very reliable connector. I think that we should investigate this possibility.

In relation to the contract; John is going to submit his proposal to the prime contractor about the end of January. We should be contacted by a number of people from the prime contractor about March 1.

The first system should be delivered about June 1. The overall system will take about two months to install and another month to be accepted. The rest of the systems will then be ordered. The second system will be due about 6 months after the delivery of the first system. The rest will be delivered in about 1 or 2 months' intervals.



INTEROFFICE
MEMORANDUM

DATE December 9, 1964

SUBJECT Cost Allocations for Jointly Supported Engineering Projects

TO Product Line Coordinators FROM Dave Packer

Attached are the cost allocation rules for jointly supported engineering projects. Please review and take comments to Bruce Garvin.

DP/eg

Dave Packer

Distribution:

Ed Harwood
Ed de Castro
Gordon Bell
Ran Wilson
Pat Greene
Mort Ruderman
Stan Olsen
✓ Harlen Anderson
Win Hindle
Bruce Garvin

COST ALLOCATIONS FOR ENGINEERING PROJECTS

% Allocations

<u>Project #</u>	<u>Project Title</u>	<u>1</u>	<u>4</u>	<u>5/8</u>	<u>6</u>	<u>7</u>	<u>35</u>	<u>55</u>	<u>65</u>	<u>81</u>	<u>90</u>
D98 H1016	Core Memory Development			30	40	30					
D50 *J1017	Signal Converters								50	50	
D50 *J1022	Power Supplies							33	34	33	
D50 *J1023	Mounting Panels							33	34	33	
D50 *A1044	Analog-to-Digital Converter Modules								50	50	
D50 *F1053	Computer Cabinets	20	20	20	20	20					
D50 *J1087	Relay and Switch Investigation							33	34	33	
D50 *J1088	Module Packaging for Shipment							33	34	33	
D50 *J1098	Module Test Development								66	34	
D50 *J1100	Power Controls							33	33	34	
D98 555 G1136	Relay DECTape Unit Development	15	15	15	30	25					
D98 57A G1161	Type 57A Mag Tape Control Development	20	20	20	20	20					
D98 57A G1162	Type 57A Mag Tape Control Prototype	25	25	25		25					
D50 J1185	Mechanical Design of Modules								50	50	
D98 570 G1196	Type 570 Tape Transport Dev. and Prototype				60	40					
D98 G1199	Future Transport Development and Prototype			33	34	33					
D98 E1209	Display Development General				50	50					
D50 J1225	Indicator Development								50	50	
D98 E1236	340 Display Development and Prototype				50	50					
D98 555A G1237	Solid State DECTape Devel. & Prototype	15	15	15	30	25					
D98 D1243	New Drum Development	20	20	20	20	20					

Project #	Project Title	% Allocations									
		1	4	5/8	6	7	35	55	65	81	90
D98 A 1244	A-D Converter Test Equipment and Testing			34	33	33					
D98 N 1257	Programming System Development			33	34	33					
D98 G 1259	Mag Tape Test Equipment			50	50						
D98 F 1294	Peripheral Equipment Tester and Processor	20	20	20	20	20					
D98 A 1301	New A-D Develop			25	25	25	25				
D98 A 1312	Sample and Hold Development and Prototype								50	50	
D 1 G 1322	Type 550 DECTape Control Dev. PDP-7	50	50								
D50 F 1323	Semi Conductor Device Development			30	30	10				30	
D98 F 1335	Teletype Equipment Engineering	20	20	20	20	20					
D98 K 1336	Photo Electric Paper Tape Reader Engineering				60	40					
D98 545 G1340	Type 545 Tape Transport				60	40					

HEA

Subject: Cost Center Coding

Date: December 10, 1964

To: All Concerned

From: Ed Simeone

Please add to your Cost Center listing the following:

<u>COST CENTER</u>	<u>RESPONSIBILITY</u>	<u>CODE</u>
Flip Chip Processing	Maynard Sandler	47

The overhead charge number for this cost center will be G 47 00000 00000.

On your listing of overhead charge numbers, please cancel G 34 00000 00128, Dechip.

CONFERENCE REPORT

<p>PRESENT FOR CLIENT</p> <p>K. H. Olsen H. E. Anderson S. C. Olsen N. J. Mazzaresse T. G. Johnson J. L. Atwood</p> <p>PRESENT FOR AGENCY</p> <p>T. P. Howard F. B. Lynch R. V. W. Todd R. Piera</p>	<p>CLIENT DIGITAL EQUIPMENT CORPORATION</p> <p>DATE December 10, 1964</p> <p>PLACE Maynard, Massachusetts</p> <p>SUBJECT</p>	<p>ROUTE TO</p> <p>C.L. Rumrill D.B. Miller B.W. Jones J.E. Rodwell W. Mostad D. Moffit S. Ansell R. Venn C.J. Raines G. Pinto J. Maffei W.E. Weller C.N. Gleason P. Monti N. Lamb</p>
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<p><u>GENERAL BACKGROUND</u></p> <p>In less than ten years, Digital Equipment Corporation (DEC) has grown from circuit designs to advanced development of modules, computers and special systems. Today the company is an important computer manufacturer, unusual because of its ability to make a profit in an area where most companies do not. Whereas the giants of the industry (e.g., IBM, Honeywell, RCA, National Cash Register, Univac Division of Sperry Rand, and General Electric) place emphasis upon computers for general business or government applications, DEC has concentrated upon the research laboratory and education markets.</p> <p>Actually, the company got its start with a family of solid-state digital logic circuit modules, which were designed for use in designing and testing transistorized computers and digital systems. By 1959, however, the first in a series of computers was introduced: the Programmed Data Processor - 1. Despite its obsolescence (the accepted lifetime of a computer is four years), the PDP - 1 is still being sold for use in laboratories. All of Digital Equipment Corporation's later entries were dubbed PDPs, the number designation merely indicating the order in which the equipment was developed and bearing no relationship to size, sophistication, or cost. By 1963 the company was ready with its PDP - 5, the only computer in its price range (\$24,000) with random-access, high-speed core memory. During the next year, DEC expects to concentrate sales efforts upon the PDP - 6, PDP - 7, and PDP - 8, the last two of which utilize integrated circuitry. Competition in the areas DEC sells its computers comes mainly from Scientific Data System in Santa Monica, California, and Computer Control Computer in Framingham, Massachusetts. Both of these firms are probably six months behind DEC in circuit design and manufacturing capability - a significant difference in computer circles. One reason</p>	<p>NOTES</p>
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CONFERENCE REPORT

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DEC is confident its lead will be maintained, or even increased, stems from competitors' propensity to copy and DEC's inclination to innovate.

Besides Digital's general-purpose PDPs, which provide a wide range of data-handling power and prices for users in need of small to medium scale computers, are special systems. It was the company's recurring use for not only modules but also ferrite cores and stacks of cores for computer memories that led to the development of special systems. The first system, introduced in 1959, enabled manufacturers to check computer memories under simulated operating conditions. It was the forerunner of DEC's present line of core and memory test rs, exercisers, and memory buffers - used by major memory manufacturers around the world. Other special systems include computer-based laboratory and control systems.

The care in design and testing of DEC's modules is unique and has led to wide acceptance of the company's other products. Up to the present time, the incomparably broad line of modules (together with their reliability and immediate availability) has been the key to the company's success. Although they represent only one-third of total sales, modules accounts for two-thirds of the company's profits. For this reason, sales emphasis will be put not only upon the latest PDPs (as already indicated) but upon the latest module development: viz., "flip chip" modules. This fast-growing addition to DEC's modules line already accounts for 80 per cent of all new module orders and represents a significant sales potential - possibly as high as \$100 million ultimately.

SPECIAL PROBLEMS

Some of the problems DEC faces - and will face in the future - are no different from what other computer manufacturers face: e.g., uncertainty over size of markets or even relative importance of different markets, the multiplicity of buying influences, and the unsettled nature of the market. So far, the company has avoided vis-a-vis competition with "systems houses," such as Foxboro and IT & T, who purchase DEC products as hardware items and incorporate them into their own systems. Companies such as these are disadvantaged by their reliance upon what customers and suppliers know about specific market applications.

One problem results from a fact already mentioned: DEC's neglect of the general-business market. In Digital's view, this represents the least important long-term opportunity for computer manufacturers; however, companies now serving this market are generally better known than DEC and sometimes

CONFERENCE REPORT

Page four

thier reputations alone are enough to offset DEC's product or cost advantages in other market areas.

Perhaps the greatest problem facing DEC is brought on by its previous concentration on hardware to the exclusion of software. As already indicated, the company's reputation for reliable products counts for little when customer requirements include considerable programming to be furnished by the computer manufacturer. Often the cost of software is greater than the cost of the hardware. Unfortunately, DEC does not have a strong reputation for software. Steps are being taken to correct this misimpression of the company, however. In fact, of the approximately 50 Digital engineers engaged in programming, half are working on software problems. The company feels that it offers with the largest, fastest, and most versatile of its computers (the PDP - 6) the best software package available anywhere. High quality engineering assistance is now offered by 20 DEC representatives in 12 sales offices throughout the United States. Additionally, the company has sales representatives in Japan, Sweden, and Australia, as well as subsidiary operations in Canada, Australia, England and Germany.

One interesting - perhaps insoluble - problem stems from the company's split personality. As indicated in this report, its identity suffers from the different company designations: "DEC" and "Digital" and "Digital Equipment Corporation." To add to the confusion, a newcomer in the computer field - a small Long Island manufacturer - bears the name "Digital Electronics."

MARKETS

The company's primary marketing opportunities are believed to lie in the fields of (1) education, and (2) research laboratories. The education market includes the military education market; in fact, DEC got its start in this area by adapting laboratory modules for use in training Navy personnel. Of greater importance, however, are both the high-school market (where the company's new training module - expected to sell for \$500 - can be used to teach digital techniques) and the university market (where Digital equipment can be employed for instructional or computational use).

The research laboratory market is to be found in large company organizations, at colleges and universities, and throughout government facilities. Experience shows that DEC equipment enjoys acceptance in these areas because of the company's past efforts to meet the research scientist's need for equipment modifications, a large number of modules to select from, etc.

CONFERENCE REPORT

Page four

In the case of both markets, buying influences vary, depending upon the cost of the equipment. Normally, research scientists exert the greatest influence upon the selection of equipment for laboratories. And heads of departments - such as the physics or engineering department - exert the greatest influence upon the selection of equipment used in educational areas. It is an important fact, however, that groups other than department heads influence the purchase of equipment for a university's computer center (and DEC must make an initial effort to reach these groups, to whom software is of extreme importance).

ADVERTISING PLANS

Steps have been taken to develop the necessary information for a complete advertising plan. Although it will be some time before all data are compiled, certain facts will be available in the near future. The forms developed for the gathering of information include:

- (1) "Current Market Analysis" sheets
 - a) vertical: product vs. industries (SIC)
 - b) horizontal: product vs. uses
- (2) "Marketing Plans" form for each product group
 - a) marketing objective
 - b) target
 - c) strategy
- (3) "Forecast by Sales Office" sheets
- (4) "Sales Office Promotional Needs" sheets
- (5) "Product Line Promotional Needs" sheets
- (6) "Special Promotional Needs"

MISCELLANEOUS

Plans call for immediate development of three new ads, background material (including photographs) for which will be supplied to the agency by JLA. The ads are tentatively scheduled as follows:

RVWT to initiate three jobs

CONFERENCE REPORT

Page five

<u>Subject</u>	<u>Publication</u>	<u>Space Unit</u>
"Flip chip"	ELECTRONIC NEWS (Jan. 18)	1 page b/w
PDP - 6	DATAMATION (Jan.)	1 page b/w
PDP - 8	SCIENTIFIC AMERICAN (Feb.)	2 page *

* announcement ad: one page four-color, facing page b/w

Closing dates for the aforementioned issues are as follows:

<u>Closing Date</u>	<u>Publication</u>
1/13	ELECTRONIC NEWS (JAN. 18)
12/15 (Chicago)	DATAMATION (JAN.)
12/24 **	SCIENTIFIC AMERICAN (FEB.)

JLA note

** will accept copy up to first of month preceeding.



INTEROFFICE MEMORANDUM

DATE December 10, 1964

SUBJECT OXFORD - PDP-6.

TO Tom Whalen

FROM R. Lane
J. Fadiman
J. Leng

We have received a P.O. from Oxford University for PDP-6 I/O equipment. Delivery is March 1965 to DEC Plant, Maynard, Mass. Invoice upon acceptance for immediate payment.

The equipment consists of:

1. 516-521	Tape Control Unit	\$14,400.
2. 570	Tape Unit	30,400.
3. 551	DEC Tape Control	11,200.
4. 555	DEC Tape Unit	7,400.
5. 760	Paper Tape Reader	7,200.
6. 761	Paper Tape Punch	<u>4,400.</u>
	Total	\$73,520.

An educational discount of 20% has been extended. The equipment is to operate on 240V, 50 cycle power.

CC: H. Anderson ✓
J. Smith



INTEROFFICE MEMORANDUM

DATE December 11, 1964

SUBJECT LINC DEMONSTRATION IN COPENHAGEN

TO *Harlan Anderson*

FROM Mort Ruderman

The LINC arrived in Copenhagen without incident. Upon my arrival I immediately proceeded to plug together all the remote units to the main frame. At this time power problems with the motor generator set were evident. The problem being that the building did not have sufficient power for the motor generator set. The motor generator eventually became operable by taking power directly from the utility lines.

The following day, Dr. Cox arrived and we proceeded immediately to determine that the LINC was operating properly. One of the instructions was not operating. We solved this problem by replacing a 1151. We then proceeded to run through some preliminary demonstrations for the next day. From this time, which was Monday afternoon, for the remainder of the week until late Saturday afternoon, the only other experience of failure that we had was marginal sense amplifier.

The first demonstration took place when some people just happened to drop in who had been doing experiments with phono-fetal electrocardiograms. We suggested that these people bring their FM tapes back and that we would process these directly for them to get a better feeling for the capability of the LINC.

The first scheduled demonstration of the many that were run during the week was held Tuesday morning where the typical demonstration ran as follows: Dr. Cox gave a bit of the philosophy of design and the history of the LINC and its development at M.I.T. and that now the LINC was commercially available. He proceeded to demonstrate the number of ways to enter the machine either through the keyboard or the toggle switches or data terminal box. Dr. Cox explained the features of the LINC tape, A to D and D to A and the relay controls. He then proceeded to demonstrate the guide utility program.

In general, this utility systems program, called, GUIDE, enables one to very easily store any programs on tape, to call for all existing programs at the keyboard, Up-Date or Modify, or do a number of different manipulations right at the keyboard with everything instantaneously displayed on the oscilloscope.

Following the discussion of these features, Dr. Cox then proceeded to demonstrate programs such as the Baslar membrane program.

The next program normally demonstrated was the Cursor Program where any data stored away on tape or in memory could be called for such as EKG or any particular analog input which would be immediately displayed on the oscilloscope and the Cursor is now available so that you can position it on any point on the curve and identify its relative amplitude.

The next program normally demonstrated was the Fourier analysis program where again we could take any information stored on tape or in memory and have it displayed on the oscilloscope. The information traverses the scope from left to right and in the left hand portion of the display scope would immediately appear a bargraph of the relative frequency distribution of the particular wave form. A number of people seemed extremely interested in this type of application where they could take EKG's or evoked potentials, store them away, and then display them on the scope and immediately get the frequency distribution of the input. Also, the scope display may be frozen so as to take a Polaroid shot.

The next program normally demonstrated was a program written by Dr. Killam at Stanford University. This particular program allows you again to take any particular wave form or data and display it immediately on the oscilloscope and by hitting individual keys on the keyboard, perform various functions, i.e., differentiation, integration, reverse polarity, smoothing, enlarge amplitude, decrease amplitude or plot a bargraph.

Then a number of other wave forms were usually displayed in this form such as fetal electrocardiograms which certainly were familiar to most people in the audience. The ability to manipulate and be able to process data in this manner seemed to be of extreme interest to individuals and always initiated a multitude of questions. Dr. Cox then proceeded to demonstrate or discuss some of the work that he was doing which was separating the fetal heartbeat from the combination of the maternal and fetal electrocardiogram. He was able to average out the maternal EKG completely so that only the fetal EKG remained. Using the memory scope that we had borrowed from Tektronik's, certain characteristics of both the fetal

and the maternal beat were displayed such as breathing effects etc.

The last actual demonstration that was usually performed during this discussion was when we took an individual and connected him to an electrocardiogram unit and then directly into an A to D channel of the analog input of the LINC, thus performing on-line processing of electrocardiograms. In this manner by hitting the numbered keys on the keyboard, a number of averaged EKG's appeared on the scope. Five letters then appeared on the oscilloscope at various positions around this EKG and these were: "R" for indicating the R wave of a typical electrocardiogram, the "P", "Q", "S", portions of the electrocardiogram. It was very interesting to see the difference between a single EKG with all the noise and an average of 16 with all the noise averaged out. Again, we could take this average EKG and store this away on the tape, call for a program such as the Fourier analysis and do a frequency analysis of the EKG that we had just obtained on-line. This seemed to be absolutely amazing to most people watching the demonstration. Following this aspect of the demonstration, Dr. Cox then indicated a number of the input-output units that various people have interfaced to date, such as IBM compatible tape, Calcomp plotters, Teletypewriters and X-Y plotters to do a variety of applications. This was a typical demonstration which normally took 1½ to 2½ hours depending upon the interest and the number of people there. Following Dr. Cox's complete demonstration, I normally spoke about the availability of the LINC and Digital Equipment Corporation and also usually discussed the PDP-8 and modules. I assured the people that we were available during the week to discuss any particular application or discuss any one of our particular machines. Following this, Jim Milton, Dr. Cox and myself worked with potential customers discussing their particular applications. Normally two demonstrations were scheduled each day, one for the morning and one for the afternoon. However, normally we usually for some reason or another had an unannounced group appear late in the afternoon and we normally went through the same type of demonstration. After running two early morning demonstrations on Friday, Dr. Cox left Friday noontime and following this, I, (after having watched Dr. Cox throughout the week) ran two demonstrations Friday afternoon and an additional two Saturday.

At various times throughout the week, we were able to discuss with Dr. Tybjaerg-Hansen, and Mr. Dessau, who were the two major individuals to be sold on any system that was to be obtained at the Rigshospitalet in Copenhagen. They were definitely committed to getting a LINC, their problem now was to get funds as soon as they possibly could.

They made, from all indications that I could see, an all-out effort to obtain the funds while we were there so that the possibility of keeping the LINC there and not having to repack it and send it back to the United States. However, since they could not exactly determine when their funds would become available - in 1 month, 2 months or 3 months or maybe even longer, it was with reluctance they determined that it probably would be best to repack and ship it back. As soon as they knew funds were going to be allocated they will notify us so that we can make the necessary arrangements to see that a 50 cycle supply and LINC tape units can be modified so that they will be operational in Europe. I promised them probably from this time we should be able to deliver a LINC in 6 months in the configuration that would be operational in Europe.

This was the World Health Organization's first meeting on data processing. People from the World Health Organization were present at various times during many demonstrations. We had two special demonstrations, however, specifically for people from the World Health Organization. This being the first demonstration, Friday morning, and the last demonstration Saturday. These people all seemed to go away extremely encouraged. DEC did extremely well. We got very good exposure. A number of people from other areas in Europe made it a point to travel to Copenhagen for the demonstration, mainly from Paris, Germany and Sweden. I had received several letters while in Copenhagen, and I have received a number since, who are extremely interested and would like to have further information and discuss the LINC, PDP-8 and Flip-Chips a bit further.

I have also circuited the News Release that SDC released on their demonstration during the same week for the World Health Organization. This was the time-sharing application between Copenhagen, and SDC and Santa Monica using the PDP-1 and the Q32. Therefore, again I say, we as a company got good exposure between time-sharing and the LINC.

Prospects from Demonstrations (Serious)

1. Dr. Tybjaerg-Hansen
Rigshospitalet, Copenhagen LINC
2. Dr. Gert Jensen
Technical High School PDP-8, Modules
3. Erling Dessau
DataContraalen, Copenhagen good potential (future) Large System
4. Mr. Bent Lassen - Modules
Datacontraalen, Copenhagen
5. Dr. Jan Strackee LINC, PDP-8
Laboratory of Medical Physics
University of Amsterdam
Amsterdam, Holland
6. Dr. Oberhoffer LINC
Department of Medicine
University of Bonn
Germany
7. Dr. Paul Hall LINC (Very good prospect
Serafimer Hospital in other areas also)
Stockholm, Sweden
8. Mr. L. Monrad-Krohm LINC, PDP-8
Norwegian Defense Research
Division for Electronics
Kjeller P. O. Box 25
Kjeller, Norway
9. Dr. O. J. Grusser LINC, PDP-8
Physiologisches Institute
Der Freien Universitat
Berlin 433, West Germany
10. Prof. Dr. G. Magner Good Computer Prospect
6907 Wilhelmsfeld
Riesenberg, Germany
11. Dr. David H. Blankenhorn LINC
% A + d B
Rigshospitalet
Copenhagen, Denmark

July 1965 % USC
Dept. of Int. Medicine
2025 Zonal Avenue
L. A., California

12. Plus Return Bingo Card - to Reading, England

13. Dr. Gray Walter
Oxford University
England

LINC, PDP-8



INTEROFFICE MEMORANDUM

DATE December 17, 1964

SUBJECT MEAN TIME BETWEEN FAILURES

TO Distribution List

FROM Jim Cudmore & Bob Hughes

Digital is in an excellent position to supply useful Mean Time Between Failure (MTBF) figures for its modules. The data available for MTBF calculations represents the results of more than two years of actual field usage. I feel that we have unique access to failure data due to our free module repair service. Module failures that go unreported are minimal when a customer realizes that his module will be repaired for the price of postage to Maynard. Every module repaired by Digital is logged with a defective module report. The module failures tabulated include all failures even customer induced. The MTBF figure obtained from this data is more meaningful than any data obtained from a "life test" rack of modules run in a very sterile environment.

Typically, MTBF figures are obtained by operating a large number of modules for a relatively short time. An example would be 100 modules operated 1000 hrs. or 100,000 module hrs. This technique may result in a high MTBF figure but should give the customer little comfort. If the device is a new product there is no guarantee that all items will not fail simultaneously in the next hour. The data used in our MTBF calculation represents one-quarter of a million modules operated an average of one year. This type of data should give the customer more confidence in our MTBF figures.

The calculation of MTBF from our data is quite simple and uses standard industry accepted technique. This technique requires that some simplifying assumptions be made:

1. Assume an average operating time for a module, i.e. 12 hrs. a day for 5 days a week.
2. Assume that modules are added to the field at a constant rate. This allows an average operating time to be used for all the modules in the field.

The MTBF is then calculated from the following equation:

$$\text{MTBF} = \frac{(\text{no. of modules in use})(\text{average operating time})}{(\text{number of defective modules})}$$

Using this formula and these assumptions, some typical MTBF figures are:

4201	316,000 hrs.
4215	445,000 hrs.
4410	361,000 hrs.
728	1,640,000 hrs.
4610	234,000 (module hrs. and no failures)

If all modules manufactured for the last two fiscal years are lumped together then the combined MTBF for a module is 550,000 hrs.

MTBF figures for specific modules are available.

cc: All Sales Offices
Ken Olsen
Harlan Anderson ✓
Dick Best
Don White
Klaus Doering



INTEROFFICE MEMORANDUM

DATE December 17, 1964

SUBJECT Solid State Mag Tape vs. LINC Tape

TO R. Best
H. Anderson
K. Olsen
S. Olsen
T. Johnson
J. Hastings

FROM Nick Mazzaresse

We are presently budgeting \$16,800 to develop a solid-state DECTape transport. From a marketing standpoint, this appears to be a marginal effort (i.e., there is no customer pressure for an improvement of this nature).

I suggest that we take a small part of this budget and investigate using the LINC Tape as our standard unit. It's manufacturing cost is about 1/2 to 1/3 of ours, and it's reliability appears adequate.

In view of the many projects we could undertake, solid state mag tape seems about lowest in priority.



INTEROFFICE
MEMORANDUM

~~12/15/64~~

DATE December 15, 1964

SUBJECT University of Bonn

TO Nick Mazzaresse

FROM Jon Fadiman

Dr. Nellen of the University of Bonn phoned me this afternoon at 4:00 p.m. from Germany. He told me that he has been in telephone contact with his boss, Dr. Paul. Dr. Paul said that he will definitely sign the contract for the PDP-6 for the University of Bonn and therefore, we should consider this contract as a firm purchase order. The only change is that they are inserting a paragraph which states that in case the Bundesrat does not approve the budget the University has the right to cancel this order by March 1, 1965. However, Dr. Nellen assured me that the Bundesrat will approve the budget and this appears to be a mere technicality.

Dr. Nellen wishes us to provide as soon as possible a proposal for the pre-digitizer including all electronics. The University of Bonn must put in their request for money for this pre-digitizer and Dr. Nellen would like to buy it from DEC.

Dr. Nellen has been in contact all day yesterday with the people from the University of Aachen and they have said that they are strongly in favor of the purchase of a PDP-6 for their PEPR system.

We have stated that if a firm order were placed by Bonn by December 15, we would provide shipment of the equipment by May 15, 1965. By this telephone call, Dr. Nellen has placed his order on the required date.

JF:nlz

cc: John Leng, UK Office
Guenter Huewe, Munich Office
Harlan Anderson
Tom Whalen
Bob Lane



INTEROFFICE MEMORANDUM

DATE December 17, 1964

SUBJECT A/D Converters

TO R. Best
K. Olsen
H. Anderson
S. Olsen
T. Johnson

FROM Nick Mazzaresse

We are currently budgeting approximately \$34,000 to improve our A/D converter product line. At our initial guiding session with Engineering, I indicated rather vehemently what sales needed. This was simply a listing of a complete A/D line including operational amplifiers, sample and holds, A/D and D/A equipment including speed, accuracy, drift noise level specs.

In cases where DEC did not have a suitable product, we were to use an outside vendor such as Adage. This list still does not exist, nor is there any plan to create it.

Effort has gone into designing new converters, flip-chip, A/D, etc. These items are of secondary importance.

I suggest that we immediately terminate all A/D converter work not related to the items which are necessary to keep selling our computers.

R. Sorensen spends about 50% of his time working on proposals presently, if he were to take time to make up an "A/D shopping list", sales would not need this much of his time.



INTEROFFICE
MEMORANDUM

DATE December 17, 1964

SUBJECT DATA DISC CORP.
(Telephone Inquiry)

TO Harlan Anderson
Nick Mazzaresse
Ken Larsen

FROM Ted Johnson

Received a call from Mr. Armand Miller from Data Disc in Palo Alto, California. He had previously sent information on the product and detailed logic required for analysis of interfacing to Data Disc, to Harlan Anderson. The call was referred to me. Mr. Ron Tuvonian at Western Electric in Princeton, New Jersey apparently is planning to order 3 PDP-8s and is interested in their Data Disc. Mr. Goiza at MIT MAC is also possibly interested in tying one of the Discs to the 8 that he has on order.

I was not familiar with the unit but at the present time this is a 12 inch diameter disc pak unit which holds 4 million bits of information, 200 μ sec access to a record and 12 bit words could be transferred at a rate of 50 to 60kc (620 kc bit rate). Unit price for the mechanical handler exclusive of the necessary control would be \$5300 and would drop to \$3800 in larger quantities. He states that they have made agreements with several companies including G. E. and Frieden to use their Data Disc. They plan to come out with a larger storage disc pak unit which would operate on the same control and offer 60 million bits.

I told him that I wasn't able to say what our possible interest might be in building the control for this unit and possibly considering it as an option for a PDP-8. The New York office should be in contact with Tuvonian to find out what his real requirements are on this system.

TJ/pr

Ted



INTEROFFICE MEMORANDUM

DATE December 21, 1964

SUBJECT

TO Harlan Anderson

FROM Ken Olsen

There is an interesting article in the latest "Fortune" Magazine on the problems many American companies have had in overseas operations. All observations may not bear directly on our Company but it is a short article and easy to read.

KO:kge

CC: Jon Fadiman
Stan Olsen



INTEROFFICE MEMORANDUM

DATE December 21, 1964

SUBJECT

TO

Ted Johnson
CC: Stan Olsen
✓ Harlan Anderson

FROM Ken Olsen

Our field people and the rest of the people who travel for a long time have requested identification cards. This is a terrific operation and it just takes someone to lay it out. Will you look into this and, if it looks like a good idea, proceed with it. You might even do it all with your own secretary. You get it laid out and have it printed by either Jack Atwood or outside. Jack, I think, has a file of the photographs. As needed, your secretary could paste on the pictures, type in the man's name, and then send them over to the Personnel Department to be laminated. The mechanics of making them is trivial and the only problem is getting the information and mailing them out to the right people.

CONFERENCE REPORT

<p>PRESENT FOR CLIENT</p> <p>J. L. Atwood S. Grover J. Nangle A. Stephens S. C. Olsen</p> <p>PRESENT FOR AGENCY</p> <p>T. P. Howard R. V. W. Todd</p>	<p>CLIENT DIGITAL EQUIPMENT CORP.</p> <p>DATE December 23, 1964</p> <p>PLACE Maynard, Mass.</p> <p>SUBJECT</p>	<p>ROUTE TO</p> <p>C. L. Rumrill D. B. Miller B. W. Jones J. E. Rodwell W. Mostad D. Moffitt S. Ansell R. Venn C. J. Raines G. Pinto J. Maffei W. E. Weller C. N. Gleason</p>
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1. Copy and layout for ad "The PDP-8 is a powerful, integrated-circuit computer (7288-5-0002)" were submitted to J. L. Atwood, who requested that the agency revise and re-submit the ad on December 28th. It was felt that the copy was more suitable for readers of DATAMATION, who are more sophisticated in computers than readers of SCIENTIFIC AMERICAN. The important point to be made in the ad appearing in the latter publication is that scientific data processing is now available to the scientist right in his office at a cost of only \$18,000; thus, the PDP-8 might well be considered an indispensable general-purpose tool. Color photographs of the equipment will be made available to the agency prior to production of this ad, scheduled to appear in the February issue of SCIENTIFIC AMERICAN.

2. At the next meeting -- to be held in New York possibly -- a representative of the agency media department will participate in a discussion of products to be marketed, sales emphasis for specific products and important buying influences in market areas for DEC's two principal product lines:

Computers: Specifically, the PDP-6, PDP-7 and PDP-8, with slightly less emphasis upon the PDP-7 than upon the other two models during 1965. Approximately two-thirds of next year's advertising budget is expected to be spent on these products. Some of the key advertising media are: DATAMATION, COMMUNICATIONS OF THE * ACM and COMPUTERS & AUTOMATION;

* ASSOCIATION FOR COMPUTING MACHINERY

P. Mostad
N. Lamb

J. L. Atwood to send transparencies to agency.

R. V. W. Todd to see R. Piera on Dec. 28th re: layout.

R. Venn to take initial steps in evaluating primary media prior to meeting.

CONFERENCE REPORT

DIGITAL EQUIPMENT CORP. - 2 - December 23, 1964

Modules: including, of course, the line of flip-chip modules. Approximately one-third of next year's advertising budget is expected to be spent in this area. Some of the key advertising media are: ELECTRONIC NEWS, COMPUTER DESIGN, ELECTRONICS and ELECTRO-TECHNOLOGY.

In the broad area of research and science, several publications are likely to be considered for reaching a major market, identifiable by function rather than by industry. Some of the key media in this area are: SCIENTIFIC AMERICAN, INTERNATIONAL SCIENCE & TECHNOLOGY and INDUSTRIAL RESEARCH. One particular medium that the agency might consider for advertising the LINC computer is the JOURNAL OF THE EXPERIMENTAL ANALYSIS OF BEHAVIOR.

The agency will be apprised by J. L. Atwood of the best place to hold this meeting and available dates. It is probable that the meeting will take place in New York on or about January 5th.

3. The agency is requested to begin preparation of copy and layout for a one-page, black and white ad on the PDP-7, copy to be based on technical information already in the agency's possession. The ad is scheduled to appear in the February issue of DATAMATION, which closes officially on January 15th.

T. P. Howard to initiate new job.



INTEROFFICE MEMORANDUM

DATE December 21, 1964

SUBJECT

TO Nick Mazzaresse

FROM Ken Olsen

Ken Larsen has just about sold a PDP-7 to Jerry Russell at the Presbyterian Hospital in San Francisco. Jerry won't have the money for a full purchase but will have enough to commit rental for two years. When Jerry was visiting us sometime ago, we suggested we could probably work out a rental agreement because of the humanitarian nature of his work. Because he can commit funds for two years, we might work out some compromise between leasing and rental.

KO:kge

CC: Stan Olsen
✓ Harlan Anderson

dec

INTEROFFICE
MEMORANDUM

DATE December 23, 1964

SUBJECT Company Dining Room

TO Stan Olsen
cc: ✓ Harlan Anderson

FROM Kenneth H. Olsen

I would like to suggest that you assign one man the responsibility for the Company dining room. Then everyone would have a place to bring their complaints and suggestions and that one person could periodically check on the place to make sure that things are in order. Ted Johnson, or Ted's secretary, might be a good one because Ted probably uses the dining room quite a lot.

My immediate suggestion is that we clean out the closet because there is a lot of literature hidden away there from some past meetings and there is also a shortage of coat hangers.

Ken Olsen

KHO:ecc



INTEROFFICE MEMORANDUM

DATE December 23, 1964

SUBJECT Feb. 2, U. of Arizona Seminar - PDP-6.

TO K. Larsen
H. Anderson ✓
B. Stiver
G. Bell
J. Jones

FROM R. Lane

There will be twenty (20) people attending the seminar which will be held at the University starting at 1:00 p.m. on February 2, 1965.

We must propose a large configuration. Use Washington State Univ. as a pattern to follow. I goofed by submitting too small an initial configuration. Submitting a configuration and proposal without a prior visit is always dangerous. This proves it!

H. ANDERSON



INTEROFFICE MEMORANDUM

DATE December 27, 1963

PDP-6 Minimum System Price List

SUBJECT

TO All Sales Personnel,
Engineering & Administration

FROM R. L. Lane

Each time we are about to issue a customer price list we have a change in ground rules! At our last Sales Meeting, I indicated that we were only offering a 16,384 word, 2 usec cycle memory module and that fast memory was not optional but part of the basic processor. We have always maintained that to efficiently use our software, a system should consist of 16,384 words of main memory, the fast flip flop memory and (1) one dual microtape. We have further maintained that a minimum useful system is available at approximately \$250,000.

To provide the latter, it was necessary to reconfigure our minimum useful system (Speckmanship) without changing prices. The following options may be quoted to customers with full assurance that we will deliver them. However, once symptoms of PDP-6 fever are detected we should pursue the possibility of the expanded system.

Option 1

Type 166 Arithmetic Processor	140,000.
7 channel sequence break	
16 Accumulators	
15 Index Registers	
Floating Point Arithmetic	
Model-33 A.S.R. (Reader & Punch) 10 char/sec	10,000.
Main Memory, 8,192 words, 2 usec cycle time	<u>80,000.</u>
Total	230,000.

Option 2

Type 166 Arithmetic Processor	140,000.
7 Channel Sequence Break System	
16 Accumulators	
15 Index Registers	
Floating Point Arithmetic	
Model 33 KSR (Printer-Keyboard)	6,100.
Main Memory 8,192 words, 2 μ sec cycle time	80,000.
High Speed Paper Tape Reader 400 cps	9,000.
High Speed Paper Tape Punch 63.3 cps	<u>5,500.</u>
Total	240,600.

Option 3

Type 166 Arithmetic Processor	170,000.
Type 162 Fast Memory	
16 Accumulators	
15 Index Registers	
7 Channel Sequence Break System	
Floating Point Arithmetic	
Model 33 KSR (Printer-Keyboard)	6,100.
Paper Tape Reader	9,000.
Paper Tape Punch	5,500.
Main Memory, 16,384 words, 2 μ sec cycle time	126,000.
Dual Micro Tape Unit	7,400.
Micro Tape Control Unit	14,000.
Data Control (Type 136)	<u>10,000.</u>
Total	345,000.

Please note that options 1 and 2 do not include Fast Memory. The index registers and multiple accumulators take advantage of main memory and although much slower, all software will operate essentially the same. The Model 33 ASR is used for paper tape reading and punching. Please appreciate the speed of 10 char/sec before you recommend this option.

Option 2 is essentially the same as option 1 except that high speed paper tape is included, still no fast memory. Be sure to appreciate the effect on processing speed when using main memory as accumulators, index registers, etc.

Option 3 is most desirable and software will perform better. However, the price is \$118,000 higher than the minimum system price and most people will expect a strong justification from you. Dit is preparing a description of the software and how each option is effected or better yet, what software you can expect for each option and the operating procedures.

The attached price list was prepared for the Sales Meeting, but did not get printed in time. All prices contained within are correct but the above options are not indicated. It will be updated to reflect an 8,192 word memory and a teletype ASR I-O capability.

Let me stress that prices have not changed!

PRELIMINARY

PDP-6

PROGRAMMED DATA PROCESSOR-6

PRICE LIST

1 January 1964

ARITHMETIC PROCESSOR

TYPE 166

Fast Memory 0.5 Microsecond - 16 Words

16 Accumulators

15 Index Registers

Floating Point Arithmetic

7 Channel Priority Interrupt I-O System

\$170,000

CORE MEMORY

TYPE 163C

Stores 16,384 36-bit words with a memory cycle time of 2.0
microseconds. Includes one memory buss interface. For each
additional processor, an additional interface is required. Each
interface services one memory-processor.

\$126,000

Each additional interface (maximum of 3)

\$ 2,000

MAGNETIC DRUM AND PROCESSOR

TYPE 236

Controls from one to four drum units, each drum unit consists of 768 tracks of 49,152 bits each for a total storage of 37.8×10^6 bits. The drum rotates at 1150 rpm or 52 milliseconds per rpm and provides a 36-bit word transfer every 6.4 microseconds. Total drum storage is 1,048,576 36-bit words.

\$ 95,000

HIGH SPEED PAPER TAPE READER AND CONTROL

TYPE 760

Reads perforated paper tape photoelectrically at 400 characters per second.

\$ 9,000

HIGH SPEED PAPER TAPE PUNCH AND CONTROL

TYPE 761

Punches 8-hole paper tape at 63.3 characters per second.

\$ 5,500

PRINTER-KEYBOARD AND CONTROL

TYPE 626

Standard ASCII 8-level Teletypewriter operating at 10 cps. Provides hard-copy outputs.

\$ 6,100

CARD READER AND CONTROL

TYPE 461

Provides on-line reading of 80-column punched cards at 200 or 800 cards per minute in either alphanumeric or binary codes.

200 cards per minute

\$ 16,500

800 cards per minute

\$ 27,200

CARD PUNCH AND CONTROL

TYPE 460

Permits on-line punching of 80-column cards at 100 or 300 cards per minute.

100 cards per minute \$ 29,000

300 cards per minute \$ 42,000

AUTOMATIC LINE PRINTER AND CONTROL

TYPE 646

Prints 300 lines per minute, 120 columns per line, 64 characters per column.

\$ 30,000

HIGH SPEED AUTOMATIC LINE PRINTER AND CONTROL

TYPE 680

Prints 1000 lines per minute, 120 columns per line, 64 characters per column.

\$ 47,500

DUAL MICROTAPES SYSTEM

Provides a fixed address magnetic tape facility for high speed loading, readout and program updating. Density is 375 ± 60 bits per track inch at a speed of 80 inches per second. Transfers 90,000 bits per second.

Type 555 Dual Transport (includes two independent tape drives) \$ 7,400

Type 551 Control Unit (controls up to eight Type 555 Tape Transports)

Requires Type 136 Data Control \$ 14,000

MAGNETIC TAPE CONTROL

TYPE 516

Automatically controls up to eight Type 570 Magnetic Tape Transports.

Permits reading, writing, forward/backward spacing, and rewind.

Requires Type 136 Data Control.

\$ 15,000

MAGNETIC TAPE TRANSPORT

TYPE 570

Reads and writes IBM compatible tape at a recording density of 200

or 556 characters per inch. Tape speed is 75 or 112.5 inches per

second with transfer rates from 15 to 62.5 KC.

\$ 30,400

DATA CONTROL

TYPE 136

Assembles and disassembles 36-bit words. May be used with up to

four tape controls and two special purpose data handling devices.

\$ 10,000

DISPLAY MONITOR AND CONTROL

TYPE 346

Plots points, lines, vectors, and characters on a 9 3/8-inch square

raster of 1024 points along each axis. 1 1/2 microseconds is re-

quired per point in vector, increment and character modes; random

point plotting rate of 35 microseconds. Uses fiber optic light pipe

and photomultiplier system for fast detection of displayed information.

\$ 40,000

Prices quoted are effective January 1, 196~~3~~⁴, FOB Maynard, Massachusetts, and apply in the continental United States only. Federal, state or local taxes are not included. Option prices are for factory installation; field installation prices will be quoted on request. Quantity prices also quoted on request. All prices are subject to change without notice.

DIGITAL EQUIPMENT CORPORATION • MAYNARD, MASSACHUSETTS

January 1, 1964

F-62

Printed in U.S.A.

3382

10-1/64



INTEROFFICE MEMORANDUM

DATE December 28, 1964

SUBJECT

TO H. Anderson
N. Mazzaresse
J. Smith
H. Crouse

FROM D. Kuyamjian

Attached are schedules of our current contracts
for major components.

12/24/64

CONTRACT	RELEASES	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
Digitronics Model 2500 Reader Qty: 35 Contract: 3-64/8-65 Price: \$714.00 Dlv.Cycle: 6 wks	Release #1-20 units 11 received	2	4	3						24th Contract Expires			
Datamec Transport D2020 Qty: 51 Contract: 10-64/4-66 Price: 45 ips \$3944.00 24 ips \$3689.00 Dlv. Cycle: 3 months	Release #1-one unit received Release #2-four unit		15th 45 ips	15th 24 ips	15th 45 ips	15th 45 ips							
Midwestern Transport 570 Qty: 50 Contract: 11-63/5-65 Price: \$8,312.00 Dlv.Cycle: 3 months	Release #1-ten unit received Release #2-ten unit four received	2	4				8th Contract Expires						

12/24/64

CONTRACT	RELEASES	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
G.I. - Magne-Head Memory Drum Qty: 4 Contract: 9-64/12-65 Price: 1st \$29,500.00 bal. \$27,750.00 Dlv.Cycle: 4 months	Release# 1-one unit	29th	8th										
Vermont Research Memory Drum 20 Qty: 5 Contract: 7-64/7-65 Price: depends on number of heads Dlv. Cycle: 4 months	Release #1-one unit \$12,950.00	24th 28th							7th Contract Expires				
Vermont Research Corp. Memory Drum 10 Qty: 10 Contract: 5-64/5-65 Price: depends on number of heads Dlv.Cycle: 3 months	Release #1-one unit \$5,900.00		1st				28th Contract Expires						

12/24/64

ORDER	RELEASES	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
Teletype 33 KSR Price: \$460.00 Qty: 120 Contract: 8-64/ 5-65 Dlvy. Cycle: 6 mos.	Release #1-120 units-30 rec'd		10	10	20	20	20	10			
Teletype 35 ASR Price: \$2313.00 Qty: 6 Contract: 7-64/ 1-65 Qty: 72 Contract: 11-64/ 6-66 Dlvy. Cycle: 7 mos.	Release #1-6 units Release #1-72 units		6					6	6	6	6
Teletype 35 KSR Price: \$1476.00 Qty: 5 Contract: 7-64/ 1-65 Qty: 60 Contract: 11-64/ 6-66 Dlvy. Cycle: 7 mos.	Release #1-5 units Release #1-60 units		5					5	5	5	5

12/24/64

CONTRACT	RELEASES	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.
<p>Anelex</p> <p>Series 5 Line Printer</p> <p>Qty: Ten</p> <p>Contract: 11-64/3-66</p> <p>Div. Cycle: 5 mos.</p>	<p>Release #1 - ten units; tentatively 5-600, ASCII, 120 col.</p>					<p>300 lpm 120 col. 50~220V</p> <p>BONN</p>							
							<p>600 lpm 120 col. 50~240V</p> <p>OXFORD</p>						
							<p><u>SPEED CHARACTER SET AND NUMBER OF COLUMNS</u></p> <p>CANNOT BE CHANGED AFTER THESE DATES WITHOUT CANCELLATION CHARGES AND/OR EXTENSION OF DELIVERY DATES.</p> <p>EQUIPMENT MAY BE CANCELLED PRIOR TO THIS DATE WITHOUT INCURRING CANCELLATION CHARGES</p> <p>EQUIPMENT CANCELLED PRIOR TO THIS DATE WILL INCUR CHARGES FOR PARTS BUT NOT LABOR</p>						



INTEROFFICE MEMORANDUM

DATE December 28, 1964

SUBJECT Dictating Equipment

TO Works Committee

FROM T. Johnson

I propose that I.B.M. dictation equipment be provided for DEC Sales personnel. Offices and sales secretaries will be equipped with transcriber units, which can also be used for in-office dictation, and field salesmen and others required to travel considerably will use portable I.B.M. dictating machines.

The main qualification for I.B.M. equipment will be requirements for direct sales contacts and considerable travel.

The first round of equipment would be:

- 1) 25 portables for field office use
- 2) 12 transcribers for field offices
- 3) 4 transcribers for sales floor use
- 4) 6 portables for use by travelling in-house salesmen and sales management; equipment to be shared and checked out for trips.

Total: 31 portables	@	420	=	\$13,020
18 transcribers	@	405	=	7,290
				<u>\$20,310</u>

I.B.M. delivery is 6 to 8 weeks with allowance to pay after 90 days. This means 4 to 5 months before payment if we order now.

All other personnel will use existing stenorette equipment. It is possible that the order above could be reduced slightly by exchanging equipment with personnel currently using I.B.M. equipment.

Applications for machines will be OK'd by Ted Johnson and Stan Olsen.

Currently, obtaining an I.B.M. machine is not controlled by a clear policy. I believe the program outlined will put the dollars to excellent use and make our salesmen more effective. I also feel that stenorettes are very adequate for in-plant use. This program will free a considerable number of units for in-plant use.





INTEROFFICE MEMORANDUM

DATE December 28, 1964

SUBJECT

TO T. Johnson (15 copies) B. Dill FROM Arthur Hall
J. Shield J. Hagerty
P. Gadaire N. Mazzaresse
D. Dubay H. Anderson ✓
J. Craig E. De Castro
A. Michaud J. Burley
F. Egan R. Wilson
W. Newell R. Belden

Early Teletype documents and instructors at the Teletype schools have given persons at DEC as well as our customers the idea that the Type 33 Teleprinter is for light duty and that it should not be operated more than 2 hours per day. This is not true.

The Type 33 may be used continuously (except for preventative maintenance) for the entire period of its life (4500 hours). I have solicited the attached letter from Mr. M. Ward, Chief; Sales Contract and Administration Department to confirm this point. Persons at DEC in contact with any customers who may question our continuous use of this unit may use this letter to allay their apprehension on the matter.

AH/mro

TELETYPE CORPORATION

5555 TOUHY AVENUE SKOKIE, ILLINOIS 60078
PHONE 676-1000 AREA CODE 312 TWX 910-223-3611

M. WARD, Chief
Sales Contract and
Administration Department

C. F. FISCHER, Supervisor
Sales Contract Section
R. C. SIMON, Supervisor
Sales Administration Section

December 21, 1964

MR. ARTHUR H. HALL III
Computer Design Engineer
Digital Equipment Corporation
Thompson Street
Maynard, Massachusetts

Dear Mr. Hall:

This is to confirm information given to you recently concerning the operating life of our Model 33 Page Printer Sets, and is also in response to your letter to me dated December 15, 1964, regarding this matter.

All references to a two hour a day limitation have been removed from our field literature covering the Model 32 and Model 33 equipment. Please refer to the enclosed P.D. Sheet Nos. 105, 106, and 107 covering three typical Model 33 Sets, in which the estimated service life and lubrication intervals are outlined. As you will note, all references to light duty and two hour a day operating limitation have been omitted. A copy (Volumes I and II) of the latest issue of our Technical Manual (273B) covering the Model 32 and Model 33 Sets is being mailed to you under separate cover. Please note that all references to two hour a day limitation have been removed from the general description (Section 574-100-102TC - Issue 1, July 1964). In Volume II, Page 9, Section 574-122-700, the estimated service life and other information is contained in the paragraph entitled, "General Maintenance Principles."

We have added your company to our general mailing list for Technical Manuals to assure your having the latest available field information.

Please accept my apology for not responding promptly with a written statement subsequent to our previous telephone discussion.

Yours very truly,



MW:MAK

Enc.





INTEROFFICE MEMORANDUM

DATE December 29, 1964

SUBJECT NEW SECURITY PROCEDURES

TO All Supervisors

FROM Loren Prentice

Effective January 4, 1965 the following new security regulations will be in effect:

1. All material and equipment removed from Digital premises: This must be done by filling out pertinent data in the sign out log and in the sign in log when the material is returned. The log sheets are made out on a one day basis initialed by the guards and/or the receptionist and returned to Judy French. She will collate the sign out log with the sign in log and those persons who have not returned their equipment will be so notified. After three notifications, a fourth notification will be sent to their supervisor. This will be done on a company form and this office will keep track of the material sign in and sign out log together with the notification as outlined above. This memo voids all old rules on stenorettes, typewriters or any lists of people who have been permitted to take out equipment in the past, primarily the field service personnel.

2. Authorization of visitors into the plant: Employee's families, boy scouts, girl scouts, cub scouts, little league baseball groups or others, will continue to be authorized by Bob Lassen's office. Customers, business persons necessary for after hours entry into the premises, can be authorized by persons designated by the department managers. This list has been submitted to the security committee and those persons who have been approved for such authorization, have been notified.

3. Security violations: In the past, Judy French has notified people by telephone, of security violations from the reports passed in by the Pinkerton Guards. This practice will be discontinued and a form will be sent to all supervisors notifying them of security violations in their area. This notification form will be delivered to your desk daily. The instances of hot irons left on, oscilloscopes and computers left running, has risen at an alarming rate and the security committee feels that, only through the supervisors taking personal interest and carrying this on to their people, can these violations be reduced.

4. Missing equipment: Items for which people are signed out for and held accountable such as test equipment signed out from test equipment headquarters, tools signed out on permanent loans from the tool crib, will be reviewed periodically. The equipment which cannot be accounted for, which is deemed lost or missing, the person who last had it signed out to him will receive a form to be filled out and returned to the security office. These in turn will be reviewed by the security committee. If the committee feels that an insufficient cause for lost equipment is given or repetition by an individual occurs, the person will be called before the security committee to explain the cause or reason for the missing equipment.

It must be the responsibility of the respective supervisors to make the people in their particular section aware of these new security procedures as no other memo will be issued. The receptionists and the Pinkerton Guards have been notified of the new procedures and these are in effect January 4th as noted in the memo.

Loren B. Prentice
Plant Security

INTEROFFICE
MEMORANDUM

DATE November 2, 1964

SUBJECT PDP 6 #4 Status Report

TO

FROM Robin Frith

166 Central Processor and I/O equipment is up and will be heat and margin tested this week.

The following are the outstanding items required to complete the system for delivery purposes. The only items which must be installed in the system for Acceptance testing are the 50 cycle Dec-tape motors and the Memory power supply.

Expected Delivery Date

Character Generator

12/16/64

Teletype 3 Model 35's

12/16/64

50V Power Supply for Display(50 cycles)

11/8/64

Memory Power Supply

11/8/64

162 Fast Memory

11/4/64

Dec-Tape Motors (original del. 10/1)

11/8/64

Dec-Dot Cable

~~Programming for Card Punch Input.~~

Program for Display Character Gen.

XRay Diffractometer Interface

11/3/64



INTEROFFICE MEMORANDUM

DATE

November 2, 1964

SUBJECT

TO

42nd Meeting of the
Test Equipment Committee

FROM

Russell Doane

Richard L. Best

Members of the Committee:

Robert Hughes, Chairman
Russell Doane, Secretary
George Gerald
Jim Cudmore
Steve Lambert
Larry White
Ed Harwood
Jack Shields
Bill Titelbaum

1. Bill Titelbaum will continue to buy our usual type of 'scope cart for each 'scope we buy, even if the committee doesn't discuss it.
2. The following items from Tektronix have arrived:
 - a) Two 581A 'scopes for Module Test.
 - b) One each type 105 and 107 squarewave generator for T.E.S. and Special Systems.
 - c) One type 180A time-mark generator for T.E.S.
 - d) Two type 1A1 dual-trace fast-rise high-sensitivity plug-in preamplifiers.
3. We expect two Tek. 547 oscilloscopes for PDP-6 checkout within about 2 weeks, and our new 1A1 plug-ins will be installed in them then. The two 1A1 plug-ins ordered for these 'scopes will arrive later (2 wks. estimated) and will then be available for the analog and low-level work for which the two we received were ordered.
4. Our elapsed - time meters have arrived and several have been installed.
5. Our ten new 630-NA-RM meters have arrived from Triplet.
6. Experiments show that the many Hewlett-Packard fast-rise current probes we have work fine with Tektronix and Fairchild Oscilloscopes.

7. Comparison of the EDC 0.01% reference with the recently re-calibrated Kinel reference (also $\pm 0.01\%$) showed errors less than the sum of the rated errors for both instruments in all cases. The committee has requested that a second EDC reference be bought, this time to the standard accuracy of 0.02% which is adequate for our highest volume PDP-5-(-8) A-D calibration needs.
8. We requested the purchase of ten more model 310 pocket meters for Field Service bringing their total to 28.
9. Oscilloscope probes and accessories now will be available from Test Equipment Service, and George Gerelds will no longer stock a supply.
10. The Telequipment (Arnet) 'scope was not sold; instead, it is being used in Power Supply Test. Our Tek. 515 and 321 'scopes are too slow for many purposes, and Bill Titelbaum will check with Tek. to see if a tradein is possible.
11. Bob Beckman has asked for a fourth 'scope to complete his complement of four for training classes. The committee suggests the purchase of a 7th Fairchild 766H with 50Mc dual-trace plug-in and calibrated sweep delay at a total cost of less than \$2000, but Bob will work out the final arrangement directly with Dick Best.
12. Bill Titelbaum will ask Triplett what can be done about sticking jewels in our panel meters; several complaints about this have recently been heard.
13. George Gerelds reports the need for one additional 581A 85Mc 'scope which the committee has requested. He also asked for one additional 30Mc or 50Mc 'scope, but the committee decided to wait and see how things develop until the next meeting, since there are several 'scopes already in the works.
14. At the request of Joe Suttor we bought and have received a Tek type 290 transistor switching-time tester.
15. Immediately after this meeting the question was raised whether a change in our manner of diode speed specifications should be made. Blue-Line Electronics claims that stored charge and the standard reverse recovery specifications together with junction capacitance can be well correlated. If this change is made, new test equipment may be required.

16. In the course of requesting about \$1000 worth of replacement probes from Tektronix, we protested loudly to Tek. about the continual nuisance of breaking probes and probe accessories. The local representative immediately responded with an offer to supply free replacement parts for any parts broken in "normal service" (i.e. not including damage by soldering irons or by being stepped on). While this does not mitigate the nuisance, at least one of the direct and measurable costs of probe breakage has been eliminated. The latest example of marginal probe design that has come to light is the seizing of attenuator heads to the body of sampling-scope cathode-follower probes, which results in destruction of the probe if head removal is attempted after long use.

The next meeting of the Test Equipment Committee will be Monday, December 7th, at 1:30 in Bob Hughes' office.



INTEROFFICE MEMORANDUM

DATE November 2, 1964

SUBJECT PDP 6 #4 Status Report

TO

FROM Robin Frith

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The following are the outstanding items required to complete the system for delivery purposes. The only items which must be installed in the system for Acceptance testing are the 50 cycle Dec-tape motors and the Memory power supply.

	<u>Expected Delivery Date</u>
Character Generator	1/12/64 *
Teletype 3 Model 35's	12/16/64 *
50V Power Supply for Display(50 cycles)	11/8/64 ←
Memory Power Supply	11/8/64
162 Fast Memory	11/4/64
Dec-Tape Motors (original del. 10/1)	11/8/64
Dec-Dot Cable	
Programming for Card Punch input.	}
Program for Display Character Gen.	
XRay Diffractometer Interface	11/3/64

MEMO

DATE 11.3.64

TO Harlan Anderson ←
Nick Mazzaresse

FROM Dave Denniston, NYO

RE: Typesetting Notes---attached

Attached are some typesetting notes which I thought might of interest and assistance before you talk with Dick Borgi of ANPA on Wednesday, 11/4/64.

Attach.

SUBJECT: TYPESETTING NOTES

November 3, 1964

The present installations of computerized typesetting (Sept., 1964, from an ANPA report) are 12 installed and 1 on order. The manufacturers of these systems are I.B.M., NCR, TRW, and CDC. Some of these systems have been in use for 18 months which is the maximum, 2 months minimum and 8 months average. Justification/hyphenation is the prime use in all cases with 11 of the 12 using justification/hyphenation for classified, 3 of the 12 using the machines for production statistics, and 1 of the 12 using the machine for accounting.

Of these 12 systems, 5 have full time programmers; 2 are allotting systems, and the rest are torn tape systems. Other uses include photo composition, legal notices, and market surveys.

According to Dick Borgi of ANPA, George Flynn of the Wall Street Journal has begun talking about their selection of DEC and several papers are waiting for our move.

Attached is a short description of CDC's system highlights.

At the present time, DEC has an advantage over the other systems available as far as cost is concerned. CDC is low (with 8090) at present, but we cannot compete costwise without a low speed and low cost reader/punch stations. Multiple low speed reader and multiple punch options would give us a price edge. (A CDC8090 with 8K, 7 readers [TTY CX] and 7 punches [TTY BRPE] costs \$66K). DECTape is advantageous for larger systems for program storage (multiple use of computer) and record storage (i.e., circulation, classified records).

November 3, 1964

The 630 Data Communications System is a feature for newspaper chains, allowing distribution of justified/hyphenated copy.

There are several other interesting uses for a machine in the newspaper field such production control (calculating necessary press speeds in real-time)--(Milgo Electronics Corporation 7620 NW 36th Avenue, Miami 7, Florida has such a system, Karl Zeigler, Sales Manager is the one to contact for information on their Press Control Counter), classified records, and circulation records.

Dick Borgi has speculated that a program producing 95%+ accuracy on hyphenation may be unnecessary for the smaller papers. He suggests a quick survey of a paper before we contact a prospect and feels that we will find about 80% preferred hyphenation; i.e., it is best to chop as little as possible from a word to provide continuity to the reader such a naturaliza-tion, not natural-ization; therefore, it would seem reasonable that a 4K PDP-8 would provide 85% efficiency would be most advantageous if sold correctly.

A program should be expandable to 8K to provide better efficiency, and should allow punch-out of typesetter designation in 5 x 7 matrix characters for torn tape systems.

We should offer a package with ease for expansion--from torn tape (two readers and 1 punch) to allotting (16 + 16) by selection and on-line direction of typesetter changes, etc.

PDP-8/CDC
COMPUTERIZED TYPESETTING CONFIGURATION

From CDC Brochure

8080 Features

1. Ability to handle hot-lead display advertising*
*(R. Borgi of ANPA says this is not required but classified justification/hyphenation should be included).
2. Hands-off on expanded system
(Basic is reader, punch and 8K 8090)

(Expanded is distributive system with 16K 8090 and 65K memory system, Type 8952)
3. Variety of type sizes and styles
4. Teletypesetter punch and reader
5. Spacing on justification eliminates linecaster jamming.
6. >95% accuracy in program
7. Adaptability of hardware/software
8. Communications links for newspaper chains
9. Punch-out readable linecaster designation on tape
10. 150 lines/min. operation.

DBD NOTE: (Typesetters run at ~ 10 to 15 cps so this is the real limit; a line of type [single column] will average 25 - 30 characters).

Dave Denniston
New York Office
11.3.64



INTEROFFICE MEMORANDUM

DATE November 3, 1964

SUBJECT Summary of the PDP-6 Planning Meeting - October 15, 1964

TO Kenneth H. Olsen
✓ Harlan Anderson
Nick Mazzaresse
Gordon Bell
Bob Lane

FROM W. R. Hindle, Jr.

1. Total PDP-6 Business - PDP-6 should not be more than 30% of DEC's gross business. If it should exceed 30%, the Company would be too vulnerable to a competitive machine which could obsolete it. In the most recent forecast of fiscal 1965 sales, PDP-6 is 30% of gross volume and 18% of the profit after taxes.
2. Standard PDP-6 Product Line - Ken proposed that the PDP-6 product line be set, both hardware and software, and that we then sell that configuration with little emphasis on special configurations. We are almost to the point where we can specify the product line and we should document exactly what it is.
3. Computation Center Market - Andy believes the Computation Center market for PDP-6 is an excellent one for our equipment. He divided the market into two classes:
 1. Present IBM 1620 computation centers where users have a relatively low level of sophistication on the use of computers. The directors of these centers are quite susceptible to generalizations and need to be impressed by the solidity of the company from which they are buying.
 2. Current 7090/7094 Computation Centers. These computation centers are, in general, run by much more knowledgeable people. It will be harder to sell PDP-6 in this market.
4. Minimum Configuration - It was decided that the minimum configuration for PDP-6 would be 16K of memory and that we would not offer an 8K configuration. However, we will keep the 8K memory module option but only for 5 microsecond memories.
5. Tape Transport - It was agreed that we need to keep a high performance, IBM-compatible magnetic tape transport in our product line.
6. Double Precision Floating Point - It was decided that we would not offer double precision floating point on the PDP-6 but would consider it for the PDP-6A.
7. Disc File - No final decision was made to add a disc file to the product line, pending further discussion on the various PDP-6 configurations that would be offered.

8. PDP-6 Configurations - The first level PDP-6 system (possible name - Genesis or Classic) will be a standard 16K memory with DECTape. The second level system will include a drum. The third level system, if offered, will include a Disc and Magnetic Tapes. In order to define these systems clearly, Gordon Bell will prepare a proposal for the various configurations, both hardware and software. This proposal will include the cost of developing new hardware and new software for each configuration. Final decision on what configurations to offer will await Gordon's memorandum.

Win Hindle

WRH:ech



INTEROFFICE MEMORANDUM

DATE 3 November 1964

SUBJECT PDP-5 Maintenance Course

TO K. Olsen
H. Anderson ✓
S. Olsen
W. Mazzaresse
R. Beckman
T. Johnson
Receptionist, Bldg. 12
All Sales Personnel
All District Offices

FROM David Edwards

The following individuals are scheduled to attend a five-day PDP-5 Maintenance and Familiarization Course convening 9 November 1964:

Mr. J. E. Lunn	Dupont
Mr. F. Senko	Remington-Arms
Mr. A. W. Sibol	Dupont

*



INTEROFFICE MEMORANDUM

DATE November 3, 1964

SUBJECT PDP-6 Option Status

TO Computer Guidance Committee FROM J. Smith

cc: R. Savell
K. Senior

Options not delivered to Checkout to date:

516-522A, LRL

516 construction has been completed. All modules are available. Currently in the process of installing a 520 interface to enable checkout with a potter drive. Checkout has progressed as far as the write-in stage, which is about 30 per cent. Estimated delivery to Checkout - November 6, 1964.

Problem Area:

We should have been notified of the decision by the Computer Guidance Committee to utilize a 520 interface-potter drive for checkout. The 522A interface, which had been installed, now has to be replaced with a 520 and then reinstalled at a later date.

646, Adams

Printer not delivered to date. Latest delivery quoted from Purchasing is November 6, 1964. Original quoted delivery was November 2, 1964. Logic wiring has been completed. Estimated delivery to Checkout - November 16, 1964.

461, Adams

Card reader was delivered late last week. Logic has been constructed. Estimated delivery to Checkout - November 23, 1964.

516-522A, Adams

Undergoing power wiring. I assume this will also utilize a 520 interface for checkout. Estimated delivery to Checkout - November 20, 1964.

"Second" 136 for Adams

Undergoing power wiring. Estimated delivery to Checkout - November 30, 1964.

163 Memory

163-3 (Project MAC)

Construction will be completed and off-line checkout started Thursday, November 5, 1964.

163-4 (LRL)

Construction will be completed and off-line checkout started Monday, November 9, 1964.

When these two (2) systems have been checked out, we will have a better feeling as to the Checkout time required. At that time, we will estimate future delivery of units to Checkout. Construction of six (6) units will be completed within the next two (2) weeks.

Problem Areas:

In-House

Engineering Hold on 1250's for flip flop memories

Outside

57A for III - 158 interface not working

Distribution:

K. Olsen
H. Anderson
S. Olsen
R. Beckman
G. Bell
R. Best
W. Hindle
N. Mazzaresse
H. Morse
D. Packer ←
R. Savell
K. Senior



INTEROFFICE MEMORANDUM

DATE November 3, 1964

SUBJECT RESPONSIBILITY OF APPLIED PROGRAMMING
IN PDP-6 SOFTWARE

TO

FROM

N. J. Mazzaresse

T. Johnson
J. Atwood
G. Bell
R. Beckman
H. Anderson
J. Ridgeway
R. Lane
S. Olsen

The responsibilities of the Sales Department in the development and distribution of PDP-6 software and documentation has been loosely defined. In order to clarify areas of responsibility the following procedures will be used in the future. (Effective November 3rd).

- A. Technical Publications will print no software documentation unless authorized by Sales to do so. This authorization will come from J. Ridgeway.
- B. No software or documentation will be given to customers without Sales approval.
- C. Sales will in-house test PDP-6 software and documentation. R. Handy has been temporarily assigned to this function. It is expected P. Harris will also support this area.
- D. R. Beckman will assume the function of preparing documentation for PDP-6 software and it will be handled as specified in items A, B, C, above. In this capacity N. Hirst and D. Gross will report to him.

NJM:ML



INTEROFFICE MEMORANDUM

DATE November 3, 1964

SUBJECT The SDS - PDP-8 Scanner System

TO Ed De Castro

FROM Gordon Bell

cc. R. Lane

A. Kotok

H. E. Anderson ✓

D. Smith

In a new Data Communication brochure by SDS, they mention a technique for sampling lines which is substantially like that outlined in our proposal to ITT and thence to SDS.

1. 8 samples by a Xtal/unit
2. Line sampling by computer instructions

Are we putting the special instructions in PDP-8 for TTY? So far Adams, BBN, and Rand have the sufficient number of lines to want this approach.

GB/mro

Hudson



INTEROFFICE
MEMORANDUM

DATE November 4, 1964

SUBJECT Engineering Expenditure

TO Works Committee

FROM J P Hastings

The attached table, setting forth the first quarter F/Y '65 engineering forecast and expenditures, by month, including breakdown between standard and FLIP CHIP modules, is in accordance with the Works Committee request of yesterday.

JPH:ASJ
Att

	July '64 Forecast	July '64 Expend.	Aug '64 Forecast	Aug '64 Expend.	Sept '64 Forecast	Sept '64 Expend.	FY '65 1st Quar. Forecast	FY '65 First Quar. Expend.
A-D-A	3.5	1.6	3.5	4.1	3.5	2.9	10.5	8.6
Card Readers & Punches	3.0	.6	3.0	0	3.0	.6	9.0	1.2
Drums	1.2	4.5	1.2	2.7	1.2	3.6	3.6	10.8
Displays	4.0	.9	3.0	8.1	2.5	.7	9.5	9.7
I/O Misc.	1.5	3.3	1.0	1.1	1.0	1.2	3.5	5.6
Mag Tape, DECTape	15.5	17.9	13.5	24.1	12.5	19.8	41.5	61.8
Memories	13.5	20.0	16.0	22.8	13.5	14.5	43.0	57.3
FLIP CHIP modules	27.5	34.4	25.5	34.3	35.0	59.6	88.0	128.3
Standard modules	17.5	25.9	19.5	18.1	10.0	13.0	47.0	57.0
Paper Tape	3.5	.8	1.5	3.7	1.0	.1	6.0	4.6
PDP-1	.5	.1	.5	.6	.5	.1	1.5	.8
PDP-4	3.0	5.4	2.5	1.7	2.5	3.9	8.0	11.0
PDP-5 (incl 8)	3.0	7.8	2.5	9.4	2.0	3.9	7.5	21.1
	4.0		4.0		4.0		12.0 (PDP-8)	
PDP-6 (incl 6A)	15.0	26.2	15.0	13.2	10.5	16.4	40.5	
	12.5 (6A)		12.5 (6A)		12.5 (6A)		37.5 (PDP-6A)	55.8
PDP-7	5.5	9.9	5.5	13.5	5.5	15.3	16.5	38.7
LINC	4.0	9.4	3.5	3.4	3.0	8.9	10.5	21.7
Printers & Typewriters	2.0	1.0	0.	2.0	0.	1.0	2.0	4.0
Programming	30.0	24.6	30.0	27.5	28.5	25.4	88.5	77.5
Special Systems	7.5	2.8	7.5	6.8	7.5	7.0	22.5	16.6
Contingencies	20.0	0.	20.0	0.	20.0	0.	60.0	0.
	197.7	197.1	191.2	197.1	179.7	197.9	568.6	592.1

digital MEMO

DATE November 5, 1964

TO Ken Olsen

FROM Tom Quinn

Chicago Office

SUBJECT: DDI - CDC MERGER

You may be aware of this rumor. If not, the enclosed clipping may be of interest.

Tom

TPQ:ms

Data Display Stock Boosted by 2 Reports

Data Display, Inc., reportedly is involved in merger negotiations, but Edward D.

IN BUSINESS Orenstein, president of the St. Paul company, declined Tuesday to comment on the reports.

The two companies most often mentioned as acquiring Data Display are Control Data Corp. and Technical Measurement Corp., North Haven, Conn.

THE REPORTS, plus leakage of a large contract recently awarded to the firm, has sent Data Display stock from \$3.50 bid in August to \$7.38 bid Monday in the over-the-counter market.

Orenstein confirmed the order and said it was "a large one," but declined to say how large or what company placed the order. A reliable source said it was Sears, Roebuck & Co.

The order was for commercial displays, a field which Data Display recently entered, Orenstein said. The firm has concentrated on manufacture of visual display units for digital computer systems.

AFTER A shakeup last winter in which Malcolm Macaulay, one of the founders, was replaced as president by Orenstein, Macaulay was hired by Control Data — in what capacity, Control Data officials have refused to say. Control Data has been a customer of Data Display.

In the fiscal year ended Oct. 31, 1963, Data Display netted 33 cents a share on sales of \$3.33 million, after a loss the previous year.

Control Data Seeks to Sell More Shares

Control Data has made a preliminary filing with the Securities and Exchange Commission to permit public distribution of 148,217 shares of common stock.

The shares currently have restrictions on public sale because they are held as the result of acquisitions.

The prospectus lists 41 shareholders who will offer their holdings in Control Data. It includes Bendix Corp., General Time Corp., the Holley Carburetor Co. and 35 individual shareholders within the Adcomp Corp., acquired last June.

S.D. Utility Reports Earnings Increase

Northwestern Public Service Co., Huron, S.D., reported third quarter revenues and income that bring nine-month profits up 2 per cent and operating revenues up 5 per cent.

The nine-month net income was \$1,467,234, up from \$1,224,226 for the first three quarters of 1963. This is equivalent to \$1.40 per common share, compared with \$1.24 in 1963.

Operating revenues at the three-quarter mark stood at \$12,316,167 against \$11,711,872 last year.

J. R. Jones, Hormel Executive, Retires

John R. Jones, a vice president of Geo. A. Hormel & Co. since 1941 and executive in charge of pork operations since 1956, has retired, the Austin, Minn., firm said.

Richards Elected Bank Director

Myron D. Richards, president of Richards Oil Co., Minneapolis, has been elected director of the Bank of Minneapolis and Trust Co., scheduled to open this month.

Executive Promoted

Clarence S. Small has been promoted to production manager for the Advance Programs Division of the G. T. Schjeldahl Co., Northfield, Minn. Small previously was production superintendent of the Ballons and Laminations section.

Executive Resigns

Laurens D. Dawes resigned Tuesday as a director of Munsingwear, Inc., and as vice president of the Men's and Boys' Division. The firm said the resignation was effective immediately and stemmed from "differences of management philosophy."

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1 1/2 Blks. from BUS DEPOT



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SOUTH ST.
—(USDA)—The
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No. 1-2 160-200
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UNI

FIX BROKEN DENTURES

AT HOME IN 8 MIN. with **PLATE-WELD**

Amazing *Plate-Weld* repairs breaks, cracks and replaces teeth. Simply flow on—put together. *Plate-Weld* uses the most successful method devised for home repairs. Works perfectly every time or money back. Get the 1.98 size.

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RIAL."

already decided.



ST!

er 15

neighbors on your side.

a surprise demonstration

arch in singing "For He's

on him over—quick—call

NORTHWEST **ORIENT**
AIRLINES

THE  **JET AIRLINE**

DIGITAL EQUIPMENT CORPORATION

MEMORANDUM

DATE: November 5, 1964

SUBJECT: Security Briefing

TO: H. Anderson

FROM: R. Dill

Due to a revision in the Security procedures, Part I of the attached Form 1464 must be signed. Before signing this form, I ask that you read the definition of your responsibility under Federal laws relating to the treatment of Government security documents and material, which is also attached.

This form should be returned to me as soon as you have signed it.

RD/bl

The following defines your responsibility under Federal laws relating to Sabotage, Espionage, Security Regulations, Government Property or Contracts, and Photographing of Defense Installations:

UNITED STATES CODE, TITLE 18

Par. 792. Harboring or Concealing Persons

Whoever harbors or conceals any person who he knows, or has reasonable grounds to believe or suspect, has committed, or is about to commit, an offense under Par. 793 or 794 of this title, shall be fined not more than \$10,000 or imprisoned not more than ten years, or both. June 25, 1948, c. 645, 62 Stat. 736.

UNITED STATES CODE, TITLE 18

Par. 793. Gathering, Transmitting, or Losing Defense Information

(a) Whoever, for the purpose of obtaining information respecting the national defense with intent or reason to believe that the information is to be used to the injury of the United States, or to the advantage of any foreign nation, goes upon, enters, flies over, or otherwise obtains information concerning any vessel, aircraft, work of defense, navy yard, naval station, submarine base, fueling station, fort, battery, torpedo station, dockyard, canal, railroad, arsenal, camp, factory, mine, telegraph, telephone, wireless, or signal station, building, office, research laboratory, or a station or other place connected with the national defense owned or constructed or in progress of construction by the United States or under the control of the United States, or of any of its officers, departments, or agencies, or within the exclusive jurisdiction of the United States, or any place in which any vessel, aircraft, arms, munitions, or other materials or instruments for use in the time of war are being made, prepared, repaired, stored, or are the subject of research or development, under any contract or agreement with the United States, or any department or agency thereof, or with any person on behalf of the United States, or otherwise on behalf of the United States, or any prohibited place so designated by the President by proclamation in time of war or in case of national emergency in which anything for the use of the Army, Navy, or Air Force is being prepared or constructed or stored, information as to which prohibited place the President has determined would be prejudicial to the national defense; or

(b) Whoever, for the purpose aforesaid, and with like intent or reason to believe, copies, takes, makes, or obtains, or attempts to copy, take, make, or obtain, any sketch, photograph, photographic negative, blueprint, plan map, model, instrument, appliance, document, writing, or note of anything connected with the national defense; or

(c) Whoever, for the purpose aforesaid, receives or obtains or agrees to or attempts to receive or obtain from any person, or from any source whatever, any document, writing, code book, signal book, sketch, photograph, photographic negative, blueprint, plan, map, model, instrument, appliance, or note, of anything connected with the national defense, knowing or having reason to believe, at the time he receives or obtains, or agrees or attempts to receive or obtain it, that it has been or will be obtained, taken, made or disposed of by any person contrary to the provisions of this chapter; or

(d) Whoever, lawfully having possession of, access to, control over, or being entrusted with any document, writing, code book, signal book, sketch, photograph, photographic negative, blueprint, plan, map, model, instrument, appliance, or note relating to the national defense, or information relating to the national defense which information the possessor has reason to believe could be used to the injury of the United States or to the advantage of any foreign nation, willfully communicates, delivers, transmits, or causes to be communicated, delivered, or transmitted, or attempts to communicate, deliver, transmit or cause to be communicated, delivered or transmitted the same to any person not entitled to receive it, or willfully retains the same and fails to deliver it on demand to the officer or employee of the United States entitled to receive it; or

(e) Whoever having unauthorized possession of, access to, or control over any document, writing, code book, signal book, sketch, photograph, photographic negative, blueprint, plan, map, model, instrument, appliance, or note relating to the national defense, or information relating to the national defense which information the possessor has reason to believe could be used to the injury of the United States or to the advantage of any foreign nation, willfully communicates, delivers, transmits, or causes to be communicated, delivered, or transmitted, or attempts to communicate, deliver, transmit or cause to be communicated, delivered, or transmitted the same to any person not entitled to receive it, or willfully retains the same and fails to deliver it to the officer or employee of the United States entitled to receive it; or

(f) Whoever, being entrusted with or having lawful possession or control of any document, writing, code book, signal book, sketch, photograph, photographic negative, blueprint, plan, map, model, instrument, appliance, note, or information, relating to the national defense, (1) through gross negligence permits the same to be removed from its proper place of custody or delivered to anyone in violation of his trust, or to be lost, stolen, abstracted, or destroyed, or (2) having knowledge that the same has been illegally removed from its proper place of custody or delivered to anyone in violation of his trust, or lost, or stolen, abstracted, or destroyed, and fails to make prompt report of such loss, theft, abstraction, or destruction to his superior officer -

Shall be fined not more than \$10,000 or imprisoned not more than ten years, or both.

(g) If two or more persons conspire to violate any of the foregoing provisions of this section, and one or more of such persons do any act to effect the object of the conspiracy, each of the parties to such conspiracy shall be subject to the punishment provided for the offense which is the object of such conspiracy. June 25, 1948, c. 645, Par. 1, 62 Stat. 736, amended Sept. 23, 1950, c. 1024, Par. 18, 64 Stat. 1003.

UNITED STATES CODE, TITLE 18

Par. 794. Gathering or Delivering Defense Information to Aid Foreign Government

(a) Whoever, with intent or reason to believe that it is to be used to the injury of the United States or to the advantage of a foreign nation, communicates, delivers, or transmits, or attempts to communicate, deliver, or transmit, to any foreign government, or to any faction or party or military or naval force within a foreign country, whether recognized or unrecognized by the United States, or to any representative, officer, agent, employee, subject, or citizen thereof,

either directly or indirectly, any document, writing, code book, signal book, sketch, photograph, photographic negative, blueprint, plan, map, model, note, instrument, appliance, or information relating to the national defense, shall be punished by death or by imprisonment for any term of years or for life.

(b) Whoever, in time of war, with intent that the same shall be communicated to the enemy, collects, records, publishes, or communicates, or attempts to elicit any information with respect to the movement, numbers, description, condition, or disposition of any of the Armed Forces, ships, aircraft, or war materials of the United States, or with respect to the plans or conduct, or supposed plans or conduct of any naval or military operations, or with respect to any works or measures undertaken for or connected with, or intended for the fortification or defense of any place, or any other information relating to the public defense, which might be useful to the enemy, shall be punished by death or by imprisonment for any term of years or for life.

(c) If two or more persons conspire to violate this section, and one or more of such persons do any act to effect the object of the conspiracy, each of the parties to such conspiracy shall be subject to the punishment provided for the offense which is the object of such conspiracy. As amended Sept. 3, 1954, c. 1261, Title II, Par. 201, 68 Stat. 1219.

UNITED STATES CODE, TITLE 18

Par. 2153. Destruction of War Material, War Premises, or War Utilities

(a) Whoever, when the United States is at war, or in times of national emergency as declared by the President or by the Congress, with intent to injure, interfere with, or obstruct the United States or any associate nation in preparing for or carrying on the war or defense activities, or, with reason to believe that his act may injure, interfere with or obstruct the United States or any associate nation in preparing for or carrying on the war or defense activities, willfully injures, destroys, contaminates, or infects, or attempts to so injure, destroy, contaminate or infect any war material, war premises, or war utilities, shall be fined not more than \$10,000 or imprisoned not more than thirty years, or both.

(b) If two or more persons conspire to violate this section, and one or more of such persons do any act to effect the object of the conspiracy, each of the parties to such conspiracy shall be punished as provided in subsection (a) of this section. As amended June 20, 1953, c. 175, Par. 2, 7, 67 Stat. 133, 134; Sept. 3, 1954, c. 1261, Title I, Par. 102, 68 Stat. 1217.

UNITED STATES CODE, TITLE 18

Par. 2154. Production of Defective War Material, War Premises, or War Utilities

(a) Whoever, when the United States is at war, or in times of national emergency as declared by the President or by the Congress, with intent to injure, interfere with, or obstruct the United States or any associate nation in preparation for or carrying on the war or defense activities, or, with reason to believe that his act may injure, interfere with, or obstruct the United States or any associate nation in preparing for or carrying on the war or defense activities, willfully makes, constructs, or causes to be made or constructed in a defective manner, or attempts to make, construct, or cause to be made or constructed in a defective manner any war material, war premises

or war utilities, or any tool, implement, machine, utensil, or receptacle used or employed in making, producing, manufacturing, or repairing any such war material, war premises or war utilities shall be fined not more than \$10,000 or imprisoned not more than thirty years, or both.

(b) If two or more persons conspire to violate this section, and one or more of such persons do any act to effect the object of the conspiracy, each of the parties to such conspiracy shall be punished as provided in subsection (a) of this section. As amended June 20, 1953, c. 175, Par. 2, 7, 67 Stat. 133, 134; Sept. 3, 1954, c. 1261, Title I, Par. 103, 68 Stat. 1218.

UNITED STATES CODE, TITLE 18

Par. 2155. Destruction of National Defense Materials, National Defense Premises or National Defense Utilities

(a) Whoever, with intent to injure, interfere with, or obstruct the national defense of the United States, willfully injures, destroys, contaminates or infects, or attempts to so injure, destroy, contaminate or infect any national-defense material, national-defense premises, or national-defense utilities, shall be fined not more than \$10,000 or imprisoned not more than ten years, or both.

(b) If two or more persons conspire to violate this section, and one or more of such persons do any act to effect the object of the conspiracy, each of the parties to such conspiracy shall be punished as provided in subsection (a) of this section. As amended Sept. 3, 1954, c. 1261, Title I, Par. 104, 68 Stat. 1218.

UNITED STATES CODE, TITLE 18

Par. 2156. Production of Defective National-Defense Material, National-Defense Premises or National-Defense Utilities

(a) Whoever, with intent to injure, interfere with, or obstruct the national defense of the United States, willfully makes, constructs, or attempts to make or construct in a defective manner any national-defense material, national-defense premises or national-defense utilities, or any tool, implement, machine, utensil, or receptacle used or employed in making, producing, manufacturing, or repairing any such national-defense material, national-defense premises or national-defense utilities, shall be fined not more than \$10,000 or imprisoned not more than ten years, or both.

(b) If two or more persons conspire to violate this section, and one or more of such persons do any act to effect the object of such conspiracy shall be punished as provided in subsection (a) of this section. As amended Sept. 3, 1954, c. 1261, Title I, Par. 105, 68 Stat. 1218.

Excerpts from the Internal Security Act of 1950

a. Section 4 (b) and (d) (50 U.S.C. 783 (b) and (c))

* * * *

(b) It shall be unlawful for any officer or employee of the United States or of any department or agency thereof, or of any corporation the stock of which is owned in whole or in major part by the United States or any department or agency thereof, to communicate in any manner or by any means, to any other person whom such officer or employee knows or has reason to believe to be an agent or representative of any foreign government or an officer or member of any Communist organization as defined in paragraph (5) of Section 782 of this title, any information of a kind which shall have been classified by the President (or by the head of any such department agency or corporation with the approval of the president) as affecting the security of the United States, knowing or having reason to know that such information has been so classified, unless such officer or employee shall have been specifically authorized by the President, or by the head of the department, agency or corporation by which this officer or employee is employed, to make such disclosure of such information.

(d) Any person who violates any provision of this Section shall, upon conviction, thereof, be punished by a fine of not more than \$10,000, or imprisonment for not more than ten years, or by both such fine and such imprisonment, and shall, moreover, be thereafter ineligible to hold any office, or place of honor, profit, or trust created by the Constitution or laws of the United States.

b. Section 21 (50 U.S.C. 797 (a) and (b))

* * * *

(a) Whoever willfully shall violate any such regulation or order as, pursuant to lawful authority, shall be or has been promulgated or approved by the Secretary of Defense, or by any military commander designated by the Secretary of Defense, or by the Director of the National Advisory Committee for Aeronautics, for the protection or security of military aircraft, airports, airport facilities, vessels, harbors, ports, piers, water-front facilities, bases, forts, posts, laboratories, stations, vehicles, equipment, explosives, or other property or places subject to the jurisdiction, administration, or in the custody of the Department of Defense, any Department or agency of which said Department or agency, or of the National Advisory Committee for Aeronautics or any officer or employee thereof, relating to fire hazards, fire protection, lighting, machinery, guard service, disrepair, disuse or other unsatisfactory conditions thereon, or the ingress thereto or egress or removal of persons therefrom, or otherwise providing for safeguarding the same against destruction, loss, or injury by accident or by enemy action, sabotage or other subversive actions, shall be guilty of a misdemeanor and upon conviction thereof shall be liable to a fine not to exceed \$5,000 or to imprisonment of not more than one year, or both.

(b) Every such regulation or order shall be posted in conspicuous and appropriate places, (Sept. 23, 1950, ch. 1024, Title I, Par. 21, 64 Stat. 1005).

SECURITY BRIEFING AND TERMINATION STATEMENTS

Section 1001 of Title 18, United States Code makes it a criminal offense, punishable by a maximum of five (5) years' imprisonment, \$10,000 fine, or both, knowingly and willfully to make a false statement or representation to any Department or Agency of the United States, as to any matter within the jurisdiction of any Department or Agency of the United States.

Employee's Name (Last, First, Middle)

Name of Contractor

PART I - INITIAL SECURITY BRIEFING STATEMENT

Date of Briefing

Typed Name and Title of Person Briefing Employee

I, the undersigned, hereby certify that I have received a security briefing. I understand fully the information presented during the briefing. I am aware that willful disclosure of classified defense information to any unauthorized person or persons may be punishable under Federal Criminal Statute. I realize that the safeguarding of classified defense information or material is of the utmost importance and that the loss or compromise of this information or material could be detrimental to the interests of national security. I have been instructed in the nature of classified defense information and the procedures governing its safeguarding. I understand that willful violation or disregard of security regulations may cause the loss of my access authorization (security clearance). I have read and am familiar with the provisions of the Espionage Laws and Federal Criminal Statutes applicable to the safeguarding of classified defense information or material.

Typed Name and Signature of Witness

Date Signed

Signature of Employee

PART II - SECURITY TERMINATION STATEMENT

I, the undersigned, fully realize the importance to the national security of the requirement for the safeguarding of classified defense information. In the fulfillment of this obligation, I certify that:

1. I have read the appropriate provisions of the Espionage Laws and Federal Criminal Statutes applicable to the safeguarding of classified defense information or material.
2. I have surrendered and no longer have in my possession or custody any classified defense information or material.
3. I shall not communicate or transmit classified defense information, orally or in writing, to any unauthorized person or agency.
4. I shall report to the Federal Bureau of Investigation, without delay, any incident wherein an attempt is made by any unauthorized person to solicit classified defense information.
5. I have - have not (strike out inappropriate words) received an oral briefing.

Typed Name and Signature of Witness

Date Signed

Signature of Employee



INTEROFFICE MEMORANDUM

DATE November 5, 1964

SUBJECT

TO Computer Guidance Committee FROM J. Smith

I feel it would help expedite matters and speed up review of the overdue computer list if some type of coding system was developed that would yield the below information.

1. Repeat items

Coding of those items that have been on the list once, twice, etc.

2. Top-Dollar items

Coding of those items that are holding up large billings. The Committee should decide what the dollar-magic number should be.

3. The project engineer responsible for the overdue item be automatically invited to the meeting by Tom Whalen as he makes his weekly review. In most cases, this would only involve three or four people.

Distribution:

K. Olsen
H. Anderson ←
S. Olsen
R. Beckman
G. Bell
R. Best
W. Hindle
N. Mazzaresse
H. Morse
D. Packer
T. Whalen

HER



INTEROFFICE
MEMORANDUM

DATE November 6, 1964

SUBJECT Semiconductor Manufacturing at DEC

TO Bob Hughes
Dick Best
Jack Smith
Win Hindle
Harlan Anderson ✓

FROM Kenneth Olsen

Now that we have decided to hire Louis Audet to head up the production of semiconductors at DEC, we have to decide where we will fit this operation into the organization.

This operation will have to involve a number of departments. We're interested in semiconductors as a production item so that the Production Department is involved. Bob Hughes is our expert on transistors but he wants to manage the Quality Control Department. The Engineering Department is, of course, deeply involved. I have concluded that this operation obviously falls to the Manufacturing Department. We will have to work out a way in which Engineering and Bob Hughes can influence.

I would like to free Bob Hughes from large amounts of time in this operation because I feel the semiconductor work is now taking too much time away from managing the Quality Control Department.

Our immediate needs are for production semiconductors but, as soon as we are manufacturing them on a regular basis, we will want to engineer new components. I would like to set up the organization so that we can later on bring in a device designer who may be organizationally over the man who we are presently hiring. I would suggest that we, for now, put this operation under Jack Smith so that our new man doesn't have the feeling that he will be reporting directly to the production manager and would feel a lowering of status if we brought in later someone more senior to him. If we made a change later on Jack Smith wouldn't feel offended because he will realize from the start that it is considered a temporary arrangement.

Ken Olsen

KHO:ncs

INTEROFFICE
MEMORANDUM

DATE November 9, 1964

SUBJECT LINC Computer Status Report

TO *H. Anderson*

FROM Mort Ruderman
Bill Vaillancourt

Linc #1 American Cyanamid (New York) EN 20483

1. Intermediate inspection completed and accepted.
2. Central Processor checked out.
3. Display checked out.
4. A/D and D/A checked out.
5. Data terminal box to be checked 11/9/64.
6. Margins and heat test 11/10/64.
7. Final inspection 11/11/64.
8. Acceptance cannot be held until Linctape is available.

Items not available from production for this system presently are:

1. Linctape (Flow Corporation)
2. Front panels for remote modules (paint, switches)
3. Data terminal box (Flow Corporation)

Delivery Date - 11/16/64

Linc #2 Denmark - Sales demonstration

Shipped 11/6/64

Linc #3 University of Pittsburgh EN 20546

1. Main frame assembly completed.
2. Started checkout 11/4/64.
3. Central Processor checked 11/11/64.
4. Intermediate inspection 11/12/64.

Items not available from production presently are:

1. Console front panel
2. Linctape (Flow Corporation)
3. Data frame (Flow Corporation)
4. A.C. control cable (Flow Corporation)
5. Display (Eng. Model Lab.)

Delivery date - 11/24/64

Linc #4 Worcester Foundation for Experimental Biology EN 20485

1. Main frame assembly complete.
2. Currently in light-board checkout.
3. Intermediate inspection to be held 11/12/64.

Items not presently available from production are:

1. All cables (Flow)
2. Display (Eng. Model Lab.)
3. Linctape (Flow)
4. Data frame (Flow)
5. Console

Deliver to Worcester personnel 11/12/64

Linc #5 University of Pennsylvania EN 20495

1. Presently in production.
2. Main frame to be assembled 11/10/64.
3. Intermediate inspection 11/11/64.
4. Delivered to checkout 11/12/64.

Items not available presently:

1. Cables
2. Linctape
3. Console
4. Scope
5. Data frame

Delivery date 11/23/64

Linc #6 Washington University EN 20578

1. Main frame assembled 11/13/64.
2. Intermediate inspection 11/16/64.
3. Deliver to checkout 11/17/64.

There are no materials available for this system presently.

Linc #7 Stanford University

Completely delivered to checkout 12/7/64.

Linc #8 Stanford University

Completely delivered to checkout 12/14/64.

DATE November 9, 1964.

F101

Ron Smart

FROM Jon Fadiman

1. I think that we should definitely plan to exhibit at the Australian Computer Conference in Canberra in May 1966. I would suggest that you would want to have an operating system with maybe a PDP-5 on display. This sounds like a good exhibit.
2. Normally, it is not worthwhile to exhibit at the more general exhibits. We have found that it is mostly a tourist trade so to speak, and of very little value compared to the amount of time that it takes to arrange an exhibit and for someone to be stationed there. So, my advice would be not to exhibit at the Sydney Trade Fair. However, the decision about this sort of thing has to be based upon whether you figure you can generate sufficient sales out of it and still stay within the 5% approximate sales cost that we figure for local office operation.
3. The correct price for the University of Queensland A-D Converter is \$4,200.00 and you can forget the quote for \$4,300.00.
4. As you are probably already aware, we are re-pricing the PDP-7 and PDP-8 peripheral equipment. Thus, quotes will be made, as for example to Professor John Bennett of Sydney University, on the basis of the new pricing structure, which will be lower than the old and no discounts will be given. Thus, the answers to your letter to Harlan Anderson of October 21st, would run something like this:
 - 1) No further educational discounts will be offered on the new pricing structure.
 - 2) I have talked with Ed DeCastro and it does not appear that we have any intention of doing a faster type drum, i.e., a swap drum, for the PDP-8. Everybody else whom I could ask this question of is at the NEREM show in Boston, so I will try to provide more information in a day or so.
 - 3) All equipment for the PDP-8 will be priced so that no discounts will be offered.
5. As you know, Bob Reid started work with us on Wednesday November 4. He is at the present time already started in attending a PDP-6 course which, it turned out, just started last week, and it appears that he is doing quite well. I think you have found a very sharp young man in Bob Reid and I am glad that you had this previous connection with him. One of the things that we have

*U.S.A.
Reply to letter of 10/22/64*

Ron Smart

-2-

November 9, 1964

not quite settled is how long Bob Reid is going to spend here. I thought he would probably spend a number of months here inasmuch as Robin Frith will be going over to Perth with the PDP-6 system. However, Robin Frith told me that he would very much like to have someone else over in Perth at the time the machine arrives to help him setting it up, and obviously Bob Reid would be the man for this. The other possibility is that we might send someone from here. But it looks as if when we ship the PDP-6 by boat we won't really be able to start installation until February 1st, so that maybe the time schedule would be that Bob Reid would fly to Perth just about the very end of January. This would give him almost three months here, which is a good long time to learn about our systems. I also want to get him involved in some transistor circuitry work with Don White, both in formal courses and maybe a little design. He hasn't had much experience with transistor circuits at all, so I think this lack can be easily taken care of. He seems for a young man to have a very excellent background in computers.

JF;nlz

NKR

INTEROFFICE
MEMORANDUM

DATE November 10, 1964

SUBJECT Options Not Delivered to Checkout to Date

TO Computer Guidance Committee FROM J. Smith

cc: R. Savell
K. Senior

516-522A

Awaiting arrival of IBM transport to complete checkout. Due in today.

646 Adams

Delivery of line printer delayed until November 16, 1964.

461 Adams

Undergoing off-line checkout. Estimated delivery holding true - November 23, 1964.

516-521 Adams

No change, estimated delivery to Checkout - November 20, 1964.

Second 136 for Adams

No change, estimated delivery to Checkout - November 30, 1964.

Problem Areas:

158 interface: Holding delivery of 57A for III

739 power supply: For 163 memories
45521: For 163 memories, not released
4998: For 163 memories, not released



INTEROFFICE MEMORANDUM

DATE 10 November 1964

SUBJECT PDP-5 Programming Course

TO K. Olsen
H. Anderson ✓
S. Olsen
W. Mazzaresse
R. Beckman
T. Johnson
Receptionist, Bldg. 12
All Sales Personnel
All District Offices

FROM J. Davis

The following individuals are scheduled to attend a five-day PDP-5 programming course convening 16 November:

Mr. C. Morris	Applied Dynamics
Mr. R. Reid	DEC - Australia
Mr. J. Hotz	Dupont
Mr. L. Smith	Dupont
Mr. M. Kirschner	Fischer & Porter
Mr. K. McClure	Foxboro Company
Mr. J. Kerekes	Remington-Arms Co.
Mr. R. Melo	Foxboro Company



INTEROFFICE MEMORANDUM

DATE November 10, 1964

SUBJECT

TO	K. E. Olsen	D. Adams	FROM	H. Crouse
	✓H. Anderson	W. Newell		A. Hall
	S. Olsen	D. Dubay		
	N. Mazzaresse	J. Craig		
	R. Wilson	F. Eagan		
	E. De Castro	J. Hagerty		
	D. Smith	H. Godfrey		
	R. Savell	S. Maminski		
	D. Kuyamjian	P. Gadaire		
	J. Smith	J. Shields		
	M. Sandler	T. Johnson		

Attached are two memos describing the various aspects of a trip to the Teletype Corporation in Skokie, Ill. on November 4 and 5 by Henry Crouse and Arthur Hall.

Subject: Trip to Teletype Corporation November 4 and 5, 1964

As general information concerning the trip can be noted in a memo by Henry Crouse, this report will cover the technical aspects of the visit.

So that we could discuss some of the mechanical difficulties with #33's, Mr. Niel Bledsoe of the Quality Assurance Department was summoned to the meeting.

Mr. Bledsoe is one of about 5 persons responsible for investigations of field troubles with Teletype equipment. His specialty is Type 33 Teleprinters. He was, I understand, responsible for setting up the production line for #33's. He was very knowledgeable about the equipment and could not have been more helpful. Mr. Bledsoe gave us a tour of the #33 assembly line.

Assembly of #33's is done on a conveyer-type assembly line, mostly by women. Virtually all the flat metal parts are stamped and processed in the plant. Plastic parts and the basic die casting are made outside. Assembly starts with the die casting which has had some machining and threading. Sub-assemblies which have been built up on small sub-assembly lines at right angles to the main line are installed on the main casting. Some adjustment but no testing is done on both sub-assemblies and the main assembly as they move down the line.

Pay is by salary plus bonus per piece produced over a set number of pieces. The work pace is brisk and there is little talk between assemblers. Most people do only one job, but because some jobs take longer than others bottlenecks tend to develop. Higher-paid assemblers who can do any one of the jobs move from station to station relieving the bottlenecks.

Parts are brought to each station by people who shuttle between stock areas and the line. Because a delay might jeopardize their bonus the assemblers are prompt in notifying the stockers when they run low on parts.

Completed assemblies minus their covers are placed in test stands and run to print standard patterns generated by tape readers. All units are "run in" and adjusted if needed after the burrs have worn off.

Completed units are put on a conveyer line which goes to a packing room and thence to storage. I could find nothing which would indicate that any selection of good or inferior units was being made for the benefit of Mother Bell or to the detriment of other customers.

Mr. Bledsoe was well aware of many of the troubles we were having with our Teleprinters. The Teletype research department has been looking into improvements to the reader sprocket wheel which has been a major source of trouble. We should have some new parts to try later this week.

Teleprinters with Serial Numbers lower than 19090 are of the early "series" and are likely to cause more trouble than the others (a prediction not particularly justified by our experience). Mod. kits are available at no cost to make the old series more like the current series.

Platen knobs are being re-designed so that they won't break so easily.

Modifications are underway which will make use of the yellow shipping locks unnecessary on future teleprinters.

The most important discovery of the day was that the 2 hour daily use restriction is no longer felt to have any validity. The unit may be run continuously (except for maintenance periods) for the life of the unit (4500 hours).

In order that we may look into our #33 difficulties in considerable detail, Mr. Bledsoe will be at DEC Thursday and Friday, November 12 and 13. Mr. Bledsoe and I will meet with all the Field Service and IO Checkout personnel concerned with #33's and with any one else who would like to talk with him.

Mr. Bledsoe is interested in hearing about troubles which happen more than 3-4 times. He would like to know the serial number (s) of the Teleprinter(s) involved, the part number of the part out of adjustment or faulty and a general description of the trouble.

Trouble reports (concerning the #33) will reach Mr. Bledsoe if addressed to:

Mr. Clarence Steichman
Department 9016
Teletype Corporation
5555 Touhy Avenue
Skokie, Illinois

Mr. Bledsoe's telephone number is:

312-CO 7-6700 Extension 6416

AH/mro

Subject: Teletype Corporation

Arthur Hall and I visited Teletype Corporation on November 4, 1964.
We visited with:

Mr. Dave Corkle, Sales Manager
Mr. Carl F. Fischer, Supervisor of Sales Contract Section
Mr. Thomas A. Race, Sales Contract Representative
Mrs. Pauline Mazzio, Sales Contract Section
Mr. Neil Bledsoe, Quality Assurance of Field Products.

The topics of discussion were:

DELIVERY: The lead time for type 33's is now four to five months, which Mr. Corkle expects to be a constant for the next 12 month period, with no predictions beyond that. We pointed out that this lead time is a major restriction to our potential computer sales, since our delivery time will be less than four weeks for a PDP-8. We ordered 1000 33 ASR's with delivery to begin next June and continue over a 24 month period. Mr. Corkle explained that Teletype was awarded a large government contract, which saturated their production facilities. They have hired over 1000 people in the past six months. He expects that our order would guarantee delivery, but probably not reduce lead time.

MOTORS: The fifty cycle motors Teletype has been evaluating are planned for release to production in three to four months and delivery to customers in eight months.

PLATENS: The sprocket feed platens for 33's are in their acceptance test phase; they will be in production shortly. No final date has been set for customer availability.

ELAPSE TIME INDICATOR: The modification kit for an elapse time indicator is \$12.20 and I purchased 100 units the day of our visit and will issue an order against it at \$12.20. The modification kit number is 182044. The modification kits are available without putting in the call in a subset.

COMPETITION: SDS visited Teletype the day after us, so I trust all our inputs will be effective before theirs.

Henry J. Crouse



INTEROFFICE MEMORANDUM

DATE November 10, 1964

SUBJECT

TO

H Anderson

FROM J P Hastings

A couple of months ago, Geoff Finch of our English subsidiary suggested to me that we change the name of our British Company in order to avoid the obvious implication that it is an importing firm.

At my request, Bob Cesari contacted his British affiliate and this morning Bob passed along their recommendations. Digital Equipment Company, Ltd is available. However, if the Register of Companies in the United Kingdom feels this name is too close to Digital Engineering Company Ltd which is already in use, Cesari's affiliates would recommend Digital Equipment and Controls Ltd. Bob did point out that in any event, we should use a name incorporating DEC.

JPH:ASJ
CC
W Hindle
R A Cesari

DEC
INTEROFFICE
MEMORANDUM

DATE November 10, 1964

SUBJECT

TO FROM

K. Olsen B. Farnham
✓ H. Anderson
S. Olsen
T. Johnson
H. Crouse

DEC presently has two types of dictation equipment, 85 Stenorettes and 10 IBM units. The Stenorettes, \$250.00 each, while they give satisfactory operation, are limited in respect to convenience in use. On the other hand, IBM units (\$405.00 each), are in great demand by the DEC personnel who do the majority of our dictating.

One aspect of a company's dictation procurement plan should be standardization in equipment, so that flexibility in use can be obtained. At the present we have requirements in our Sales Department for dictation equipment. It is recommended that we establish a program for the procurement of IBM equipment in the Sales area. The balance of the company can continue to use the present Stenorettes supplemented by the units replaced in the Sales Department. We have facilities for Stenorette repair in Building #5, and control of distribution can be maintained by the Office Supply area of the Purchasing Department.

The reasons for the selection of IBM equipment, despite its higher cost, are: (1) convenience of operation, which is important because people will use the equipment, (2) reliability, based on DEC experience, indicating quality, (3) outstanding ratings by independent sources indicating acceptance (4) full line equipment that is interchangeable in use, an aspect that a majority of the competition does not have, including Stenorette, and (5) our present commitment of \$4000.00 in IBM equipment.



INTEROFFICE MEMORANDUM

DATE November 10, 1964

SUBJECT Beards

TO Stan Olsen

FROM Bob Oakley

The pictures of the individuals wearing beards in our most recent brochures are not meeting with favorable results. With all due respect to our programming staff, the persons in the PDP-7 and PDP-8 literature create a somewhat negative sales effect in many areas.

In a few areas of contact, the effect is wholly negative and more specifically is the lose of time. There never seems to be a lack of something to talk about in a sales call, but recently I have found myself either explaining or half apologizing for the pictures of the bearded ones. It is not only time consuming, but it detracts from the purpose of my visit. It is hard enough to keep the conversation to the point of business without the help of unrelated pictures in our literature.

The use of people in pictures of our equipment is necessary for good advertizing to keep the people out of focus and somewhat conservative would appear to be more appropriate at the present time.

cc: Harlan Anderson ✓
Ted Johnson
Ed DeCastro
Ron Wilson
Jim Burley



INTEROFFICE MEMORANDUM

DATE November 11, 1964

SUBJECT

TO K. Olsen
H. Anderson ←
S. Olsen
G. Bell
R. Best
N. Mazzaresse

FROM J. Smith

Bob Lane is in the process of charting the probability of future PDP-6 computer and peripheral equipment sales.

At the next Computer Guidance Committee meeting, we should review this chart as to the feasibility of ordering additional long-lead time peripheral equipment.



INTEROFFICE MEMORANDUM

DATE November 11, 1964

SUBJECT RESPONSIBILITY OF APPLIED PROGRAMMING
IN PDP-6 SOFTWARE

TO T. Johnson
J. Atwood
G. Bell
R. Beckman
H. Anderson
J. Ridgeway
R. Lane
S. Olsen

FROM N. J. Mazzaresse

The responsibilities of the Sales Department in the development and distribution of PDP-6 software and documentation has been loosely defined. In order to clarify areas of responsibility the following procedures will be used in the future. (Effective November 11th).

- A. Technical Publications will print no software documentation unless authorized by Sales to do so. This authorization will come from J. Ridgeway.
- B. No software or documentation will be given to customers without Sales approval.
- C. Sales will in-house test PDP-6 software and documentation. R. Handy has been temporarily assigned to this function. It is expected P. Harris will also support this area.
- D. R. Beckman will assume the function of preparing documentation for PDP-6 software and it will be handled as specified in items A, B, and C above. In this capacity N. Hirst will report to him.

NJM:ML

INTEROFFICE
MEMORANDUM

DATE November 12, 1964

SUBJECT Programs Submitted by Engineering Programming

TO K H Olsen
J Shields
R Beckman
G Bell
E Harwood
H Anders on

FROM L M Hantman

Since few lists presently exist concerning the availability of programs produced by the Engineering Programming Group (and incidentally to celebrate the first anniversary of the group's existence) the following list is being published. It includes only those items completed during the past year by members of the group.

*Documentation not yet printed. Information can be gained from the program directly.

** Documentation is in the library and can be obtained from Joan Cowles or Norm Hirst (for PDP-6), but is presently not numbered.

PDP-1

DEC - 1 - 139 - M	PDP-1D-45, CHAR, Flag Test, Chg Flg - 45
DEC - 1 - 146 - M	Mag Tape 131/510C
DEC - 1 - 147 - M	Mag Tape 131/510D Transport Statistics
DEC - 1 - 142 - M	PDP-1 Multiplexer (139) Interface Test
DEC - 1 - 149 - M	630 System Data Test
DEC - 1 - 135 - M	Extended Memory Control Test
DEC - 1 - 136 - M	Extended Memory Address Test
DEC - 1 - 148 - M	Lots of Little Pictures (340 Test)
*	57A Compiler
*	57A Test
*	340 Test
*	BBN Drum

PDP-4

*	AP Automatic Program Priority Interrupt
DEC - 4 - 42 - M	630 System Data Test
DEC - 4 - 44 - M	340 Display Diagnostic
DEC - 4 - 53 - U	Generalized Sort
DEC - 4 - 29 - IO	Microtrieve
DEC - 4 - 54 - M	Extend Memory Control Test
DEC - 4 - 56 - U	Internal Repetitive Merge Subroutine
DEC - 4 - 55 - U	Internal Variable Length Sort Subroutine (Shell Sort)
DEC - 4 - 46 - M	AD 138, 142 Test
DEC - 4 - 45 - M	370 Light Pen Diagnostic
DEC - 4 - 57 - M	57A Tape Error Specification Test
DEC - 4 - 40 - U	57A Subroutines
DEC - 4 - 30 - M	57A Compiler
DEC - 4 - 51 - P	Wire List Program
*	Revised Faster and Shorter CAL Handler
*	Program to remove Comments and Spaces from PDP-5 Tapes
Digital 4 - 46 - IO	PDP-4 MICROTOG
Digital 4 - 45 - IO	PDP-4 DECtape Subroutines
Digital 4 - 44 - M	Extended Memory Checkerboard
Digital 4 - 35 - M	Extended Address Test
Sales Brochure	DECtape: Its Features and Applications
Sales Brochure	Graphpad and other Display Demos
*	Bus-Pak
DEC - 4 - 52 - M	LLP-4 (340 Display Adjustments)
*	Calcomp Plotter
DEC - 4 - 20 - U	Tape Control 54

PDP-5

DEC - 5 - 5 - S	Octal Debugging Tape
DEC - 5 - 40 - M	High Speed Reader Test, Type 570
DEC - 5 - 38 - M	PDP-5 Read Alpha Test
DEC - 5 - 50 - M	Memory Extend Test
DEC - 5 - 52 - M	Teletype 634S Test (Full Duplex)
DEC - 5 - 48 - M	Type 34B Display Test
*	Microtog
*	Simple Tape (580) Test
DEC - 5 - 3 - O	Teletype Output Package
DEC - 5 - 8 - U	Octal Dump on Teletype
DEC - 5 - 41 - U	Octal Dump under Program Control
*	DECtape Subroutines
*	250 Drum
*	Multiply and Divide Test
*	Calcomp Plotter
DEC - 5 - 23 - I	Binary Format Loader for 750
DEC - 5 - 29 - I	Rim Loader for 750
DEC - 5 - 22 - I	Binary Loader for TT33
*	Binary Format Loader - Macro 5 Compatible
*	Binary Format Loader - Macro 5 Compatible, Extended Memory
DEC - 5 - 27 - O	Rim Punch

PDP-6

Maindec 611	Read Alphanumeric Test Program
Maindec 612	PDP-6 Punch Test
Maindec 614	Teleprinter Test
Maindec 602	Micro Checkerboard
Maindec 623	Protect and Relocate Test
Maindec 664	Line Printer Diagnostic
Maindec 610	Read Binary Test Program
Maindec 622	4 x 4K Low End Checkerboard
**	4 x 4K High End Checkerboard
Maindec 622 - 2	16 x 16K Checkerboard
Maindec 613	Core Data Test
Maindec 603-2	16K High End Address Test
*	16K Low End Address Test
Maindec 662	Accumulator Test
Maindec 634 - 2	Lots of Little Pictures on the 6 (LLP6)
*	516 Cursory Operation Code Test
*	516 Data Test
*	630 Data Control (Half Duplex)
*	ASCIAD -- add 2 5 digit ASCII numbers
Maindec 601	Instruction Test (5 parts)
Maindec 641	Card Reader Test
*	Memory Power On-Off Test

LINC

**

Memory Test

**

Instruction Test

LMH:ASJ



INTEROFFICE
MEMORANDUM

DATE November 12, 1964
SUBJECT SEMICONDUCTOR MANUFACTURING
AT DEC
TO Ken Olsen
FROM Bob Hughes

In reference to your memo of November 6th, I believe it was a good move to hire Lou Audet to headup the production of semiconductors for Digital.

In regard to my wanting to manage the Quality Control Department, I obviously do, unless there is a better position available in the management of the research and development of semiconductors.

I feel that whoever you appoint to manage the research and development of the Semiconductor Group for you, should perform in the capacity that the Engineering Department does with respect to discrete circuits. That is, to develop techniques in the manufacture of semiconductors, conductors, protective coatings, and other approaches related to the chemistry of devices that will make DEC the leader in the integrated ceramic circuits field.

cc: Dick Best
Jack Smith
Win Hindle
Harlan Anderson ✓

INTEROFFICE MEMORANDUM

SUBJECT: PDP-6 DECtape Compatibility
TO: PDP-6 Distribution List

DATE: November 13, 1964
FROM: Bob Reed

Commencing 9:00 A.M., November 13, 1964 any new tape written on the prototype will be compatible with all other PDP-6 machines.

Tapes written on the prototype prior to this date must be re-written to insure compatibility with other machines. However these tapes may still be read on the prototype, until December 13, 1964, when I will assume all existing tapes have been rewritten and I will make the permanent logic change.

RR/mro



INTEROFFICE MEMORANDUM

DATE 13 November 1964

SUBJECT Rand Corporation
Reference: Your Memo of 6 November
TO Harlan Anderson

FROM Robert Beckman

Attached are a suggested letter to Chuck Baker and some material to include with the letter. The Xeroxed sheets are copies of the Adams' contract with portions blanked out that do not apply to Mr. Baker's questions. Note that on one copy I have blanked out Adams' name all through it in case you feel it would be inappropriate to pass this information on to Rand.

I hope this covers everything because there is not much more available at this time.

**



INTEROFFICE MEMORANDUM

DATE November 16, 1964

SUBJECT Status of Peripheral Equipment on Open Order

TO Computer Guidance Committee FROM J. Smith

cc: R. Savell
K. Senior
T. Whalen

Below is the status of equipment that is the responsibility of Peripheral Checkout to test off-line:

		<u>Status</u>
552	Woods Hole	Off-line checkout complete, delivered to the machine
552	Dow Badische	Shipped
552	L.R.L.	Shipped
552	Desy Hamburg	Off-line checkout complete, delivered to the machine
550	J.P.L.	Off-line checkout complete, delivered to PDP-7
550	Foxboro	Off-line checkout complete, D. Vonada investigating power interrupt problems. Delivery date - December 2, 1964
550	Hanscom	Off-line checkout complete, awaiting acceptance, will be stored for Hanscom until the end of December
57A	I.I.I.	Off-line checkout complete, awaiting acceptance, Field Service having problems with the 158 interface

57A	Woods Hole	Off-line checkout complete, delivered to the machine, awaiting acceptance test
57A	Patricks	Off-line checkout complete, delivered to the machine
57A	J.P.L.	Transport (570) being tied on today. Will be installed to the PDP-7 the end of the week..

We have strived to have all the above equipment completed by the second week in November to enable shipment to the customer by the end of the month. We feel, we have fulfilled our commitments. If there are questions as to status, or if we can be of further assistance to assure shipment by the end of the month, please contact me.

PDP-6 Options Not Delivered to Computer Checkout to Date

516-522A, L.R.L.

I.B.M. transport arrived Friday. Checkout in process. Will try and install Wednesday.

646, Adams

Line printer has not arrived, due in today - Purchasing is expediting.

516-521, Adams

No change, estimated delivery to Checkout - November 20, 1964.

Second 136 for Adams

No change, estimated delivery to Checkout - November 30, 1964.

First 163 for L.R.L.

Undergoing off-line checkout. Should be ready to go on-line Thursday.

First 163 for Adams

Stack due in today, was returned to vendor for repairs. Logic is complete, awaiting the stack.

Second 163 for L.R.L.

Stack due in Wednesday.

Second 163 for Adams

Stack due in November 28, 1964. Logic complete.

Third 163 for Adams

Stack due in December 14, 1964. Acceptance tests on the Adams computer system start January 2, 1965.

Harlan Anderson

digital MEMO

November 15, 1964

WASHINGTON OFFICE

1430 K Street, N.W.
Washington, D.C. 20005

To: Perry Harris

From: Howie Painter

Dear Perry:

Talked with Joe Young of NASA/Langley today. He is extremely interested in talking to us in person about the PDP-6. He said that he had several good reports about the machine, and is interested in going into some real detail on it. In particular, he is interested in learning about the ease of input/output connections to the machine, since his application will be of a hybrid nature.

I have tentatively arranged a date for you to see him on Friday December 11, at 10 a.m. Please let me know as soon as possible whether or not you can make it at that time.

In the meantime, I shall try to arrange visits for you that same week to Dr. Pevsner at Johns Hopkins University Physics Dept., and with Dr. Jim Pugsley of the University of Maryland. Pevsner's application is that of film reading (he is a close friend of Dr. Plano at Rutgers and feels a little left out at not having a PDP-6); Pugsley's application will be for the University of Maryland Computer Science Dept in a time-sharing configuration, connecting several of the University departments to a central computer.

Best regards,

Howie

cc: Harlan Anderson

dec

INTEROFFICE
MEMORANDUM

DATE November 16, 1964

SUBJECT Scheduled visit by Brookhaven.

TO R. Beckman
G. Bell
H. Anderson ✓
H. Hyman

FROM R. Lane

The visitors from Brookhaven are scheduled to arrive Thursday, November 19th, at 9:00 a.m. at Bedford Airport.

I plan to meet them and bring them back to DEC.



INTEROFFICE MEMORANDUM

DATE November 17, 1964

SUBJECT Notes on Computer Applications

TO Stan Olsen
Nick Mazzaresse
✓ Harlan Anderson

FROM Kenneth H. Olsen

Here are some notes on computer applications which we might consider having people work on.

Enclosed are copies of memos which I wrote in 1960 on the magazine addressing problem. At that time, our equipment wasn't economical for the small addressing shop and we didn't want to take the effort to go out after the very large ones. At that time, Univac installed a very large - I would guess several million dollars - installation for "Esquire" magazine. "Esquire" then did the addressing for many other magazines. "Readers Digest" also made a very elaborate setup at that time.

Now I believe it would be worthwhile putting a man to work on this project because I think we have equipment which is economical for the small addressing shop to replace the hand operations and those for which no automatic updating or sorting is available. We also have the equipment which is large and powerful but much more economical than what the large addressing firms are renting from IBM and Univac.

When we are ready to go into this, I'll call Mr. Frawley of Harvard Business Review and ask him for an introduction to the man who is now doing their addressing.

There is probably extensive applications for this in other areas. Companies like General Radio maintain expensive mailing lists and some well thought out automation would sell relatively easy, I believe. Book clubs are another highly automated project and it might be possible to replace it or get some of the newer projects.

The digital controlled machine tools were designed and planned when digital computers were exceedingly expensive. They made very elaborate boxes to cut down on the computing needs. Now many of these elaborate boxes can be done with simple computers at a much lower cost.

Ken Olsen

KHO:ech



INTEROFFICE MEMORANDUM

DATE February 7, 1960

SUBJECT Harvard Business Review

TO File

FROM Kenneth H. Olsen

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

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

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

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

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

Kenneth H. Olsen

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



INTEROFFICE MEMORANDUM

DATE February 10, 1960

SUBJECT Harvard Business Review

TO File

FROM Kenneth H. Olsen

Mr. E. D. Frawley, of the Harvard Business Review, and Mr. James Watson, who runs the company that maintains the mailing list for Harvard Business Review, visited on February 8 to discuss the use of a PDP for maintaining their list. They have about 60,000 subscribers of which 50,000 are changed each year. The magazine is mailed out every other month but the list is revised several times during the two month period. In addition, they have to exchange mailing lists with other magazines several times during the year and they would like very much to get statistical information on their list for the verification services and for their own use. They now have all their subscriptions on multigraph plates, which is very unwieldy and useless as far as getting statistical information. The sorting problem there is not particularly satisfactory. Two companies have punched cards which have the address of the subscriber in hectograph master form on the back of the card from which addresses are printed.

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

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

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

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

Kenneth H. Olsen

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



INTEROFFICE MEMORANDUM

DATE March 7, 1960

SUBJECT Harvard Business Review

TO Ben Gurley/ Harlan Anderson

FROM Kenneth H. Olsen

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

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

Ken Olsen

dec**INTEROFFICE
MEMORANDUM**

DATE November 17, 1964

SUBJECT Educational Market

TO Burt Scudney
Nick Mazzaresse
cc: Stan Olsen
✓ Harlan Anderson
Win Hindle

FROM Kenneth H. Olsen

Let us set about to systematically and thoroughly hit the complete educational market. There are two ways in which the market was cut between the civilian and the military and then between the modules and the computers. I'm not including the large PDP-6 type computation centers in this study, although we may get leads as a by-product of it.

For the military market, let's make contact at every training place in which we have a customer or a lead. From these, let's find out the names of all the other places and an individual there in that particular service who are doing training. Let us then plot a plan which will cover all of these areas. Bob Beckman can be particularly helpful in covering the Navy.

Let us then prepare a brochure showing our training aids and send them to all the president's of all the small colleges in the country. In addition, we can send them to department heads of all the larger universities. We might do well in having one man in charge of our educational sales.

Ken Olsen

KHO:ech

INTEROFFICE
MEMORANDUM

DATE November 17, 1964

SUBJECT Some Notes Taken at the American Management Association Conference No. 8251-03, on Compensation Abroad for Overseas Employees, November 11 - 13, 1964.

TO FROM

Ken Olsen
Harlan Anderson
Win Hindle
Stan Olsen
Dick Mills

Jon Fadiman

The first speaker was George F. Dickover of the Industrial Relations Counsellors' Service in New York City, who presented a plan which he recommends to businesses sending personnel overseas. The program refers to Americans sent overseas for two years or more. Compensation follows a balance sheet approach in which the employee is compensated by a premium plus all excess costs that he will incur.

1. First there is the base pay.
2. On top of that there is an overseas premium which is given for the following reasons:
 - a. Separation from home.
 - b. Foreign job usually involves larger responsibility.
 - c. Job involves training of foreign nationals.
 - d. Employee must often work in a foreign language.
 - e. The employee is representing the company more than he would be if in the United States

Suggestion is that this premium should equal 15% of the base pay. In addition, there is an environmental factor for undesirable locations, such that this premium may vary from a minimum of 10% up to 25%.

3. Allowances:
 - a. For shelter, employee will pay more. The company should make up the excess that he will pay over that which he would pay in the U. S. Employee is normally considered to pay 15% of his base pay for shelter in the U. S.

- b. An additional allowance should be made for cost of living. This is based upon the State Department's local cost of living index, compared with Washington, D. C. This is determined to be an excellent index and almost all companies use it. It should be applied only to the percentage of income spent in the foreign living which normally is between 50 and 60%.
- c. In addition, education for children should be fully reimbursed for the lower school.
- d. In addition, any benefits required by foreign governments should be paid for by the company, if these benefits will not accrue back to the individual.
- e. Policy of full tax equalization should be followed. This means that the company retains and pays out for the employee the same amount of taxes he would pay on his U. S. income as if he were not going overseas. Normally the tax is computed on his base pay only. In a few cases, the premium is also taxed. All the rest of the benefits are thus tax free. Supply of an automobile is considered separately. It is usually at the employee's expense if he is permanently living abroad.

The next speaker was Mr. Knappen of Standard Oil of New Jersey, speaking about compensation for nationals. Unique factors:

1. General inflation rate, which has been recently about 5% of the cost of living per year.
2. Salary levels themselves have been rising and thus there has been an increase of about 6 to 8% per year in real income.
3. Bargaining goes up into the professional levels in Europe. Minimum wage levels etc. are bargained and set at the national level.
4. Many additional bonuses, etc., required by law or customs, such as the Christmas bonus, etc.

Recommendation is neither to categorically ignore these extra factors, nor to follow them explicitly, but in general a compromise

is best which leans on the side of sticking with custom rather than going against it. There is always the problem of equal pay for equal work. The nationals want pay equal to the amount of the American expatriot, and in general they don't get it. Nevertheless, there are some valid reasons for this. It is important not to pay dollar salaries to other than Americans.

First case study was presented by Ralph E. Paddock of Socony Mobil, in which he presented the compensation program for his company for American expatriots, i.e., personnel living abroad for two years or more. Balance sheet method also used.

Base salary plus variable foreign service premium varying from 20 to 30% depending on location. Mr. Paddock believes that for Europe this should go down to 15%. In addition a cost of living allowance is paid based upon the State Department local cost of living index for the city in which the person will be. This cost of living allowance is reduced by a factor of 1/12 because the employee is given one month's vacation back in the United States. It is also adjusted for spendable income only, which is assumed to be about 60% of actual income. In addition there is a housing allowance given of 100% of the differential cost of rent and utilities in the foreign city versus rent and utilities in America. In addition, the policy of tax equalization is followed, such that the amount of taxes withheld by the company is what the employee would pay in U. S. income taxes based upon his normal deductions and an additional straight 10% deduction. He is reimbursed for all foreign income taxes. In addition there is an educational assistance allowance paid for everything in excess of \$10 per month per child.

The next case study was presented by Mr. R. L. Schmidt for General Electric. Mr. Schmidt discussed some of the fears that an American employee has when he is sent abroad. Most important is his fear of detachment from the parent company. Second, comes his fear of unfamiliar environment. Third, comes his fear of how he will educate his children, and fourth come economic worries caused by the unfamiliar. GE has developed a new plan for GE employees abroad, based upon the following philosophy:

1. The employee is retained on a U. S. exempt salary structure with all normal benefits continued.
2. He is paid a premium for foreign service.

3. For employees on a foreign assignment the philosophy is that he is to be kept "economically whole" with respect to his U. S. counterpart. This is done in the following way:
 - a. His base salary is computed.
 - b. He is paid a premium of 10% of his base salary.
 - c. He is paid an economic adjustment which consists of:
 - 1) A housing allowance,
 - 2) A cost of living allowance,
 - 3) An income tax differential,
 - 4) A 10% additional unitemized expense factor.

The lowest premium paid is 5%, never 0, and in addition to this there is a 10% unitemized expense factor, which comes out to a minimum premium of 15%. Often the expatriot American is given his payment in local currency equal to the amount which a national would receive and the additional is paid back home. Vacation schedules are four weeks per year and every two years the employee is allowed to come home with his way paid for himself and his family. Four weeks' vacation is given overseas in spite of the fact that the company grants only two weeks in the United States for employees with under ten years of service.

Case study number 3 by H. F. Scharges, Chase Manhattan Bank. There is always a problem of education. Careful explanation must be given to the employee so that he understands what his benefits are and that he is not losing by going overseas and there is also the problem of education of top management so that they understand the difficult problems of overseas compensation, and the fact that the additions are necessary.

Allowances are as follows:

1. Base salary, plus an overseas premium. There should always be an overseas premium. Mr. Scharges believes there should be one premium not based on hardship of the area. The reason for this premium are as follows:

- a. There is a break in the person's cultural ties with home.
 - b. Great mobility of the employee is expected.
 - c. There are always difficulties in adjustment to a new environment. A 15% premium allowance everywhere is what Chase Manhattan Bank gives.
2. Cost of living allowance. Use the State Department local index and apply it to the spendable income only. This is normally considered by the bank to be 75% of the base salary for married people or 56% of the base salary for single persons.
 3. Housing allowance, based upon the difference in housing costs for the employee overseas and in America.
 4. Additional hardship or area allowance. This may be 0 to 25% of the base salary, depending on the hardship of the area in which the employee is sent.
 5. Tax equalization is the best system. Company withholds income tax equal to the U. S. income tax that would be paid by the employee on his base salary counting the dependents and straight 10% deduction. Only Federal taxes are withheld, not state taxes.
 6. Vacations: 4 weeks per year.
 7. Education: Company pays up to \$500 per child for local school.
 8. Additional \$500 is given to the employee as preparation allowance for going overseas the first time.
 9. All reasonable household goods shipped at company expense.

Other comments: Language training is paid for by the company for private lessons for the employee and his wife. Bank wishes to have employee know two foreign languages.

Temporary assignments: Not too much mention was made of temporary assignment. However, the plans of Socony Mobil, General Electric, and Chase Manhattan

Bank were all approximately the same, as follows: For travel of up to six months the company does not pay for the wife or family to go abroad but allows one trip back home if the employee is away for more than three months. If the employee is away for a period of from six months to two years, the wife and family are sent abroad at company expense. In all ways they are treated exactly like foreign expatriots, as mentioned in the previous plans, with all benefits, cost of living allowances, premiums, etc. The only difference is that the company will subsidize completely the cost of housing overseas because the employee is assumed on this temporary assignment to still have his housing costs at home. The temporary employee away from six months to two years is completely protected for U. S. income tax as for permanent employees, so he does not pay any additional taxes.

The next speaker was Mr. Hutscheson, an economist with IBM World Trade. He listed some of the economic and social trends in Western Europe.

1. Persistent shortage of labor.
2. Tremendous competition for trained personnel.
3. Educational system not designed for economic growth, but instead for the development of an elite group.
4. Inadequate facilities for education.
5. Social structure of state paid benefits.
6. In France many new universities which are trying to de-centralize out of Paris.
7. General influx of American know-how in industry, etc., into the United Kingdom.
8. European managers are well trained in technology, philosophy, and culture.
9. Spain has in general failed to adapt to the modern age but is now becoming awake. Interested in plant modernization, etc. Computers are being applied to Government planning.

November 17, 1964

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Final speaker was Mr. Walter Rothschild of Cleary, Gottlieb, and Stein.
Subject: Taxation questions for American expatriots.

Salaries: Income from services outside the United States, not subject to U. S. income tax if the employee is either

- a) A bona fide resident of a foreign country for over one year or,
- b) A resident in a foreign country for 17 out of 18 months including one calendar year.

In these cases, the employee may exclude the first \$20,000 of his foreign income. All company benefits, even those not paid in cash are subject to taxation by U. S. Government. Only moving expenses are not taxable. There is a foreign tax credit on an employee's U. S. income tax for all foreign taxes which he has paid which is complete, except that it can be no larger than that required to offset the U. S. tax on foreign income. If a man is overseas on April 15th, he is automatically allowed an income tax extension until June 15th, but must pay the one month interest. A book is available known as "Tax Guide for U. S. Citizens abroad" from the Department of Internal Revenue.

Social Security Coverage: When working for a foreign employer the employee is not subject to social security. The parent company can, however, enter into a contract with the Government to extend its social security benefits to all U. S. citizens working for its subsidiaries.

As for pensions and profit sharing, it is legal for the U. S. parent company to include all its U. S. citizens working for its foreign subsidiaries. With respect to welfare benefits, an insurance company may cover foreign employees if there are not too many. With respect to qualified stock options, the rule is that they must include foreign employees if the U. S. employees of foreign subsidiaries are considered.

In addition, I have the following printed material which you can get from me if interested:

1. Compensation Plan for American Foreign Residents by Socony Mobil Oil Company, a printed booklet stating their plan, effective January 1, 1964.
2. General Electric Program for Compensating Foreign Service Employees, a mimeographed outline of this plan as presented at the AMA Seminar.

November 17, 1964

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3. A mimeographed survey on foreign compensation dated March 6, 1964 in which 47 companies were asked a total of 38 questions concerning their foreign plans. Answers are given without mentioning which companies do what.
4. An article by Spencer J. Hayden, President of the Spencer Hayden Company of New York entitled "Overseas Operations: Their Personnel Implications."
5. An article by Mark Priceman, manager Education Programs, IBM World Trade Corporation, entitled "Practical Advice for the Overseas Personnel Man."
6. A list of names and company affiliations of the 30 participants in the conference.

JF:nlz



INTEROFFICE MEMORANDUM

DATE November 18, 1964

SUBJECT Discfile for Adams

TO H. Anderson
G. Bell
H. Crouse
N. Mazzaresse
R. Savell
R. Beckman

FROM D. Kuyamjian

Attached is a copy of the letter of intent sent to Data Products concerning the Adams Discfile.

The following information was given me by William Collins, Marketing Manager at Data Products.

WARRANTY - Data Products normally warrantees their file for a twelve month period. The warranty excludes parts subject to normal wear and tear, but does include the discs, motors, heads, electronics, and most machined parts. A list of the exceptions is en route to us. I secured an agreement from Collins to allow the warranty to run to DEC's customers for a period of twelve months commencing from date of shipment from DEC but not in excess of thirteen months from date of shipment by Data Products.

FIELD SERVICE CENTERS: Data Products has one field service office of three engineers located in St. Paul, Minnesota. The East is serviced by this office.

PRICING: 5022/5024 - The model 5022 and 5024 discfiles are identical in design and operation. The model 5022 is priced at \$66,200.00; The model 5024 pricing is on a sliding scale depending upon the quantity purchased in an approximate twelve month period:

1st	\$84,500.00	4th	\$64,700.00
2nd	\$74,800.00		
3rd	\$69,700.00	12th	\$60,000.00

Data Products has justified the differences in pricing as follows:

Specifications - The 5022 must be purchased as a standard unit with no deviations from standard specifications. The purchaser may specify special input levels, sectoring, painting, etc. within the general scope of the 5024 specifications without an increase in price. It is possible, however, to purchase a 5022 with special characteristics, the changes for which would be computed on the basis of engineering and manufacturing time and materials. This would obviously be the course to take when changes in the specifications would amount to considerably less than the price differential between the 5022 and the 5024 and only a small number of drums is being considered.

Finish - The 5022 is supplied primed only; the 5024 may be painted without charge.

Installation - Installation assistance is provided with the 5024 but not with the 5022.

Field Service - Field service is provided with the 5024 but not with the 5022, except on a \$120.00/day basis. (This leaves the area of in-warranty non-functioning equipment a bit gray. I will obtain a further definition of this policy from Data Products).

Personnel Training - Instruction and maintenance classes are provided at no charge with the purchase of a 5024, but not a 5022.

Pricing of the 5024 is designed to be identical with the 5022 if six units a year are purchased, and since there is no quantity discount for 5022, advantageous if a larger yearly quantity is involved.

5022 FIELD SERVICE/TRAINING - A \$7,500.00 package field service and personnel training program can be purchased with the 5022. More detailed information is en route.

November 17, 1964

Data Products Corporation
8535 Warren Drive
Culver City, California

Attention: Mr. William Collins

Dear Mr. Collins:

Digital Equipment Corporation is considering the purchase of a disc file storage system to be used with DEC's PDP-6 Computer. It is our intention to purchase the Data Products Model 5022 Disc File providing our PDP-6 customer makes his requirement for this storage device definite. The version of the Model 5022 under consideration has been quoted to us at a price of \$66,200.00 with an additional charge of \$1,500.00 for special sectoring of the discs (seven outer, four inner zones per disc side).

We do, however, wish you to be aware that we may elect to purchase your Model 5024 in lieu of the Model 5022. Your telephone quotation to Mrs. Kuyamjian of \$84,500.00 would apply to the purchase of the initial Model 5024.

Although a purchase order cannot be issued to Data Products at this time, this letter may be regarded as an intent, though not an obligation, to purchase the above mentioned equipment, contingent upon receipt of a firm commitment by DEC from its customer.

We expect a decision on this equipment by approximately November 25, 1964 and understand that Data Products can accomplish delivery by February 1, 1965 should the decision be affirmative. In this event, a purchase order will be promptly issued to Data Products to insure the February 1, 1965 delivery.

Sincerely,

DIGITAL EQUIPMENT CORPORATION

Henry J. Crouse
Purchasing Agent



INTEROFFICE
MEMORANDUM

DATE November 18, 1964

SUBJECT Univac

TO ✓ Harlan Anderson
Gordon Bell
Nick Mazzaresse
Bob Savell

FROM Henry Crouse

Mr. Howard Heintz of Univac has quoted us their Fastran Drum system with the following prices:

2 - 5 units-----	\$120,000.00
6 - 10 units-----	\$110,000.00
11 units up-----	\$105,000.00.

Henry J. Crouse

November 19, 1964

Perry Harris' Sale Call Report #4534 Dr. Benoit

R. Lane

Jack Shields

I Paper Tape Reader problems - has had some problems. Reasons:

- A. Hardware Malfunctions.
- B. They just plain wore out some of their tapes with usage and never reproduced them or replaced same.

Present Action:

Man is on his way down there now to find out the problems - and resolve them.

His 70K PDP-5 isn't two months late according to my records. It is at this writing 6 days late. The man to see is Pat Greene, the Project Engineer.

CC: H. E. Anderson ✓
T. G. Johnson

C
O
P
Y



INTEROFFICE MEMORANDUM

DATE November 20, 1964

SUBJECT Quotation Forms

TO All Branch Offices

FROM Frank Kalwell

CC: Stan Olsen
Ken Olsen
Harlan Anderson
Burt Scudney
Ted Johnson
John Padiman
Nick Mazzarese
Tom Whalen

Good News at last, men!! A standard quotation form which can be used on all RFQ's. We are not attempting to embark into a "Paperwork Jungle", but we are just attempting to simplify and ease paper work in all branch offices. Even though there seems to be a rise in paper work, quite the opposite is our intention! Unnecessary paper work creates additional work and excessive high costs, not only in printing matter, but in the time spent in completing the forms. Many ask "Why another form?" The reason is to eliminate all the repetitive letters we send to customers quoting our terms and conditions, f.o.b. point, payment terms and many other items. This form will enable all the proper parties in our home office to know, in advance, what requirements may be forthcoming from the branch offices.

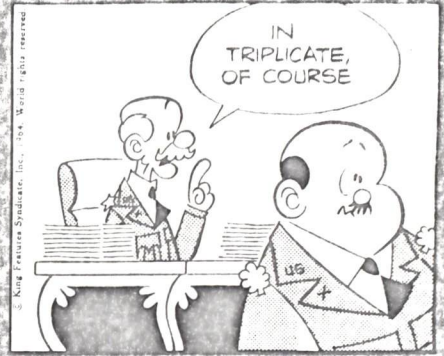
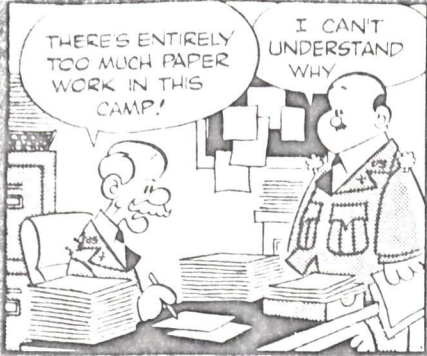
Please note - this does not replace the RFQ cover sheet. The quotation number will still be assigned, as previously, per example:

M- - -17
-or- C- - -25

The questionnaire on the reverse side of the two yellow copies designated "Branch Office" and "Branch Office Follow Up" will give us an idea of the customer's reaction to our quotation. Please return one copy to the Maynard office and maintain the other copy for your files.

If there are any questions or if additional forms are required, please contact me.

FAK:jeh
enc: 30 Quotation Forms
1 Laugh



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INTEROFFICE MEMORANDUM

DATE November 20, 1964

SUBJECT PDP-6 Construction Rate

TO Computer Guidance Committee FROM J. Smith

PDP-6 Central Processors have been delivered to Checkout at a rate of one (1) per month as illustrated below. After reviewing Bob Lane's probability chart, I suggest we continue at this rate for the next yearly quarter.

<u>Number</u>	<u>Customer</u>	<u>Delivered to Checkout</u>
#3	Brookhaven	6/19/64
#4	Western Australia	7/7/64
#5	L.R.L.	8/1/64
#6	Adams	9/1/64
#7	Rutgers	10/1/64
#8	MIT (LNS)	11/17/64

Distribution:

K. Olsen
H. Anderson ←
S. Olsen
R. Beckman
G. Bell
R. Best
W. Hindle
N. Mazzaresse
H. Morse
D. Packer



INTEROFFICE MEMORANDUM

DATE November 24, 1964

SUBJECT Bell Telephone Laboratories' PDP-7

TO K. Olsen
H. Anderson ←

FROM J. Smith

Present Status:

1. Memory construction complete, undergoing checkout.
2. Central processor being wired at R.C.A. Ohio; will be delivered to D.E.C. - November 30, 1964.
3. Power wiring; console and indicator wiring in process.
4. Reader, punch wiring being hand wired. Will be available - December 4, 1964.

Planned delivery date to Ron Wilson for checkout is December 7, 1964. Ron feels this will give him enough time to meet our commitment to Bell Telephone Laboratories.

dec

INTEROFFICE
MEMORANDUM

DATE November 24, 1964

SUBJECT

TO Nick Mazzaresse
CC: Computer Guidance Committee

FROM R. L. Lane *Rob*

We have a definite market advantage today with PEPR type systems. IBM, CDC, SDS and CCC are making a strong bid to reduce this advantage. Bids on five (5) PEPR Controllers will be requested approximately January 1965 from Yale, LNS, Stanford, Rutgers, and Bonn. The first four are the critical subscribers and we should sell them in order to get all the business. Strong members within the NSF and the User-Researchers have indicated we should market a total system (with shared operational responsibility by the user). IBM and CDC are gearing up to do this and may buy in at SLAC or Berkeley - (they are concentrating their strength on the West Coast).

Lets don't just talk and lose this advantage, Lets Act Now by establishing a plan and naming a product line manager. He should investigate the design and the market to get a two month head start on the competition. (He should be full time - and a hardware Engineer). We have many good friends (Pless, Rosenfeld, Taft, Plano) who we can go to for advice or consultation.

I strongly urge that we name the product line manager before December 2, 1964 and have him freed from all other ties to concentrate on this PEPR market.

I estimate that during calendar year 1965, we can book \$4,000,000 in this market and only hit the early users or pioneers. This is 10 systems! We estimate that in 3 years there will be 40 more.

Our exposure between December 2, 1964 and March 1965 is one man to evaluate and prepare a marketing plan. Or he may be just a PDP-6 salesman to PEPR if we do not proceed in this market except for bidding on the controller and the processor.

We still need an engineer (the same one) if we only go for the Controller. Lets let him recommend how far we go!

NOV 25 1964

H. Anderson

Subject: Alphabet Soup

Date: November 25, 1964

To: The World

From: Me

Since passing out the lists of PDP-6 documents, a nasty rumor has reached my ears. It has been said, "It is not immediately obvious what the left half of the page means." The clue to the whole thing is that - like a menu - you read it right to left. However, for those who would like to join in the magic number fun - behold!

If you will pardon our being conventional, we shall begin at the left. The first field is for the origin of the document, program, or whatever. We put the origin at the beginning, so to speak. So far, the only thing that appears there is the letters DEC (I'm confused about whether I should write DEC or 'DEC'. My impression is that Quine would say, "'DEC'", and Curry would say, "Don't be silly." Since the leitmotif of this memo is food, let's go with Curry.)

If we don't ignore spaces, a la assemblers, compilers, et al, we shall find that we leave the point of origin to arrive at the universe of discourse. If no specification is given, or if the specification is 00, we assume the universe of discourse to be everything, contrary to "nihil ex nihilo."

So far, the only universe of discourse is denoted 06, the connotation being PDP-6 (one might also refer to the universe of discourse as the system series - one might!).

Contrary to the laws of philosophical methodology, by which we come to know less and less about more and more, we proceed from here to know more and more about less and less as follows:

Field 3: Subsystem Series - 2 digits

00	Independent of subsystem
1	Decatpe time share
2	Drum time share
3	Disc

Field 4: Item Class - 4 characters

TP	Trans. Prog.
UP	Utility Prog.
L	Loader
FS	Funct/Subs.
AP	Arith. Prog.
M	Maindec
IO	Inout
OS	Oper. Sys.
SM	Sort Merge
MAT	Matrix Prog.
HDW	Hardware
SC	System Conv.
TECH	Techniques
DEMO	
EX	Executive

Field 5: Item Abbreviation/Code - 4 characters

MAC	Macro
FII	Fortran II
FIV	Fortran IV
AL	Algol
COB	Cobol
DDT	
EDIT	
RIM	Read-In-Mode
RB	Reloc. Bin.
LIB	Lib. File
PT	Paper Tape
PIR	Paper Tape Reader
PTP	Paper Tape Punch
CD	Card
GDR	Card Read
CDP	Card Punch
LPT	Line Print
TTY	Teletype
DT	Dectape
MT	Mag Tape
UT	Micro Tape
IO	IO Control
UJO	UJO Handler
CMD	Command
JOB	Job Control
COM	Common Subs

Field 6: Item Form - 4 characters

GM	General Manual
LM	Language Manual
UM	Users Manual
OM	Operators Manual
PM	Primer Manual
MM	Maintenance Manual

FD	Flow Diagram
TD	Time Diagram
SD	State Diagram
SYD	System Diagram
SAD	Storage Alloc. Diagram
STD	Format Diagram
IFD	Listing/Flow Diagram
IND	Index
L	Listing
GS	Gen. Spec.
PN	Prog. Note
CON	Conventions
ASCII	Ascii Format
RB	Reloc. Bin. Format
RIM	Read-In-Mode Format

Field 7: Item Physical Media - 2 characters

PT	Paper Tape
CD	Card
DT	Dectape
UT	Micro Tape
MT	Mag Tape
UF	Micro Film
A	"A" Drawings
B	"B" Drawings
C	"C" Drawings
D	"D" Drawings
IP	Informal Printing
FP	Formal Printing

Field 8: Status - 3 characters

PRP	Proposed
PRE	Prelim.
ACT	Active
APR	Approved
OBS	Obsolete
REQ	Required
INT	Internal

Field 9: Revision # - 2 digits

00,.....,99

Field 10: Comments, Name - 45 characters

Name extension

DEC 06 1	EX		FTD	PRE2	USER BUFFER AREA
DEC 06 1	EX		GS	PRE1	MONITOR SYSTEM SYMBOLS
DEC 06 1	EX		GS	PRE1	NAMING OF ACCUMULATORS + INDEX REGISTERS
DEC 06 1	EX		GS	PRE1	REFERENCING DATA IN CANONICALLY STRUCTURED BLO
DEC 06 1	FX		GS	PRE1	SYSTEM CONVENTIONS
DEC 06 1	EX		GS	PRE1	SYSTEM TAPE FILES
DEC 06 1	EX		GS	IP PRE1	MONITOR SUBROUTINE CONVENTIONS
DEC 06 1	EX		SAD	PRE5	JOB AREA
DEC 06 1	EX	CMD	UM	PRE1	SYSTEM COMMANDS
DEC 06 1	EX	COK	GM	PRE1	CLOCK QUEUE ROUTINE
DEC 06 1	EX	COM	FD	PRE1	CKS 12
DEC 06 1	FX	L	UM	PRE1	X6 LOADER CONTROL
DEC 06	FS	F2	GS	PRE1	BUILT IN FUNCTIONS
DEC 06	FS	F2	GS	PRE1	DOUBLE PRECISION AND COMPLEX FUNCTIONS
DEC 06	FS	F2	GS	PRE1	FORTRAN LIBRARY
DEC 06 2	HDW	DRUM	GS	IP PRE2	236 DRUM CONTROL AND 237 DRUMS
DEC 06 1	IO		FTD	PRE1	DEVICE DATA BLOCKS
DEC 06 1	IO		FTD	PRE1	IO STATUS WORD
DEC 06 1	IO		GS	PRE1	INTERRUPT SERVICE ROUTINE CONVENTIONS
DEC 06 1	IO		PN	IP PRE1	MONITOR IO SUBSYSTEM
DEC 06 1	IO		UM	PRE1	EXECUTIVE SYSTEM IO PART 1
DEC 06 1	IO		UM	PRE2	EXECUTIVE SYSTEM IO PART 1 ADD 1
DEC 06	IO		UM	FP PRE1	NON MONITOR VERSION OF IO SYSTEM
DEC 06	IO	CRD	FTD	PRE1	CARD FORMATS
DEC 06	IO	DT	FMT	PRE1	DECTAPE FORMAT
DEC 06 1	IO	DT	PN	PRE1	SUMMARY OF COMMAND STRUC FOR FILE MANIPULATION
+++++ 1	IO	DT	UM	PRE1	DECTAPE OPERATIONS
DEC 06 1	IO	MTDT	FTD	PRE1	FILE STRUCTURE ON DEC + MAG TAPES
DEC 06 1	IO	MTDT	UM	PRE1	DATA STRUCTURES + DUMP COMMANDS FOR MAG + DECT
DEC 06	IO	PT	FTD	PRE1	PAPER TAPE FORMAT
DEC 06	IO	PTCR	FTD	PRE1	BINARY FORMATS FOR BINARY TAPE AND CARDS
DEC 06 1	IO	TTY		PRE2	TELETYPE SERVICE
DEC 06	IO	TTY	FTD	PRE1	TELETYPE FORMATS
DEC 06	IO		UM	FP PRE1	INPUT OUTPUT SERVICE ROUTINES
DEC 06	L	DT	L	IP PRE1	DECTAPE LOADER CONSTRUCTOR
DEC 06	L	DT	LFD	IP PRE1	DECTAPE LOADER
DEC 06	L	DT	UM	IP PRE1	DECTAPE LOADER
DEC 06	L	PT	L	IP PRE1	RIM LOADER CONSTRUCTOR
DEC 06	L	PT	UM	IP PRE1	PAPER TAPE LOADER
DEC 06	L	RB	GS	IP PRE1	LINKING LOADER TAPE FORMAT
DEC 06	L	RB	OM	IP PRE1	LINKING LOADER
DEC 06	L	SHAD	L	IP PRE1	SHADOW MODE LOADER
DEC 06	L	SHAD	LFD	IP PRE1	SHADOW MODE LOADER
DEC 06	L	TMRC	GS	IP PRE2	LINKING LOADER
DEC 06	M	601	GM	FP PRE1	INSTRUCTION TEST
DEC 06	M	6011	L	FP PRE1	INSTRUCTION TEST
DEC 06	M	6011	RIM	PT PRE1	INSTRUCTION TEST
DEC 06	M	6011	ASCI	PT PRE1	INSTRUCTION TEST
DEC 06	M	6012	L	FP PRE1	INSTRUCTION TEST
DEC 06	M	6012	RIM	PT PRE1	INSTRUCTION TEST
DEC 06	M	6012	ASCI	PT PRE1	INSTRUCTION TEST
DEC 06	M	6013	L	FP PRE1	INSTRUCTION TEST
DEC 06	M	6013	RIM	PT PRE1	INSTRUCTION TEST
DEC 06	M	6013	ASCI	PT PRE1	INSTRUCTION TEST
DEC 06	M	6014	GM	FP PRE1	INSTRUCTION TEST
DEC 06	M	6014	L	FP PRE1	INSTRUCTION TEST
DEC 06	M	6014	RIM	PT PRE1	INSTRUCTION TEST
DEC 06	M	6014	ASCI	PT PRE1	INSTRUCTION TEST 4K
DEC 06	M	6014	ASCI	PT PRE1	INSTRUCTION TEST 8K
DEC 06	M	6014	ASCI	PT PRE1	INSTRUCTION TEST 16K

DEC 06	M	6015	GM	FP	PRE1	INSTRUCTION TEST	
DEC 06	M	6015	L	FP	PRE1	INSTRUCTION TEST	
DEC 06	M	6015	RIM	PT	PRE2	INSTRUCTION TEST	
DEC 06	M	602	GML	FP	PRE1	MICRO CHECKERBOARD	
DEC 06	M	602	RIM	PT	PRE1	MICRO CHECKERBOARD	
DEC 06	M	602	ASCI	PT	PRE1	MICRO CHECKERBOARD	
DEC 06	M	6032	GM	FP	PRE1	HIGH END ADDRESS TEST	
DEC 06	M	6032	L	FP	PRE1	HIGH END ADDRESS TEST	
DEC 06	←←←←←	6032	RIM	PT	PRE1	HIGH END ADDRESS TEST	
DEC 06	M	6032	ASCI	PT	PRE1	HIGH END ADDRESS TEST	
DEC 06	M	610	GM	FP	PRE1	READ BINARY TEST PROGRAM	
DEC 06	M	610	L	FP	PRE1	READ BINARY TEST PROGRAM	
DEC 06	M	610	RIM	PT	PRE1	READ BINARY TEST PROGRAM	
DEC 06	M	610	ASCI	PT	PRE1	READ BINARY TEST PROGRAM	
DEC 06	M	611	GM	FP	PRE1	READ ALPHANUMERIC TEST PROGRAM	
DEC 06	M	611	L	FP	PRE1	READ ALPHANUMERIC TEST PROGRAM	
DEC 06	M	611	RIM	PT	PRE1	READ ALPHANUMERIC TEST PROGRAM	
←←←←←	M	611	ASCI	PT	PRE1	READ ALPHANUMERIC TEST PROGRAM	
DEC 06	M	612	GM	FP	PRE1	PUNCH TEST	
DEC 06	M	612	RIM	PT	PRE1	PUNCH TEST	
DEC 06	M	612	ASCI	PT	PRE1	PUNCH TEST	
DEC 06	M	613	GM	FP	PRE1	CORE DATA TEST	
DEC 06	M	613	RIM	PT	PRE1	CORE DATA TEST	
DEC 06	M	613	ASCI	PT	PRE1	CORE DATA TEST	
DEC 06	M	614	GM	FP	PRE1	TELEPRINTER TEST	
DEC 06	M	614	L	FP	PRE1	TELEPRINTER TEST	
DEC 06	M	614	RIM	PT	PRE1	TELEPRINTER TEST	
DEC 06	M	614	ASCI	PT	PRE1	TELEPRINTER TEST	
DEC 06	M	622	UM	FP	PRE1	LOW END MEMORY CHECKERBOARD	4 X 4K
DEC 06	M	622	L	FP	PRE1	LOW END MEMORY CHECKERBOARD	4 X 4K
DEC 06	M	622	RIM	PT	PRE1	LOW END MEMORY CHECKERBOARD	4 X 4K
DEC 06	M	622	ASCI	PT	PRE1	LOW END MEMORY CHECKERBOARD	4 X 4K
DEC 06	M	6221	UM	FP	PRE1	HIGH END MEMORY CHECKERBOARD	4 X 4K
DEC 06	M	6221	RIM	PT	PRE1	HIGH END MEMORY CHECKERBOARD	4 X 4K
DEC 06	M	6221	ASCI	PT	PRE1	HIGH END MEMORY CHECKERBOARD	4 X 4K
DEC 06	M	6222	UM	FP	PRE1	MEMORY CHECKERBOARD	16 X 16 K
DEC 06	M	6222	RIM	PT	PRE1	MEMORY CHECKERBOARD	16 X 16K
DEC 06	M	6222	ASCI	PT	PRE1	MEMORY CHECKERBOARD	16 X 16K
DEC 06	M	623	GM	FP	PRE1	PROTECT AND RELOCATE TEST	
DEC 06	M	6231	L	FP	PRE1	PROTECT AND RELOCATE TEST	
DEC 06	M	6232	L	FP	PRE1	PROTECT AND RELOCATE TEST	
DEC 06	M	6231	RIM	PT	PRE1	PROTECT AND RELOCATE TEST	
DEC 06	M	6232	RIM	PT	PRE1	PROTECT AND RELOCATE TEST	
DEC 06	M	6231	ASCI	PT	PRE1	PROTECT AND RELOCATE TEST	
DEC 06	M	6232	ASCI	PT	PRE1	PROTECT AND RELOCATE TEST	
DEC 06	M	6342	UM	FP	PRE1	LOTSAS LITUL PICHAS ONNA SIX	
DEC 06	M	6342	L	FP	PRE1	LOTSAS LITUL PICHAS ONNA SIX	
DEC 06	M	6342	RIM	PT	PRE1	LOTSAS LITUL PICHAS ONNA SIX	
DEC 06	M	6342	ASCI	PT	PRE1	LOTSAS LITUL PICHAS ONNA SIX	
DEC 06	M	641	GM	FP	PRE1	CARD READER TEST PROGRAM	
DEC 06	M	641	L	FP	PRE1	CARD READER TEST PROGRAM	
DEC 06	M	641	RIM	PT	PRE1	CARD READER TEST PROGRAM	
DEC 06	M	641	ASCI	PT	PRE1	CARD READER TEST PROGRAM	
DEC 06	M	662	UM	FP	PRE1	AC TEST PROGRAM	
DEC 06	M	662	L	FP	PRE1	AC TEST PROGRAM	
DEC 06	M	662	RIM	PT	PRE1	AC TEST PROGRAM	
DEC 06	M	662	ASCI	PT	PRE1	AC TEST PROGRAM	
DEC 06	M	664	UM	FP	PRE1	LINE PRINTER DIAGNOSTICS	
DEC 06	←←←←←	664	L	FP	PRE1	LINE PRINTER DIAGNOSTICS	
DEC 06	M	664	RIM	PT	PRE2	LINE PRINTER DIAGNOSTIC	

DEC 06	M	664	ASCI	PT	PRE1	LINE PRINTER DIAGNOSTIC	
DEC 06	MAT	ATRA	UM	IP	PRE1	PREMULTIPLY A MATRIX	
DEC 06	OS	F2	DS		PRE1	BUFFER AREA HEADERS	
DEC 06	OS	F2	DS		PRE2	CODING GENERATED BY IO STATEMENTS	
DEC 06	OS	F2	GS		PRE1	FORTRAN SUBROUTINE LINKAGES	
DEC 06	OS	F2	GS		PRE1	IO CONVERSION	
DEC 06	1	SC		GS	PRE1	ORGAN OF SYSTEM FOR DISTRIBUTION	
DEC 06	1	SC		SYD	PRE1	SYSTEM DIAGRAM	
DEC 06		SM		UM	PRE1	SHELL SORT	
DEC 06		TECH		PN	APR1	COUNT ONES	
DEC 06		TECH		PN	APR1	FIX A FLOATING NUMBER	
DEC 06		TECH		PN	APR1	PARITY CHECKING	
DEC 06		TP	F2	GS	PRE3	FOL ASSEMBLER	
DEC 06		TP	F2	LM	FP	PRE1	PDP6 FORTRAN II LANGUAGE
DEC 06		TP	F2	OM	IP	PRE1	FORTRAN OPERATIONS
DEC 06		TP	MAC	GS		PRE1	IO ROUTINE FOR PTR, PTP, LTP
DEC 06		TP	MAC	GS		PRE1	SUBROUTINE LE
DEC 06		TP	MAC	OM	FP	APR2	MACRO6 OPERATION
DEC 06		TP	MAC	PN		APR1	CORRECTION TO MACRO6 LANGUAGE MANUAL
DEC 06		TP	MAC	PN		PRE1	MACRO PROCESSOR STATUS
DEC 06		TP	MAC	PN		PRE1	STATUS OF MACRO INSTRUCTIONS
DEC 06		TP	MAC	SAD		PRE1	STORAGE MAP
DEC 06		TP	SC	SS	IP	PRE1	SYNTAX COMPILER
DEC 06		TP	SC	UM	IP	PRE1	WRITING SYNTAX RULES
DEC 06		UP		ASCIPT		PRE1	ASCIAD
DEC 06		UP		L		PRE1	ASCIAD
+++++		UP		UM		PRE1	CARD LISTER
DEC 06		UP		RIM	PT	PRE1	CARD LISTER
DEC 06		UP		UM	FP	PRE1	DECDUMP
DEC 06		UP		RIM	PT	APR1	DECDUMP
DEC 06		UP		ASCI	PT	APR1	DECDUMP
DEC 06		UP		UM		PRE1	CORE DUMP
DEC 06		UP		RIM	PT	PRE1	CORE DUMP
DEC 06		UP		UM		PRE1	TAPE LISTER
DEC 06		UP		RIM	PT	PRE1	TAPE LISTER
DEC 06		UP	DDT	FTD		PRE1	DDT6 LOADER
DEC 06		UP	DDT	UM	FP	PRE1	DDT6 MANUAL
DEC 06	1	UP	EDIT	PN	IP	PRE1	DECTAPE EDITOR STATUS
DEC 06		UP		RIM	PT	APR1	PAPER TAPE DUPLICATOR

+++++

H. Anderson



INTEROFFICE
MEMORANDUM

DATE November 25, 1964

SUBJECT

TO Computer Guidance Committee

FROM R. E. Savell

cc. J. Mc Kalip

Recently we quoted a parity option for Adams for the 2 microsecond memory. In the latest issue of the Sales Newsletter Bob Lane has explained to all our sales people what this parity option does and also the price. The implication to me of publishing this information in the Sales Newsletter is that we have a parity option that we are willing to sell to anyone. To the best of my knowledge this is not the case however, as we do not believe that parity is really necessary. We agreed to do this for Adams only as one of the necessary things that one must occasionally do in order to get an order.

I think that our position on this item should be clarified immediately.



INTEROFFICE MEMORANDUM

DATE 11/25/66

SUBJECT

FDP-6 Presentation for NASA of Huntsville

TO

Bob Lane

FROM

Don Henderson

In reference to our conversation at the sales meeting I would appreciate an answer from you on the following:

1. When will be the most opportune time during December for you to come to Huntsville?
2. Can you spare one or two days? If one, I would like to have a presentation for the Computation Lab and the Quality Division. If two, would like to have a presentation for Comp, Quality, Test, and Astrionics.
3. Would like for the Presentation to be oriented toward Directors of Labs and Deputy Directors. Approximately 70%--80% Computation and 20% technical. The other 10% at your discretion.

I have asked Harland Anderson if he would come down and he said, yes. Would also like to have Stan, Ted, and Nick.

Believe we need one extremely powerful presentation, then I can sell the big one for you.

Please advise.

DH:sj

cc: Harland Anderson
Stan Olsen
Ted Johnson
Nick Manzerese
Gordon Bell



INTEROFFICE MEMORANDUM

DATE November 26, 1964

SUBJECT

TO H. Anderson ← FROM D. J. Doyle
R. Lane
R. Handy
T. Johnson

Following our visit to the University of Manitoba the other day, I have had a chance to talk to someone who is quite closely related to the situation, and the following background seems to unfold:

1. All such grants to the Canadian universities are supplied by the Federal Government and funnelled through the National Research Council.
2. The money pie is being split in essentially five large pieces over the next few years. This is a reversal of the previous habit of concentrating on Ontario and Quebec and leaving both East and West poor. The Eastern and Western Universities (Western particularly) have had trouble attracting good people for this reason and are solving the problem by getting expert lobbyists on their staff. Example -- Dr. Katz at University of Saskatchewan.
3. Here is what is supposed to be in the wind:
 - a) University of Alberta, Edmonton -- geophysics facilities--with computerized remote stations and even their own aircraft. We should be talking PDP-8, and have been. They have a 7040.
 - b) University of Saskatchewan, Saskatoon -- nuclear physics--they have a cyclotron but no computer as of yet. Dr. Katz is a good businessman and very difficult to judge. He is not influenced by the Chalk River installations. We have talked to him many times about the PDP-1 and PDP-6.
 - c) University of Manitoba, Winnipeg -- a large computing center -- they will get a lot more than the \$800,000 which Dr. Hodson spoke about. Dr. Hodson seems to be the lobbyist here. We should impress him with a show of strength -- give a good shiny proposal, drop as many names as possible, and advise him of other installations.



INTEROFFICE MEMORANDUM

DATE November 26, 1964

SUBJECT

TO

H. Anderson
R. Lane
R. Handy
T. Johnson
(Cont'd)

FROM D. J. Doyle

- d) University of Toronto -- expansion of their 7094 and a linear accelerator in the Physics Department. They have been taking a back seat to McMaster University in Hamilton, which is about to be cut off for a few years.
- e) University of Montreal -- they have been given the Chalk River Van de Graffe and will be getting something like a PDP-7 from us. Their math department has already ordered a \$1.4 million CDC system (3100 and 3400). I think we are in Dr. Levesque's goodbooks. He will be using the Van de Graffe and is relying heavily on Chalk River advice.

The above information is based on discussions with AECL, NRC and finally with a senior scientist who is evaluating the various universities and has selected the University of Manitoba to go to. I would like everyone to have this broad picture in mind in evaluating requests.

Denny



INTEROFFICE MEMORANDUM

DATE November 30, 1964

SUBJECT PLASTIC HANDLES FOR FLIP CHIP MODULES

TO Dick Best
Module Guidance Committee

FROM Loren Prentice

Material we are now using is Cyclac T which is an ABS Polymer and its working temperature is rated from 192° to 220°F. Transcribing these to degrees centigrade would be 90° to 100°C. Higher temperature materials would be Polycarbonate unfilled trade name Lexon. Its working temperature is 250°F 125°C.

The cost of item #1 in lots of 25,000 is \$21.50/M and the cost of item #2 in lots of 25,000 would be \$43.00/M.

In order to use the second mentioned material, the mold must be modified. The tooling charge for this would be \$800.00 and the time would be four weeks.

We have also talked with our supplier; Kirk Molding about supplying these units in Polypropylene and he agreed to make a few of these for encapsulation for show purposes but stated it was impractical to mold these on a regular basis. These are also higher temperature than the Lexon and moreover, will stand the molding pressures necessary for encapsulation. The hot stamping operation for numbering as far as we know, could be accomplished with Lexon, however the operation might take somewhat longer. There is a dwell time involved in operating hot stamping machines. In our best judgement at this time, this time would have to be increased.



INTEROFFICE MEMORANDUM

*Follow up
on Dec. 20*

DATE 27 November 63

SUBJECT Prints for BBN's PDP-1

TO Harlan Anderson

FROM Bob Beckman

At the time we did the overhaul on BBN's machine over a year ago, the first step was to try and bring the prints up to date. Paul Gadaire and another man spent over two weeks bringing copies of the prints that were then available up to date on the basis of what was actually in the machine. These marked up prints were then used during the overhaul and were to be turned over to Drafting when that job was finished so that corrected prints could be produced. Right in the middle of the overhaul someone at BBN did away with these prints.

Since that time we have supplied several sets of what we have in the way of prints (which are admittedly not up to date) and it was my understanding that the people at BBN would, over a period of time, redo the job of bringing them up to date on the basis of the actual equipment. Our Drafting Department could then bring all the prints for the system up to date. We have been careful to maintain accurate documentation of the things that have been added since that time.

We could redo the job again ourselves, but it would be an expensive, time consuming process. Under the circumstances, however, if BBN wants us to do the job I think we should charge for it at our regular per call service rates.

BBN has never had any trouble getting copies of what we do have available. Except for the initial discussion at the time the marked-up prints disappeared, I have never been approached by them to do this job. In fact, this was one of the first things that Dave Bjorkgren was supposed to do when he went to work for BBN.

All of the preceding was in the way of background. I'll see that we get in touch with the people at BBN on this and see what we can do to help the situation.

H. Anderson

11/30/64

On the following list please check the equipment names for which you are responsible. If you wish to change any name, please consult Dick Best or Arthur Hall.

An "N" in the margin preceding an option number denotes that the entry has been changed in some way from the previous list or is new.

Arthur Hall
November 30, 1964

OPTION NUMBER LIST

Distribution

R. Best	R. Beckman	J. Atwood	R. Dill
D. White	J. Shields	S. Grover	R. Mills
J. McKalip	P. Godaire	G. Karr	E. Simeone
J. Hastings	S. Mikulski	A. Stephens	F. MacLean
R. Reed	A. Michaud	J. Nangle	J. Myers
R. Sorenson	J. Rutchman	J. Lozouski	
D. Vonada	K. Senior	G. Loynd	R. Melanson
J. Sullivan		R. Buyer	E. Hunt
G. Bell	N. Mazzaresse	P. Barber	N. Perryman
A. Hall	R. Lane	D. Watson	S. Pruitt
A. Kotok	J. Fadiman	R. Wooldridge	G. Graham
W. Colburn	D. Smith	L. Marshall	A. Yurkstas
J. Godbout	J. Jones	J. O'Leary	
D. Adams	A. Titcomb		M. Sandler
S. Lambert	E. DeCastro	R. Tringale	J. Smith
R. Savell	G. Moore	L. White	D. Kicilinski
R. Boisvert	T. Whalen	W. Long	
D. Chin	10 to T. Johnson	R. Wilson	R. Hughes
D. Packer	L. Prentice	K. Olsen	E. Harwood
	S. Miller	H. Anderson	

The numbers on the list attached are those assigned to options for all DEC computers and computer peripheral equipment. This list is the primary source for Option numbers and names. All other information on the list is unofficial and for informal reference only. An attempt is made to make the secondary information as accurate as possible, however, other sources (Sales, Technical Publications, etc.) must be consulted for authoritative information. Suggestions for improvements or corrections to this list will be most welcome. Listing here is no assurance that the equipment is or will become available.

Persons requiring numbers for new options should consult Dick Best or Arthur Hall. It should be kept in mind, however, that this is just a listing of numbers and that:

The person receiving the number is responsible for: notifying Technical Publications if the number is to be included in a manual; establishing a once-and-for-all official name for the option; telling Drafting whether or not they must change existing drawings, etc.

When deciding how equipment is to be divided for purposes of option numbering, thought should be given to how this division will affect renegotiation.

The first digit of the option number indicates the broad category into which it falls.

<u>First Digit of #</u>	<u>Option Category</u>
1	Primarily Logic
2	Drums and Disk Files
3	Displays and Plotters
4	Paper Tape & Card Handling Equip.
5	Magnetic Tape Equipment
6	Printers and Typewriters
(7)	(Older Paper Tape Equip.) (No further numbers assigned)

Numbers for multipurpose equipment, which does not naturally fall into a particular category, will be assigned depending upon the primary purpose of the equipment.

No more 2-digit numbers will be assigned.

When two similar options differ only by the number of plug-in units installed (as for example the #170 16K Memory Module) or by the equipment with which it works (such as the #421 Card Reader & Control), the same option number is used, followed by letters to denote the difference. Exceptions to this (such as #30 Displays) have numbers which were assigned prior to the new system.

The initials given beside the option number indicate who can supply further information on the equipment or can direct you to those who know.

Some equipment listed is no longer sold but, in many cases, is still extant in the field. Some options have become part of some other equipment.

The parts of the descriptions which are in parentheses are explanatory only and are not part of the equipment name.

Glossary of Initials

AH all
AK otok
AM ichaud
AT itcomb
BS avell
DA adams
DC hin
DS mith
DV onada
ED eCastro
EH arwood
GB ell
GM oore
GR ice
JF adiman
JG odbout

JJ ones
JM cKalip
JS ullivan
KS enior
LW hite
RB oisvert
RL ane
RS orenson
RR eed
RT ringale
RWilson
SL ambert
SM ikulski
WC olburn
WL ong

N = CHANGED OR ADDED THIS EDITION

PRIMARILY LOGIC OPTIONS

Option #	For use with PDP or OPT.#		Description
10	1	EH	Automatic Multiply & Divide
11			Do not use
12	1	JM	Magnetic Core Memory Module
12A	1	GM	Special (Time Sharing) Memory
13	1	GM	Special (Time Sharing) Memory Switch
14			Do not use
15	1	EH	Core Memory Extension Control
15A	1	GM	Memory Extension Control for Special (Time Sharing) Memory
16	4	AH	Core Memory Extension Control
17	4	JM	Magnetic Core Memory Module (4K for 4B only)
18	4	AK	Extended Arithmetic Element
19	1	EH	High Speed Channel Control
100			
↓			Do not use
119			
120	1	EH	Multiple Channel Sequence Break System
121A	1	GM	Core Memory Control (to allow control by 1 processor)
121B	1	GM	Core Memory Control (to allow control by 2 processor)
121C	1	GM	Core Memory Control (to allow control by 3 processor)
121D	1	GM	Core Memory Control (to allow control by 4 processor)
123	1	EH	High Speed Data Channel
125	4	AH	Real Time Option (Now part of standard PDP-4)
126	4	AH	Real Time Option (Foxboro)
127	4	AH	Device Selector Extension
128	4	AH	Information Collector Extension
129	5	ED	Data Channel Multiplexer
130			Do not use
131	1	RB	Data Control
131D	1	RW	Data Control (Special for Stanford)
131M	1	RW	Data Control (Special for Stanford)
132	4	GB	Clock Multiplexer
133	4	WC	Data Interrupt Multiplexer
134	4	JM	Core Memory Module (Expansion of 4K to 8K PDP-4C)
135	4	JM	Core Memory Module (8K PDP-4C)
N 136	6	RR	Data Control
137	5	RS	Analog-to-Digital Converter (11-bit)
N 138A	-	RS	General Purpose Analog-to-Digital Converter
N 138B	-	RS	A #138 with 11 bits, 45 μsec, fixed word length
N 138C	-	RS	A #138 with 11 bits, 45 μsec, fixed word length
N 138D	-	RS	A #138B which connects to PDP-5/8

Option#	For use with PDP or OPT.#		Description
N 139A	-	RS	General Purpose Multiplexer Control (up to 64 chan.)
139B	-	RS	General Purpose Multiplexer Control (16 channel)
N 139D	-	RS	A #139 which connects to 2 PDP-5/8
140	1	EH	Relay Buffer
141	142	RS	High Speed Multiplexer Control
142	1,4	RS	High Speed Analog-to-Digital Converter (10-bit)
142B		RS	High Speed Analog-to-Digital Converter (8 bit)
143	4	GR	16-channel Priority Interrupt
144		RS	Analog-to-Digital Converter (15-bit)
145	138	RS	Input Multiplexer (2-Channel)
146	4	AH	Parity Checking Option
147	7	DC	First Additional 4K Memory
148	7	RW	Memory Extension Control
N 149A	7	DC	Core Memory Module (4K)
150	4	GB	Signal Interface for IBM 7090
151	5	AH	Real Time Option & Clock (Foxboro)
152	1	EH	Real Time Clock (18-bit)
153	5	ED	Automatic Multiply & Divide
154	5	ED	Memory Extension Control (can accommodate up to 7 4K memories)
155	5	ED	Core Memory Module (4K)
157	5	RB	Interface for 57A
158	1	SL	IOT Selection for 57A
160	-	JJ	Nuclear Analog-to-Digital Converter
161A	6	JM	Core Memory (4K) (5 μ sec)
161B	6	JM	Core Memory (8K) (5 μ sec)
161C	6	JM	Core Memory Module (12K) (5 μ sec)
161D	6	JM	Core Memory Module (16K) (5 μ sec)
162	6	WC	Flip-Flop Memory
163C	6	JM	Core Memory (16K) (2 μ sec)
166	6	AK	Arithmetic Processor
167	6	GB	Drum Processor
N 168	6	GB	Arithmetic Processor (Flip Chip)
170A	1	JM	Core Memory Module (16K-4K configuration)
170B	1	JM	Core Memory Module (16K-8K configuration)
170C	1	JM	Core Memory Module (16K-12K configuration)
170D	1	JM	Core Memory Module (16K-16K configuration)
171	1	JM	Core Memory Extension Control (for #170 Memory)
172	7	RW	Automatic Priority Interrupt
173	7	RW	Data Interrupt Multiplexer
174	7	RW	Data Control
N 176	7	RW	Parity Checking
177	7	RW	Extended Arithmetic Element

Option#	For use with PDP or OPT.#		Description
179	6	JM	Core Memory (8K) (6 μ sec) (Rutgers) (Residual Inventory)
N 180A	-	RS	Digital to Analog Converter (12 bit)
N 180B	-	RS	Digital to Analog Converter (13 bit)
N 180C	-	RS	Digital to Analog Converter (14 bit)
N 181A	180	RS	Operational Amplifier (1751 Module)
N 182	8	ED	Extended Arithmetic Elements
N 183	8	ED	Memory Extension Control
N 184A	8	ED	Memory Module (12 bits)
N 184B	8	ED	Memory Module (13 bits)
N 185	1-6	BS	PDP-1/PDP-6 Interface Control
N 186	7090-6	BS	7090/PDP-6 Interface Control
N 187	6	RL	Additional Memory Interface Module
N 188	8	ED	Parity Option
N 189	8	ED	Analog-to-Digital Converter (12 bit)

DRUMS AND DISC FILES

Option#	For use with PDP or OPT. #		Description
20			
↓			Do not use
22			
23	1	RT	Parallel Drum (BBN System)
24A	4	RT	Serial Drum (32,768 words)
24B	4	RT	Serial Drum (65,536 words)
24C	4	RT	Serial Drum (131,072 words)
24D		RT	Drum for Display (AECL)
24E	4,5	RT	Serial Drum (32K Word Flying Head)
24F	4,5	RT	Serial Drum (65K Word Flying Head)
24G	4,5	RT	Serial Drum (131K Word Flying Head)
25			
↓			Do not use
29			
200			
↓			Do not use
219			
236	167	RT	Drum Control (Controls up to 4 Drums)
237	236	RT	Drum Memory
250A	5	RT	Serial Magnetic Drum System (8,192 words) (12 bit)
250B	5	RT	Serial Magnetic Drum System (16,384 words) (12 bit)
250C	5	RT	Serial Magnetic Drum System (32,768 words) (12 bit)
250D	5	RT	Serial Magnetic Drum System (65,536 words) (12 bit)
250E	5	RT	Serial Magnetic Drum System (131,072 words) (12 bit)
250F	5	RT	Serial Magnetic Drum System (196,608 words) (12 bit)
250G	5	RT	Serial Magnetic Drum System (262,144 words) (12 bit)
251	250	RT	Sector Option for #250 (Divides each track into 2 individually addressable sectors)
N 270	6	SL	Disc File Control

DISPLAYS AND PLOTTERS

Option#	For use with PDP or OPT.#		Description
30	1,4	LW	Precision (16 inch) CRT Display
30N	5	LW	Precision (16 inch) CRT Display
31	1	DC	Ultra-Precision CRT Display
31A	1	DC	Ultra-Precision CRT Display
31B	1	DC	Ultra-Precision CRT Display
32	1,4	DC	Light Pen
33	1,4	LW	Symbol Generator
34A	4	JS	Oscilloscope Display (w/o Tektronix Scope #503)
34B	5	JS	Oscilloscope Display (w/o Tektronix Scope #503)
34C	1	JS	Oscilloscope Display (w/o Tektronix Scope #503)
35			
↓			Do not use
39			
300			
↓			Do not use
319			
330		JS	Incremental Display (MIT)
336		WL	Electrostatic Display
340	1,4	WL	Precision Incremental CRT Display
341	1,4	WL	Direct Data Channel (Simple version of Type 131)
342		AT	Character Generator
343	340	WL	Monitor Display (for remote slave operation)
344	340	WL	Display Interface (to use 340 with PDP-6)
N 346	6	WL	Incremental CRT Display (340 + 342 + 344 + 370)
347	340	WL	Subroutine Option
N 348	6,30	RL	PDP-6 IO Interface to #30 CRT Display
350	5	ED	Incremental Plotter & Control
DELETE 351			
DELETE 352			
			<u>Digital Plotters</u>
N 354	4	AM	Incremental Plotter & Control
N 356	6	RL	Incremental Plotter & IO Bus Interface
360	30	LW	Display Buffer (operated by CDC-160)
361	30	LW	Display Buffer (operated by IBM 7090)
362			
363			
364			
			Display Buffers for non-DEC computers
370		DC	Photomultiplier Light Pen
371		DC	Portable Display Tester
372	30,340	DC	Camera Mount
373	30	DC	Slave Display
N 390	6	KS	Memory Cycle Counter

PAPER TAPE & CARD HANDLING EQUIPMENT

Option#	For use with PDP or OPT.#		Description
40	1,4	JS	Card Punch Control
41			
↓			Do not use
49			
400			
↓			Do not use
419			
421A	1,4	JS	Card Reader (200 cpm)
421B	1,4	JS	Card Reader (800 cpm)
425	444,750	JS	Perforated Tape Reader (Digitronics 2500)
426	444	JS	Perforated Tape Reader (Digitronics 3500)
427	75,761	JS	Perforated Tape Punch (Teletype BRPE11)
435	5	ED	Perforated Tape Spooler (for #2500 Digitronics Reader)
436	5	ED	Perforated Tape Spooler (for Teletype Punch)
437	1	JS	Perforated Tape Reader & Spooler
444A	4	AH	Perforated Tape Reader & Control
444B	7	RW	Perforated Tape Reader & Control
444C	1	EH	Perforated Tape Reader & Control
450	5	JS	Card Punch Control (100 cpm) (IBM)
451A	5	JS	Card Reader (200 cpm) (Burroughs)
451B	5	JS	Card Reader (800 cpm) (Burroughs)
460A	6	JS	Card Punch (100 cpm) (Burroughs)
460B	6	JS	Card Punch (300 cpm) (Burroughs)
461A	6	JS	Card Reader (200 cpm) (Burroughs)
461B	6	JS	Card Reader (800 cpm) (Burroughs)

MAGNETIC TAPE HANDLING EQUIPMENT

Option#	For use with PDP or OPT.#		Description
50	1,4	RB	Magnetic Tape Transport
51	1	RB	Programmed Magnetic Tape Control
52	1	RB	Automatic Magnetic Tape Control
53			Do not use
54	4	RB	Programmed Magnetic Tape Control
55			Do not use
56			Do not use
57	4	RB	Automatic Magnetic Tape Control
57A	4,5	SL	Automatic Magnetic Tape Control
58			Do not use
59			Do not use
500			
↓			Do not use
509			
510	1	RB	Automatic Magnetic Tape Control
515	5	JG	Magnetic Tape Control
516	6	SL	Magnetic Tape Control
520	4	RB	Magnetic Tape Control Interface (for Potter Transport)
521	4	SL	Magnetic Tape Control Interface (for #570)
522	4	SL	Magnetic Tape Control Interface (for IBM Transport)
530	570 or IBM 729	SL	Magnetic Tape Transport Simulator
531	530	SL	Interface for #530 to PDP-1
534	530	SL	Interface for #530 to PDP-4 or PDP-7
535	530	SL	Interface for #530 to PDP-5
536	530	SL	Interface for #530 to PDP-6
N 545		JG	Magnetic Tape Transport (MT-24)
550		DV	DECtape Control (word transfer)
551	6	RR	DECtape Control (Block Transfer)
552	5	ED	DECtape Control (Block Transfer)
N 553	1,4	DV	DECtape Control (Block Transfer)
555	550,551, 552	DV	DECtape Dual Transport (Rack Mount)
555B	550, 551, 552		DECtape Dual Transport (Dest Mount)
570		RB	Magnetic Tape Transport (MW)
575			(Save this # for Roland Boisvert)
N 580	5	JG	Magnetic Tape Transport (#545) & Control

PRINTERS AND TYPEWRITERS

Option#	For use with PDP or OPT.#		Description
60			Do not use
61			Do not use
62	1,4	LW	Automatic Line Printer (600 or 900 lpm)
63			Do not use
64			Do not use
65	4	JS	Printer-Keyboard & Control
66			
↓			Do not use
69			
600			
↓			Do not use
609			
610	1	EH	Alphanumeric Typewriter & Control
611	1	EH	Alphanumeric Typewriter (Spare)
612	1	EH	Teleprinter (Spare KSR28)
626	6	JS	Printer-Keyboard & Control
630		DS	Data Communication System
631	630	DS	Data Line Interface
631A	630	DS	Data Line Interface (60 ma., 120v line)
632	630	DS	Send-Receive Group (See literature for variations on this #)
633	630	DS	Flag Scanner (See literature for variations on this #)
634	630	DS	Basic Control (See literature for variations on this #)
635	630	DS	DCS Options (See literature for variations on this #)
635D			Teleprinter (Type ASR 33)
635E			Teleprinter (Type 33 KSR)
636 } 639 }			Save for D. Smith (Data Communication System)
642A		DA	Teleprinter (Type 35 KSR DEC modified)
642K		DA	Teleprinter (Type 35 ASR DEC modified)
644A	1,4	LW	Automatic Line Printer (300 lpm)
645A	5	LW	Automatic Line Printer (300 lpm)
646A	6	LW	Automatic Line Printer (300 lpm)
646B	6	LW	Automatic Line Printer (600 lpm)
646C	6	LW	Automatic Line Printer (1000 lpm)
647A	7	RW	Automatic Line Printer (300 lpm)
647B	7	RW	Automatic Line Printer (600 lpm)
647C	7	RW	Automatic Line Printer (1000 lpm)
648	5	ED	Teleprinter (ASR33) & Control
649	7	RW	Teleprinter (KSR33) & Control
650			
↓			Do not use
679			

Option#	For use with PDP or OPT. #		Description
680		JF	Line Control Interface
681		JF	Input Level Converter (32 lines)
682		JF	Output Level Converter (32 lines)
683		JF	Line Control (32 x 32 lines)
685	5	JF	Input-Output Multiplexer
686	6	AK	TWX Interface

PAPER TAPE HANDLING EQUIPMENT

No further numbers are available in this series.

Option#	For use with PDP or OPT. #		Description
75A	5	JS	Perforated Tape Punch & Control
75B	4	JS	Perforated Tape Punch & Control
75C	1	EH	Perforated Tape Punch & Control
75D	7	RW	Perforated Tape Punch & Control
76	4	JS	On-Line, Off-Line Flexo Writer & Control
750A	5	JS	Perforated Tape Reader (300 cps)
750B	5	AH	Portable High Speed Perforated Tape Reader & Control
760	6	JS	Perforated Tape Reader
761	6	JS	Perforated Tape Punch