

J. Smith
October 31, 1966

This report includes only those items that could be billed. Next month's report will be expanded to include all completions; such as deliveries to Special Systems, field offices, shows, capital equipment, etc.

Distribution:

✓ K. Olsen
A. Alexanian
R. Dill
M. Ford
P. Kaufmann
H. Mann
N. Mazzaresse
J. Myers
J. Jones

SUMMARY BY PRODUCT LINES

PDP-8

Total Domestic \$ 476,279

Total Foreign 255,132

P.L. TOTAL \$ 731,411

PDP-7-9

Total Domestic \$ 258,500

Total Foreign 147,788

P.L. TOTAL \$ 406,288

SMALL COMPUTER P.L. TOTAL \$1,137,699

SMALL COMPUTER MONTHLY ACTIVITY

Month Ending: October 29, 1966

Scheduled and Shipped

| PDP-8 | Standard Line | | Special Line | |
|------------------------------|---------------|----------|--------------|----------|
| | Domestic | Foreign | Domestic | Foreign |
| EC 18116, DEC, U.K. | | \$17,312 | | |
| EC 17468, CIT | \$18,720 | | | |
| EC 12636, Teradyne | 15,656 | | | |
| EC 17457, No. Amer. Avia | 24,000 | | | |
| EC 17969, Royal Infirmary | | 18,000 | | |
| EC 18329, Warren | 30,000 | | | |
| EC 16296, AEG | | 17,000 | | |
| EC 14005, German Cancer | | | | \$32,000 |
| EC 18055, Columbia | 20,800 | | | |
| EC 18065, Oxford Univ. | | 14,440 | | |
| EC 18141, Harwell | | 18,000 | | |
| EC 18142, Harwell | | 20,500 | | |
| EC 12637, Teradyne | 15,656 | | | |
| EC 16743, E.G. and G. | 32,000 | | | |
| EC 17968, Mullard | | 14,440 | | |
| EC 17486, Western Reserve | 24,500 | | | |

SMALL COMPUTER MONTHLY ACTIVITY

Month Ending: October 29, 1966

Scheduled and Shipped

| PDP-8 | Standard Line | | Special Line | |
|-----------------------------|------------------|------------------|-----------------|-----------------|
| | Domestic | Foreign | Domestic | Foreign |
| DEC 16788, Nottingham | | \$20,000 | | |
| DEC 18103, B.B. and N. | \$17,000 | | | |
| DEC 16921, AIL | | 14,440 | | |
| DEC 15558, Dow Jones | 15,000 | | | |
| DEC 15559, Dow Jones | 15,000 | | | |
| DEC 18315, Palo Alto | --- | | | |
| DEC 18533, Brooklyn Meth | 18,000 | | | |
| DEC 16230, Ferrante | | 29,000 | | |
| DEC 17424, B.B. and N. | | | \$32,000 | |
| DEC 16767, Carleton Univ | | 16,000 | | |
| DEC 17452, Toronto | | 17,000 | | |
| DEC 13750, UC | 19,000 | | | |
| DEC 18051, N.C. State U. | 18,000 | | | |
| TOTAL BY CLASS | <u>\$283,332</u> | <u>\$216,132</u> | <u>\$32,000</u> | <u>\$32,000</u> |
| TOTAL BY LINE | | <u>\$499,464</u> | | <u>\$64,000</u> |
| TOTAL SHIPMENTS | | <u>\$563,464</u> | | |

SMALL COMPUTER MONTHLY ACTIVITY

Month Ending: October 29, 1966

Scheduled and Shipped

| PDP-8 OPTIONS | Standard Line | | Special Line | |
|------------------------------|---------------|---------|--------------|---------|
| | Domestic | Foreign | Domestic | Foreign |
| EC 18199, Stanford | --- | | | |
| EC 17924, Brookhaven | \$ 4,000 | | | |
| EC 17404, Brookhaven | 3,500 | | | |
| EC 15573, NBS | 2,000 | | | |
| EC 17455, Raytheon | 23,400 | | | |
| EC 15009, U. of Calif. | | | \$10,000 | |
| EC 15035, Foxboro | 4,000 | | | |
| EC 15036, Foxboro | 4,000 | | | |
| EC 15807, U. of Minnesota | 13,000 | | | |
| EC 12013, Foxboro | 2,500 | | | |
| EC 13738, Lear Siegler | 5,047 | | | |
| EC 15041, Foxboro | 2,500 | | | |
| EC 17454, Raytheon | 10,000 | | | |
| EC 14059, U. of Rochester | 9,000 | | | |
| EC 17964, Beaver | 3,000 | | | |

SMALL COMPUTER MONTHLY ACTIVITY

Month Ending: October 29, 1966

Scheduled and Shipped

| PDP-8 OPTIONS | Standard Line | | Special Line | |
|-----------------------------|------------------|------------------|-----------------|------------|
| | Domestic | Foreign | Domestic | Foreign |
| DEC 15839, NASA | \$12,000 | | | |
| DEC 13161, Harwell | | | \$15,000 | |
| DEC 16262, Tucson | 12,000 | | | |
| DEC 15094, Stanford | 8,000 | | | |
| DEC 15114, Canadian G.E. | | \$ 7,000 | | |
| DEC 14233, Tufts | 8,000 | | | |
| Miscellaneous | 10,000 | | | |
| TOTAL BY CLASS | <u>\$135,947</u> | <u>\$ 7,000</u> | <u>\$25,000</u> | <u>---</u> |
| TOTAL BY LINE | <u>\$142,947</u> | | <u>\$25,000</u> | |
| TOTAL SHIPMENTS | | <u>\$167,947</u> | | |

J. Smith
9/28/66

SMALL COMPUTER MONTHLY ACTIVITY

Month Ending: October 29, 1966

Scheduled and Shipped

| PDP-7-9 | Standard Line | | Special Line | |
|-----------------------------|---------------|-----------|--------------|-----------|
| | Domestic | Foreign | Domestic | Foreign |
| EC 14023, Erlangen | | | | \$75,601 |
| EC 17424, B.B. and N. | | | \$151,500 | |
| EC 18140, U. of Michigan | \$50,000 | | | |
| EC 18377, Imperial Coll. | | \$72,187 | | |
| TOTAL BY CLASS | \$50,000 | \$72,187 | \$151,500 | \$75,601 |
| TOTAL BY LINE | | \$122,187 | | \$227,101 |
| TOTAL SHIPMENTS | | \$349,288 | | |

J. Smith
9/28/66

SMALL COMPUTER MONTHLY ACTIVITY

Month Ending: October 29, 1966

Scheduled and Shipped

| PDP-7-9 OPTIONS | Standard Line | | Special Line | |
|----------------------------|-----------------|-----------------|-----------------|---------|
| | Domestic | Foreign | Domestic | Foreign |
| EC 16726, MIT | | | \$18,000 | |
| EC 14051, JPL | \$12,000 | | | |
| EC 17937, Hanscom Field | 5,000 | | | |
| EC 18430, U.S. Navy | 12,000 | | | |
| miscellaneous | 10,000 | | | |
| TOTAL BY CLASS | <u>\$39,000</u> | --- | <u>\$18,000</u> | --- |
| TOTAL BY LINE | <u>\$39,000</u> | | <u>\$18,000</u> | |
| TOTAL SHIPMENTS | | <u>\$57,000</u> | | |

DEC INTEROFFICE MEMORANDUM

TO: M. Ford C. Kendrick
 J. Jones N. Mazzaresse

FROM: J. Smith

DATE: October 28, 1966

cc: K. Olsen ✓

Attached you will find a detailed breakdown of the receival activity to the Small Computer Stock Room for the past eight weeks. The numbers within parenthesis indicate the figures for the first three weeks of October; however, these numbers have been included in the eight-week totals.

Outlined below is a comparison of receivals against requests for both the first three weeks of October and the total eight weeks.

| | <u>Weeks 1, 2 and 3 of October</u> | | <u>Eight-Week Total</u> | |
|------------------------------------|------------------------------------|-----|------------------------------------|------------------|
| Types Ordered: | 209 | | Types Ordered: | 224 |
| Types Received: | 130 | 62% | Types Received: | 180 80% |
| Weeks' Request: | 18,763 | | Weeks' Request: | 43,808 |
| Quantity Received Against Request: | 11,685 | 62% | Quantity Received Against Request: | 33,568 77% |
| Number Ordered: | 18,763 | | Number Ordered: | 43,808 |
| Number Received: | 16,803 | 90% | Number Received: | 44,597 102% |

Outlined below is the progression of "module mix" over the past eight-week period.

| | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 |
|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|
| Type | 26% | 42% | 58% | 69% | 74% | 82% | 78% | 80% |
| Quantity | 29% | 43% | 56% | 70% | 69% | 72% | 77% | 77% |
| Overall Numbers | 130% | 102% | 103% | 123% | 115% | 112% | 108% | 102% |

MODULE RECEIVAL STATUS REPORT

Week Ending: October 21, 1966

Weeks 1, 2, 3, 4, 5, 6, 7 and 8

Please Note: Numbers within parenthesis represent weeks 1, 2 and 3 of October.

| TYPE | QTY. ORDERED | QTY. RECEIVED | TYPE | QTY. ORDERED | QTY. RECEIVED |
|------|--------------|---------------|------|--------------|---------------|
| A100 | 57 (57) | 72 (72) | G283 | 91 (42) | 90 (7) |
| A101 | 2 | 2 (2) | G601 | 38 (4) | 37 |
| A502 | 19 (9) | 22 (12) | G602 | 43 (4) | 29 |
| A601 | 136 (76) | 15 | G603 | 899 (360) | 756 (356) |
| A604 | 59 (36) | 9 | G620 | 28 (16) | |
| A704 | 25 (23) | 55 (21) | G622 | 9 | |
| B104 | 244 (203) | 334 (224) | G800 | 3 | 27 |
| B105 | 658 (411) | 727 (24) | G802 | 15 | 24 |
| B113 | 164 (89) | 124 (102) | G804 | 8 (2) | |
| B115 | 256 (120) | 229 (79) | G805 | 21 (8) | |
| B117 | 82 (30) | 71 (48) | G808 | 53 (24) | 58 |
| B123 | 2 (2) | 46 | G850 | 178 (100) | 334 (274) |
| B124 | 23 (3) | 23 (5) | G851 | 96 (13) | 10 (10) |
| B130 | 18 | 55 | G852 | 146 (98) | |
| B131 | 60 (38) | 42 (12) | G882 | 60 (40) | 126 (102) |
| B141 | 416 (180) | 416 (87) | G900 | 31 (21) | 32 |
| B155 | 23 (19) | 33 | G903 | 5 | 35 (24) |
| B169 | 174 (100) | 285 | G904 | 6 (6) | 8 (8) |
| B171 | 229 (67) | 259 (33) | G920 | 9 (2) | |
| B200 | 47 (5) | 72 | R001 | 192 (121) | 301 (96) |
| B201 | 1040 (314) | 623 (189) | R002 | 1185 (678) | 1483 (371) |
| B204 | 170 (67) | 117 (30) | R105 | 28 (15) | |
| B210 | 206 (19) | 188 (83) | R107 | 1053 (498) | 1068 (423) |
| B213 | 305 (194) | 209 | R111 | 1043 (813) | 1685 (1304) |
| B301 | 82 (65) | 48 | R113 | 149 (56) | 108 (8) |
| B310 | 15 (4) | | R121 | 129 (55) | 154 (38) |
| B360 | 242 (36) | 221 | R122 | 17 (10) | 108 |
| B401 | 31 (15) | 24 (12) | R123 | 428 (278) | 636 (197) |
| B405 | 15 (10) | 14 | R131 | 17 (10) | 54 (47) |
| B602 | 491 (204) | 678 (495) | R141 | 684 (234) | 902 (352) |
| B620 | 70 | 254 | R151 | 187 (77) | 187 (78) |
| B684 | 303 (124) | 285 | R181 | 55 (45) | 111 (68) |
| G007 | 1061 (540) | 842 (512) | R201 | 841 (384) | 786 (1) |
| G008 | 168 (55) | 136 (22) | R202 | 1355 (389) | 1018 |
| G009 | 10 (10) | 31 (31) | R203 | 347 (186) | 462 (137) |
| G010 | 12 (4) | 8 | R205 | 600 (221) | 594 (192) |
| G081 | 78 (42) | 82 (36) | R210 | 1351 (429) | 732 (337) |
| G202 | 133 (36) | 217 (50) | R211 | 1266 (396) | 674 (239) |
| G208 | 514 (270) | 397 (51) | R220 | 648 (210) | 410 (290) |
| G209 | 1006 (444) | 990 (300) | R284 | 33 (21) | 110 |
| G210 | 10 (4) | | R302 | 581 (264) | 250 (198) |
| G211 | 51 | | R401 | 217 (93) | 194 (70) |

| TYPE | QTY. ORDERED | QTY. RECEIVED | TYPE | QTY. ORDERED | QTY. RECEIVED |
|------|--------------|---------------|-------|--------------|---------------|
| R405 | 93 (62) | 112 | W980 | 33 (33) | 261 |
| R50 | 50 (25) | 28 | W985 | 15 (10) | |
| R601 | 54 (52) | 62 (49) | W990 | 208 (107) | 182 |
| R602 | 332 (161) | 237 (150) | W991 | 4 (4) | 12 (12) |
| R603 | 625 (213) | 424 (270) | | | |
| R650 | 1334 (439) | 961 (371) | 1011 | 41 (25) | 40 |
| S107 | 1121 (399) | 1063 (656) | 1110 | 1 (1) | 1 (1) |
| S111 | 1552 (844) | 598 (598) | 1113 | 15 (12) | |
| S151 | 8 (8) | 13 (13) | 1150 | 8 (7) | 8 (8) |
| S181 | 290 (148) | 477 (477) | 1201 | 39 (39) | |
| S202 | 231 (105) | 643 (205) | 1213 | 15 (15) | 24 (24) |
| S203 | 522 (280) | 380 (209) | 1304 | 23 (23) | 7 |
| S205 | 233 (89) | 124 (3) | 1310 | 1 (1) | |
| S284 | 222 (66) | 270 (202) | 1501 | 21 (11) | 5 (4) |
| S602 | 727 (292) | 323 (123) | 1534 | 27 (10) | 16 (14) |
| S603 | 1819 (472) | 1138 (614) | 1535 | 49 (20) | 37 (37) |
| W005 | 288 (160) | 318 (87) | 1537 | 6 (6) | |
| W011 | 207 | 1676 (295) | 1562 | 2 (2) | |
| W016 | 2 | | 1567 | 41 (20) | 24 (2) |
| W017 | 2 | | 1568 | 16 (16) | |
| W019 | 3 (3) | 14 | 1571 | 10 (10) | 3 (3) |
| W020 | 11 (11) | 154 | 1575 | 37 (20) | 27 (27) |
| W021 | 788 | 2426 (995) | 1579 | 40 (20) | |
| W023 | 147 (147) | 1019 (410) | 1609 | 35 (16) | |
| W025 | 902 (125) | 422 (300) | 1663 | 18 (10) | 12 (12) |
| W026 | 174 (174) | 551 (351) | 1669 | 1 (1) | |
| W027 | 90 (57) | 209 | 1677 | 44 (44) | 22 (22) |
| W033 | 111 (70) | 191 | 1685 | 22 (12) | 26 (26) |
| W034 | 1900 (500) | 2276 (512) | 1703 | 37 (20) | 36 |
| W040 | 475 (273) | 463 (60) | 1704 | 1 (1) | |
| W042 | 20 (10) | | 1705 | 22 (13) | |
| W050 | 202 (154) | 312 (223) | 1802 | 9 (9) | 10 (6) |
| W051 | 41 (21) | 20 | 1978 | 1 (1) | 9 (9) |
| W070 | 215 (65) | 305 (30) | 4102 | 284 (157) | 119 (26) |
| W103 | 323 (159) | 307 (144) | 4106 | 7 (7) | |
| W300 | 207 (90) | 259 | 4113 | 234 (96) | 54 (50) |
| W500 | 4 | 13 (9) | 4114 | 12 (12) | 13 |
| W501 | 104 (79) | 159 (84) | 4115 | 52 (40) | 8 (8) |
| W511 | 77 (25) | 97 | 4127 | 342 (162) | 171 (76) |
| W513 | 28 (28) | 36 (36) | 4141 | 26 (26) | 20 (8) |
| W520 | 17 (17) | 64 | 4151 | 30 (20) | |
| W601 | 10 (10) | 10 | 4215 | 142 (78) | 44 (37) |
| W602 | 43 (10) | 58 | 4217 | 25 (25) | 40 |
| W607 | 196 (70) | 165 (103) | 4218 | 5 (5) | 23 (23) |
| W612 | 89 (50) | 121 (72) | 4220 | 32 (22) | 4 (4) |
| W640 | 750 (185) | 615 (152) | 4221 | 21 (15) | 10 (10) |
| W681 | 7 (4) | 10 | 4222 | 72 (26) | 25 (13) |
| W684 | 1 (1) | | 4225 | 6 (5) | 12 |
| W700 | 99 (42) | 124 | 4227 | 11 (6) | 13 (10) |
| W701 | 54 (50) | 125 (42) | 4228 | 87 (48) | |
| W750 | 471 (338) | 197 (21) | 42281 | 42 (18) | 36 |
| W802 | 88 (10) | 9 | 4260 | 12 (11) | |

| TYPE | QTY. ORDERED | QTY. RECEIVED | TYPE | QTY. ORDERED | QTY. RECEIVED |
|------|--------------|---------------|------|--------------|---------------|
| 4261 | 13 (11) | | W505 | | 1 |
| 4301 | 13 (10) | 13 (3) | W510 | | 5 (5) |
| 4303 | 97 (57) | 34 (34) | W590 | | 3 (3) |
| 4304 | 13 (13) | | W600 | | 13 |
| 4306 | 15 (12) | | W989 | | 140 |
| 4320 | 1 (1) | | | | |
| 4321 | 1 (1) | | 1000 | | 7 |
| 4401 | 12 (12) | 10 | 1115 | | 20 |
| 4410 | 7 (7) | 9 (5) | 1607 | | 9 |
| 4523 | 110 (55) | 11 (11) | 1973 | | 2 (2) |
| 4526 | 28 (21) | | 1987 | | 11 (11) |
| 4529 | 2 (2) | 7 | 4112 | | 48 (15) |
| 4530 | 10 (10) | 61 (12) | 4117 | | 7 (7) |
| 4531 | 6 (6) | 31 (12) | 4214 | | 10 |
| 4603 | 39 (14) | 4 (4) | 4407 | | 4 (4) |
| 4604 | 78 (78) | | 4505 | | 2 (2) |
| 4605 | 68 (45) | 44 (29) | 4659 | | 3 (3) |
| 4606 | 26 (26) | | 4680 | | 21 |
| 4656 | 5 | 5 (5) | 4702 | | 4 |
| 4667 | 3 (3) | | 4902 | | 9 (9) |
| 4671 | 7 (7) | 8 (8) | | | |
| 4678 | 2 (2) | | | | |
| 4688 | 19 (12) | 23 (23) | | | |
| 4689 | 53 (12) | 52 (28) | | | |
| 4706 | 16 (16) | 18 (18) | | | |
| 4707 | 16 (16) | 18 (14) | | | |
| 4903 | 25 (2) | 23 (3) | | | |
| 4904 | 21 (21) | | | | |
| 4905 | 114 (24) | 103 (17) | | | |
| 4910 | 89 (14) | | | | |
| 4912 | 181 (76) | 75 (34) | | | |
| 4915 | 28 (28) | 225 (225) | | | |
| 6102 | 172 (72) | 60 (1) | | | |
| 6106 | 10 (10) | 1 | | | |
| 6122 | 7 (3) | | | | |
| 6202 | 1 | 1 (1) | | | |
| 6203 | 5 (5) | | | | |
| A702 | | 11 | | | |
| B681 | | 13 | | | |
| G001 | | 164 | | | |
| G091 | | 4 | | | |
| G201 | | 40 (40) | | | |
| G809 | | 10 (10) | | | |
| R212 | | 39 (39) | | | |
| R303 | | 14 | | | |
| W001 | | 200 | | | |
| W002 | | 24 | | | |
| W032 | | 684 | | | |
| W071 | | 368 | | | |
| W073 | | 47 (47) | | | |
| W101 | | 46 (22) | | | |



INTEROFFICE MEMORANDUM

DATE October 28, 1966

SUBJECT SECURITY COMMITTEE

TO Ken Olsen
cc: Harry Mann
Al Hanson

FROM Loren Prentice

I am submitting the following names to be considered as members to reconstitute the Security Committee. These will cover the areas of activities in the similar manner to the old committee.

Ted Johnson or Mike Ford

Harry Mann

Pete Kaufman

Bob Lassen

Attached is a copy of the memo originally written, which explains the objectives of this committee.



INTEROFFICE MEMORANDUM

DATE April 23, 1964

SUBJECT PLANT SECURITY

TO Kenneth H. Olsen

FROM Loren B. Prentice

First I would like to spell out my understanding of the security problems as they effect this company. (These will be given in descending order of importance.)

1. Lives and health of the employees
2. Protection of plant and company property
3. To protect the vital interest of the company, that is to prevent desecration of company owned information.
4. The accomplishment of all of the above with the least inconvenience to personnel and the smallest amount of regulation and rules.

I would like you to consider as a committee and for the reasons noted, the following people:

Bob Beckman

For customer relations and sales

Dick Mills

Because of the insurance and protection of property

Maynard Sandler

Because he has the responsibility for the most people and the greatest amount of dollar value in goods

Bob Lassen

Because he controls, to a large degree, the desecration of information to all personnel and he has control of the receptionist who's cooperation with the Pinkerton Guards is essential.

These people all have a vital interest in plant security and I believe understand its problems. The other people who you have suggested appear to be interested and have vital concern only in #4 which I fully appreciate and am sympathetic with but believe they fail to see the overall picture.

Every "All Employee" rule or regulation has been cleared with either Bob Lassen and generally with Maynard Sandler because it most generally effects his people. Advance notice of any change in security policy has been forwarded to all supervisors.



INTEROFFICE MEMORANDUM

DATE October 27, 1966

SUBJECT Semiconductor Planning
(a) Facilities (b) DD-5 and DD-1 Production

TO Ken Olsen
Dick Best
Stan Olsen

FROM Bob Brown

FACILITIES

The present facilities do not give us the positive pressure which we need in the furnace room or in the masking room. In order to more completely isolate these two rooms from surrounding atmospheres and their contamination, we have rearranged the area. It is urgent that the work be done as soon as possible.

Briefly this entails enlarging the masking room while installing more clean air sources, separating lapping and sawing into their own room, and restricting access to personnel wearing proper clothing. We will use sticky-mat in the restricted areas.

These facilities are shown on print (Exhibit A).

DD-5

The plan for the DD-5, as we have previously stated, is for a constant level of 300,000 diodes per month.

Equipment

This requires little additional equipment beyond that which we already have. The additional equipments needed are (a) the plating jig at an estimated cost of \$750.00 and (b) a photo resist developing jig which should cost about \$300.00.

Personnel

The number of production personnel, excluding supervision, needed for this production level is ten full time girls.

Schedule

We produced 60,000 DD-5 diodes in August and 117,000 in September. The schedule to full production level is per following table:

| <u>Month</u> | <u>Number Diodes (in Thousands)</u> |
|--------------|---|
| October | 140 |
| November | 180 |
| December | 220 |
| January | 260 |
| February | 300 |

The 300,000 per month level results from a study of Company requirements.

DD-1

In our planning for the DD-1 we will build to the level of 1,000,000 diodes per month. This appears to be a reasonable level judging the companies needs from the available data.

Equipment

Most of the additional equipment needed has been budgeted.

| | |
|-------------------------------------|----------|
| Mask Aligning Jig and Clean Station | Due Dec. |
| Wafer Alignment Microscope | * |
| Inspection Microscope | * |

*Requested but accounting asks one month delay.

We have not budgeted for a tester or for additional

digital equipment corporation

saws. Both of these will be needed soon.

We must also construct a simple furnace for tungsten reduction. This is a low cost furnace compared to the diffusion furnaces.

The tester is being built in cooperation with Tom Stockebrand and Henry Crouse. We shall have to obtain one or more saws from outside. I judge that we do not have manpower in design or machine shop to do a proper job on saws internally. I shall check to see what is available on the outside.

Personnel

The number of trained personnel to produce at this level is ten production girls. These should be hired over a period of production build up, as per curve (Exhibit D).

Schedule

We have been making DD-1 diodes on nonexpitaxial wafers to develop masking skills in our girls. We are now going to use the more expensive epitaxial material so that we can measure diode characteristics.

The schedule which we plan to follow on this is to make about 1,000 DD-1 diodes during November and then as tabulated below:

| <u>Month</u> | <u>Number Diodes (in Thousands)</u> |
|--------------|---|
| November | 1 |
| December | 1 |
| January | 2 (Note 1) |
| February | 5 (Note 2) |
| March | 20 |
| April | 80 |
| May | 100 |

Note 1: At this time we should not be lacking for metalizing furnaces.

Note 2: A tester for this diode will be necessary for larger volume.

It is not planned to execute a faster build up on this diode because (a) Tom is able to get it externally and (b) we can put more effort on the transistor.

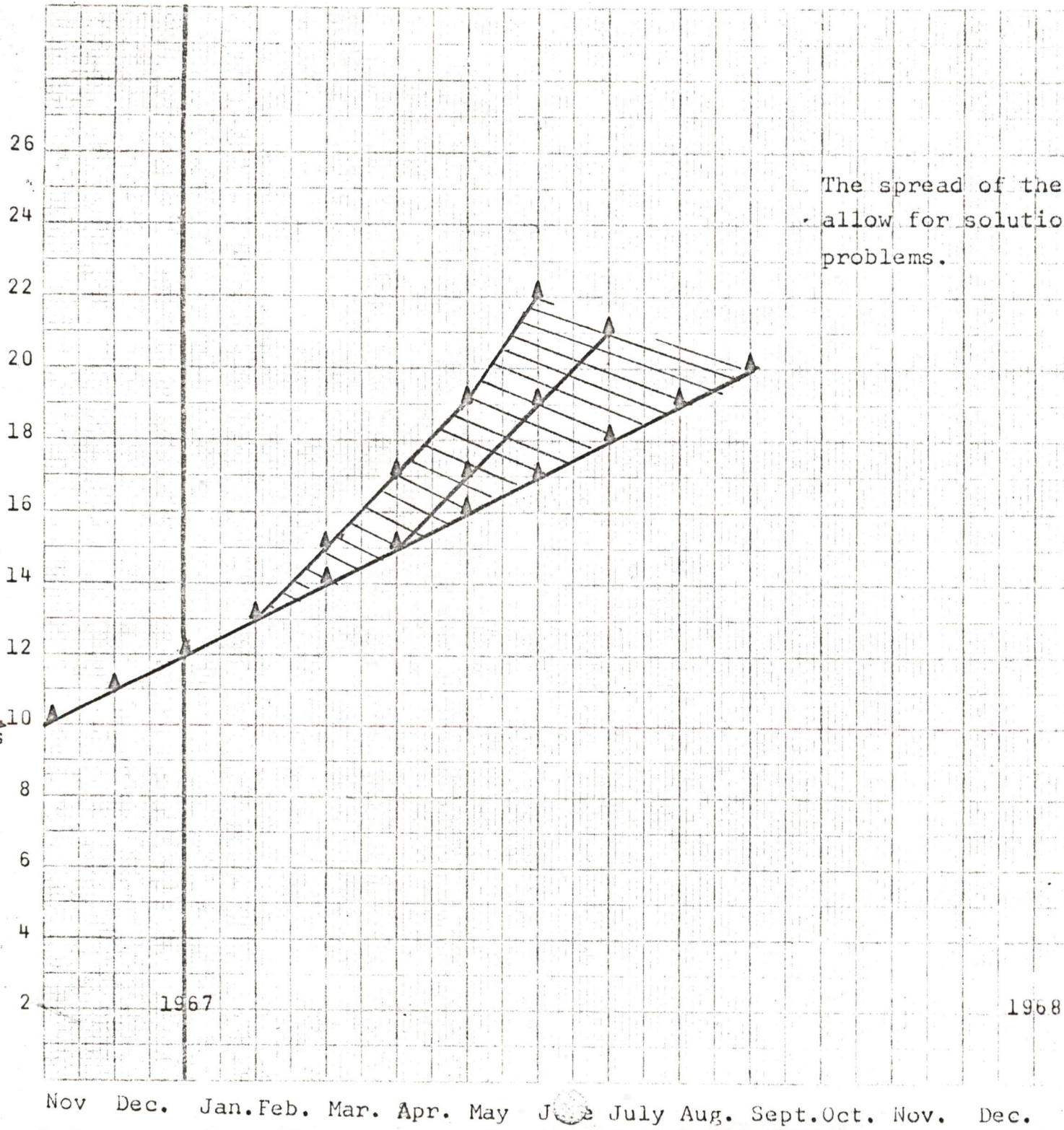
GENERAL

The target production quantities of 300,000 for the DD-5 and 1,000,000 for the DD-1 may be increased with anticipated increase in Company requirements after these quantities are reached. It requires about 60 to 90 days to obtain increased quantities of material necessary for scale up.

The production of these two diodes will develop the process skills needed in diffusion and masking for more sophisticated devices.

cc: Tom Stockebrand

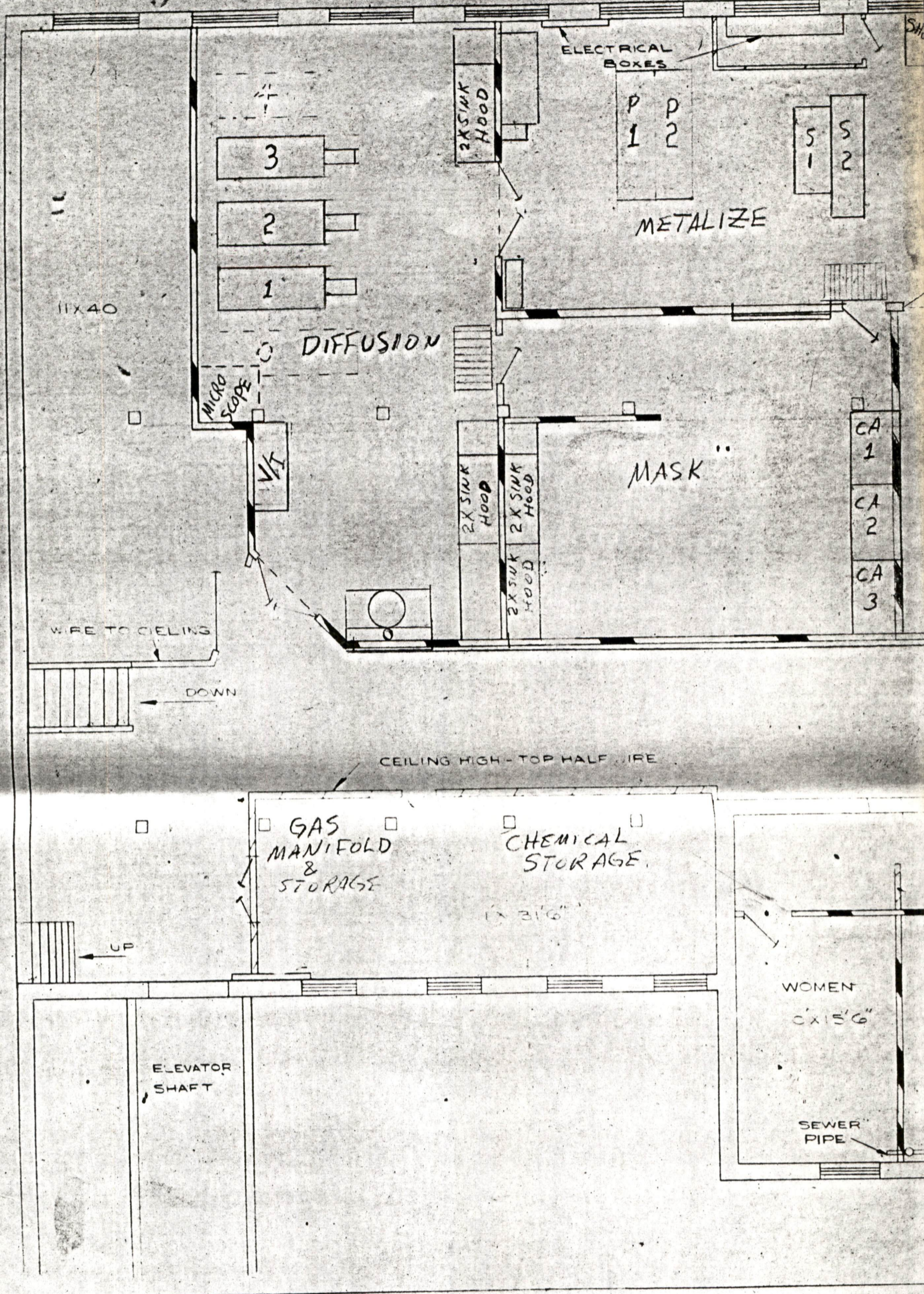
RTB/mf



The spread of the curve is to allow for solution of production problems.

NO. 334 - 2 III, THE HALF INCH.
Build up for DD-1 production personnel.

The ten girls required for production of DD-5.



11x40

3
2
1

2X SINK HOOD

ELECTRICAL BOXES

P 1
P 2

METALIZE

S 1
S 2

DIFFUSION

MICRO SCOPE

W/X

2X SINK HOOD

2X SINK HOOD

MASK

CA 1
CA 2
CA 3

WIRE TO CEILING

DOWN

CEILING HIGH - TOP HALF WIRE

GAS MANIFOLD & STORAGE

CHEMICAL STORAGE

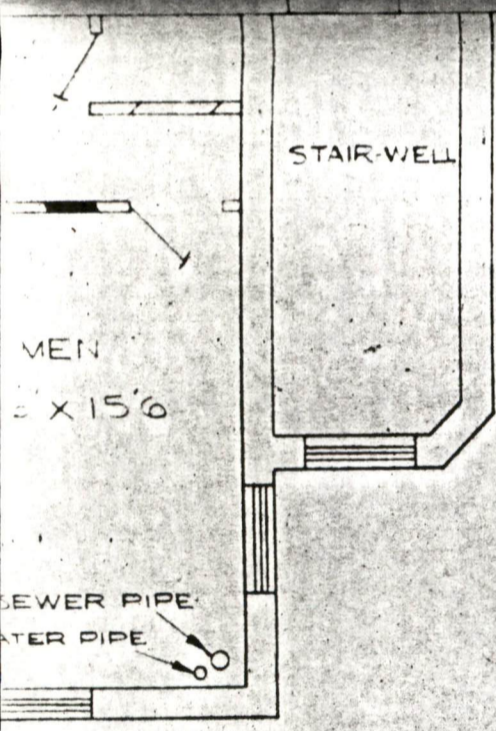
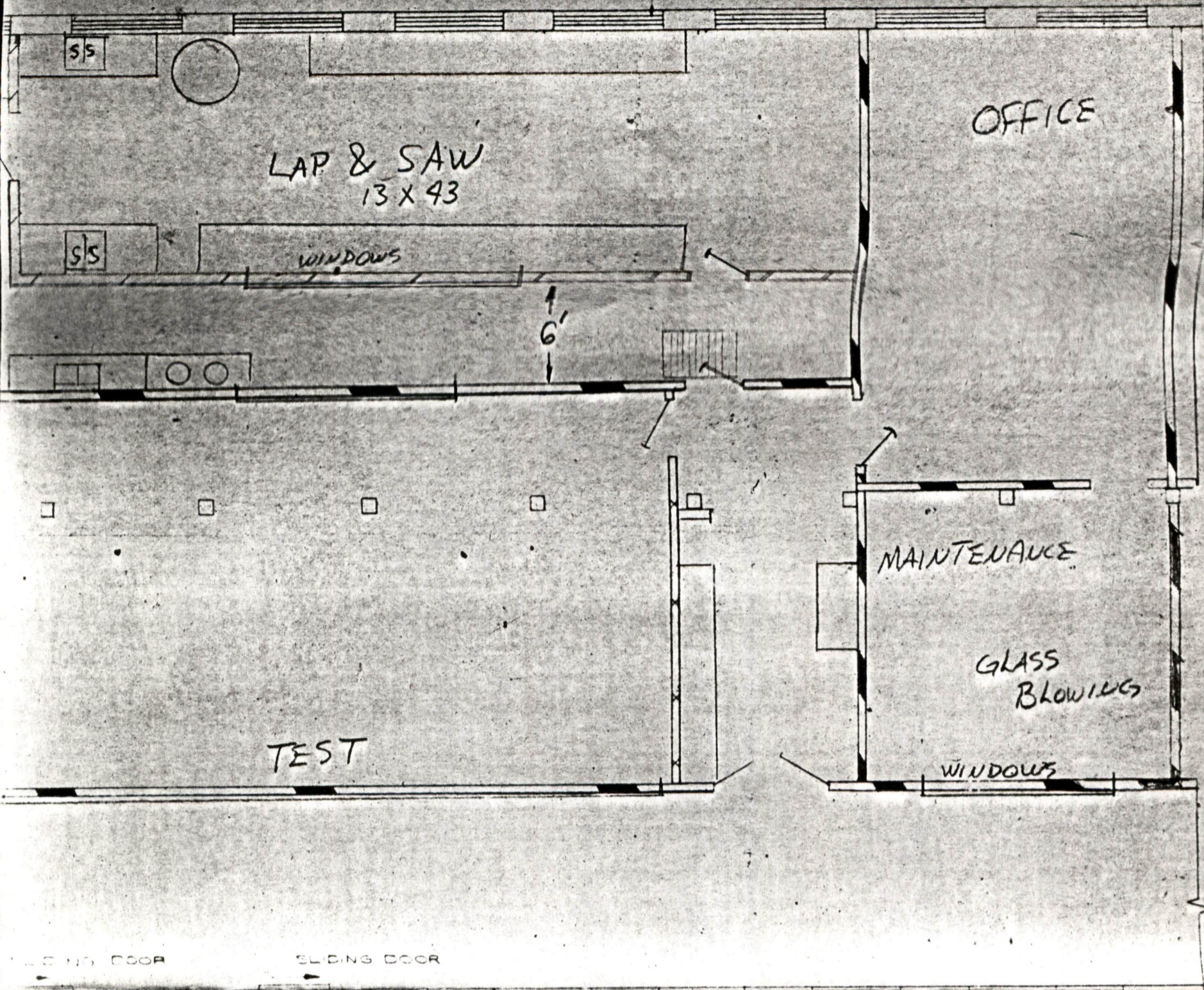
6x3'6"

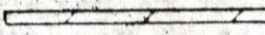
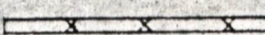
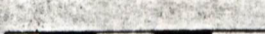
UP

ELEVATOR SHAFT

WOMEN
6x15'6"

SEWER PIPE



BUILDING 3, 3RD FLOOR 468 X 50
 23,900 SQ FEET
 SCALE: 1/4" = 1'
 ALL DIMS. IN FEET UNLESS OTHERWISE SPECIFIED
 PARTITION LEGEND
 7 FOOT HIGH 
 10 FOOT HIGH 
 TO CEILING 

10/1/66 *RTB*

EXHIBIT A

| | | | | | |
|----------------------------|-----------------|--|---|-------|-----------|
| DRAWN <i>J. Maddala</i> | DATE 10/4/65 | digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS | TITLE FLOOR PLAN-BLD. 3, 3RD. FLOOR | | |
| CHECKED | DATE | | FOR | | |
| ENG. | DATE | | ASSY NO. | CODE | DRWG NO. |
| PROJ. ENG. | DATE | | | 00 | D-00299-4 |
| PROD. | DATE | | SCALE SEE CWS SHEET 4 OF 4 | DIST. | REV. LTR. |

FIRM ESTIMATE OF PEOPLE & EQUIPMENT FOR DD-1

| OPERATION | NO. GIRLS NEEDED | NO. WAFERS PER DAY | EQUIPMENT (WAFERS/DAY) (CAPABILITIES) | DESCRIPTION OF OPERATION |
|--------------------|------------------|---|--|--|
| (1) Preparation | 1/2 | 60 | 2 Furnaces (800) 1 Double Sink and Hood (shared) | Inspect Wafers and Oxidize |
| (2) Mask | 3 | 180 | 1 Spinner (1400 shared) 1 Mask Aligner (to be purchased) (est. 200/day) 1 Developer Jig (shared) 1 Drying Oven (shared) Clean Air shower | Coat - Dry - Expose - Develop - Etch - Strip |
| (3) Lap & Metalize | 2 | 60 | 1 Speed Lap (800) 1 Plating Jig (60) 2 Sinter Furnace (1000 shared) 1 Tungsten Furnace (to be built) | Lap Backside - Ni - W - AG plate |
| (4) Test & Saw | 4 | 2 Saws or one Double Saw (to be purchased) 2 Mount Jigs 1 Auto tester (Shared) (30 per hour est.) | | Test - Mount - Saw Dismount, clean Sample Test |
| (5) Diffusion | 1/2 | 60 | 2 Furnaces (280) 1 Double Sink & Hood (shared) | |

10-5-66/mf

The above estimate is for 1 million diode/month level.

PEOPLE & EQUIPMENT FOR DD-3

| OPERATIONS | NO. GIRLS NEEDED | NO. WAFERS PER DAY | EQUIPMENT AND (WAFER/DAY) | DESCRIPTION |
|--------------------|------------------|-----------------------------|--|--|
| (1) Preparation | 1/2 | 60 | 2 Furnaces (800) 1 Double Sink & Hood (800) | Etch Wafers to Polish, Oxidize |
| (2) Mask | 3 | 120 | 1 Spinner (1400) 1 Mask Aligner (200) 1 Developer Jig 1 Drying Oven | Coat - Dry - Expose - Develop - Etch - Strip |
| (3) Lap & Metalize | 2 | 30 (Now) 60 (New Plater) | 1 Speed Lap (800) 1 Plating Jig (60) 2 Sinter Furnace (1000) | Lap Backside Ni _s - W, Ni - Ag Plate |
| (4) Test & Saw | 4 | 35 | 2 Saws (35-40) 2 Mount Jigs (40) 1 Automatic Tester (est. 30/hour) | Test - Mount - Saw Dismount & Clean - Check Test |
| (5) Diffusion | 1/2 | 60 | 2 Furnaces (280) 1 Double Sink & Hood | Clean Wafers Load & Diffuse |
| | 10 | | | |

The above figures are for 300,000 diodes/month (75% yield level).

10/5766/mf

dec

INTEROFFICE
MEMORANDUM

DATE October 27, 1966

SUBJECT PLASTIC MODULE - DETAILED OUTLINE OF PROJECT SCHEDULE

TO Project Review Committee

FROM George Wood

1. BUDGET/COST ANALYSIS

- A. Write project schedule to determine manpower requirements and time schedule.
- B. Research process to determine most probable success route.
- C. Learn process fundamentals to determine the type of facility required.
- D. Gather cost data on equipment and process materials to determine capital equipment requirements.
- /A. Apply process material costs and manpower requirements against current cost data to determine the economic soundness of the process.

2. OBTAIN SAMPLES AND TEST

- A. Study data on availability of plastics with properties compatible with module processing and use requirements.
- B. Obtain samples from manufacturers and test for compatibility with mechanical, chemical, thermal, and application environments.
- C. Obtain powder of most likely substrate materials and have modules manufactured to size.

3. CONDUCTOR BONDING EXPERIMENTS

- A. Investigate various means of applying a well bonded base conductor for plating. Laminations, adhesives, electroless, depositions and conductive epoxies are to be considered.
- B. Test experimental results for: Ability to accept copper electroplate, bond strength to substrate, and compatibility with subsequent processing environments.

- C. Locate vendor or provide in-house facility to coat the first set of test samples.

4. DEVELOPMENT OF CIRCUITRY

- A. Obtain results from committee working out the application possibilities of DIP's.
- B. Select an application and design a circuit.
- C. Purchase DIP's. (STOCKY'S SUBSTRATE)
- D. Construct photographic image.

5. PURCHASE SAMPLE MOLD

- A. Determine molded hole pattern configuration.
- B. Complete module design with attention to: tolerances, shape, component hole size, jiggling hole locations, and shrink factor (based on plastic most likely to succeed).
- C. Locate vendors and order sample mold.

6. DEVELOP PROCESS TECHNIQUES/PROVIDE PROCESS FACILITY

- A. Investigate and determine a means for surface preparation and for handling, locating, coating, drying and curing conductive coating.
- B. Provide or locate a facility for above.

7. PHOTO RESIST APPLICATION (SCREENING ?)

- A. Learn pros and cons of both positive and negative resists.
- B. Run experiments to determine application and handling facilities required to insure a minimum of rejects.
- C. Locate and/or build photoresist and handling equipment.
- D. Run experiments to determine the most practical way to expose the image.
- E. Locate light source and buy or build exposing facility.

8. PLATING

- A. Learn the basic chemistry of electroplating.

- B. Learn the pitfalls of various processing techniques relative to printed circuit board manufacture.
- C. Get professional advice relative to:
 - 1. Plating bath control and facilities required.
 - 2. Throwing power of various baths.
 - 3. Ductility and thru hole reliability.
 - 4. Testing procedures necessary to determine quality control.
 - 5. Plating methods to obtain good resolution and edge acuity.
 - 6. Plating thickness possibilities with a minimum amount of mushrooming.
 - 7. Compatibility of circuit with subsequent soldering operations.
 - 8. Various plating baths and how they affect later processes.
- D. Build or locate facilities for plating.

9. SUBSTRATE SAMPLES

- A. Obtain powder samples from manufacturers.
- B. Have sample substrate molded.
- C. Run through abuse and environmental tests with no specific circuitry.

10. PROTOTYPE

- A. Apply circuitry to one or more substrates.
- B. Assemble components, solder and test for electrical compliance.

11. SELECTION OF ENDURANCE

- A. Subject completed modules to every conceivable use and abuse test.
- B. Revise process as test results indicate weaknesses.
- C. Re-evaluation of cost for comparison.
- D. Recheck inter-related process compatability.
- E. Revise mold to strengthen or otherwise improve substrate if required.
- F. Build additional prototypes and recheck.

12. PRE-PRODUCTION RUN

- A. Make a small lot run of substrates.
- B. Manufacture boards of one or more circuit types.
- C. Evaluate relative to repeatability and reliability.

13. DESIGN AND BUILD PRODUCTION FACILITY

- A. Build or buy equipment for molding, coating, exposing, plating, handling, locating, inserting, soldering, testing, etc.
- B. Prepare specifications relative to process parameters, controls, techniques, etc.
- C. Orient or train production personnel.

14. PRODUCTION

- A. Continuing process improvement
- B. Continuing cost reduction



INTEROFFICE MEMORANDUM

DATE October 27, 1966

SUBJECT Review of Installation and Trouble Reports

TO K. Olsen FROM J. Smith

In reference to our telephone conversation on trouble reports from the field, I would recommend a committee be formed to review these reports on a regular basis. Recommended committee members would be as outlined below.

- Field Service Installation Supervisor
- Field Service Acceptance Supervisor
- Computer Production Checkout Supervisor
- Computer Production Assembly Supervisor
- Engineering (D. White)

Active participation by "line supervisors" should develop a feeling of mutual co-operation across the departments mainly involved. A better understanding of the causes and effects of problems incurred in each other's areas should result. Minutes of the meetings should be kept with conclusions, recommended action and task assignments spelled out.

If you are in agreement, I can get together a proposal to be presented to the product line managers or just forge ahead with the co-operation of Field Service and Engineering.



INTEROFFICE MEMORANDUM

DATE : October 27, 1966

SUBJECT: WENTWORTH'S ENGINEERING TECHNICIAN PLACEMENT FOR THE
CLASS OF 1966

TO : ✓ K. Olsen

S. Olsen

W. Hindle

N. Mazzaresse

FROM : Joe Gaffney

Attached is a summary of Wentworth's Engineering Technician Placement for the Class of 1966. Statistics of DEC's successful recruiting effort are also included.

We have already started recruiting plans for the Class of 1967. They include participation in a Career Day at Wentworth by six technicians from the Class of 1966, an Open House for Wentworth students in January, 1967, and visits to Wentworth by our Engineers to participate as speakers in various student activities.

Several members of the Class of 1967 were employed by DEC during this past summer. We have found in the past that this is an effective means of attracting these individuals to consider DEC as a potential full time employer and having them acquaint other students with our opportunities.

JFG/srb

SUMMARY OF WENTWORTH ENGINEERING TECHNICIAN PLACEMENT FOR CLASS OF 1966

| | # OF GRADS. | PLACEMENT IN INDUSTRY | DEC PLACEMENT | SERVICE | FURTHER EDUCATION | FOREIGN STUDENT | UNAVAILABLE (HEALTH-TRAVEL) |
|-----|-------------|-----------------------|--|---------|------------------------------|-----------------|-----------------------------|
| EEE | 122 | 64 (52%) | 19 15.6% of Class 29.6% of Placement in Industry | 12 | 41 | 3 | 2 |
| EE | 109 | 39 (35.8%) | 7 6.4% of Class 17.9% of Placement in Industry | 5 | 16 + (48 at Wentworth) | 0 | 1 |

SALARY RANGE

| | HIGH | LOW | AVERAGE | DEC's AVERAGE |
|-----|----------|---------|----------|---------------|
| EEE | \$145.00 | \$90.00 | \$112.00 | \$110.00 |
| EE | \$130.00 | \$70.00 | \$105.00 | \$106.00 |



INTEROFFICE MEMORANDUM

SUBJECT Review Committees
TO Ken Olsen
DATE October 26, 1966
FROM Win Hindle

I propose the following committees, with top priority on the first group:

PMA-8 Engineering Review

Ed deCastro, Chairman
Dick Best
Jack Shields (or someone designated by him)
Don White
Ken Olsen

PMA-8 Marketing Review

Dave Cotton
Mike Ford, Chairman
Ted Johnson
Stan Olsen
Mort Ruderman

LINC-8 Engineering Review

Saul Dinman, Chairman
Pat Greene
Dick Best
Bob Savell
Ken Olsen

WH/bwf



INTEROFFICE MEMORANDUM

DATE October 26, 1966

SUBJECT USIA Exhibit

Tim

TO Ken Olsen
cc: Ted Johnson

FROM Tim McInerney

Attached is a copy of a memo from Steve Bowers and letters from Mr. Messmore of USIA regarding a request for the use of one of our PDP-8 computers (non-working model) for their exhibition in the USSR in 1967.

What is our policy with regard to displaying equipment, nonworking or otherwise, in the Soviet Union? Please advise.

TJM/jdr
Attachments

o - (e g u b) e .

*Call Jim for
thinks we
should exhibit
11/2/66
ec*



INTEROFFICE
MEMORANDUM

SUBJECT U.S.I.A. Exhibit
TO Tim McInerney

DATE October 14, 1966
FROM *Steve*
Steve Bowers

Attached is a photostat of the letter from the U.S.I.A. regarding the "Industrial Design - USA" exhibit.

Disregard what it says in the first paragraph. We have not promised them anything yet.

I have talked with Nick Mazzaresè and he is in favor if we can get a non working model. He feels you and I should work together to coordinate the matter if necessary approvals are received.

Where do we go from here, and what other help can I give you?

SDB:rsn

OCT 13 1966



UNITED STATES INFORMATION AGENCY

WASHINGTON 20547

October 7, 1966

Dear Mr. Bower:

Re: "Industrial Design-USA" Exhibit
Loan/Donation Agreement #15,556

This will confirm our telephone conversation of yesterday whereby you will loan to the United States Information Agency

1 - POP-8 Desk Top Computer (ref: Industrial Design Magazine (Code S-5a)
12/65 - page 42)

for the United States Exhibition in the USSR in 1967.

As we told you, your product was chosen by our designer, George Nelson and Company to represent excellent American Industrial Design in their field. This exhibit will travel between February and June to Kiev, Moscow and Leningrad in the USSR and in September will go to West Berlin, Germany as the U. S. Exhibition in the German Industries Fair.

It is requested that this item be shipped prepaid to our New York warehouse. Shipping and marking instructions are enclosed. Please forward six copies of your brochure describing your product to my attention.

We certainly appreciate your cooperation and for your convenience we are sending a copy of this letter for your signature. It would be appreciated if you could return it to the writer promptly for our records.

Very truly yours,

Howard C. Messmore
Howard C. Messmore
Exhibits Division
Information Center Service

Encls:

Mr. Steve Bower
DIGITAL EQUIPMENT CORPORATION
Maynard, Massachusetts

OCT 20 1966

U. S. INFORMATION AGENCY
Exhibits Division
Logistics Section

Mr. Steve Bower
DIGITAL EQUIPMENT CORPORATION
Maynard, Massachusetts

Date October 17, 1966

Exhibit Industrial Design

PRN 15566

617 897-8821

Dear Mr. BOWER:

This refers to the shipment of exhibit material procured for the above exhibit per Letter of Agreement from Mr. Howard C. Messmore of October 7, 1966 of this office.

PLEASE FOLLOW THE SHIPPING INSTRUCTIONS INDICATED BELOW:

1. Pack materials in domestic container(s) properly protected for the expected time in transit.

2. Provide three packing list/invoices with the shipment listing each item and its value. Please show on your packing list also, the coded number we have assigned to each item you are furnishing.

3. Mark each container as follows:

USIA Warehouse
29th Street & 2nd Avenue
Loading Door 15
Brooklyn, New York 11232
ATT: Ralph Di Salvio
For: Industrial Design - USA, Exhibit

4. Material and/or equipment must be delivered to the above-designated address on or before November 1, 1966.

5. Please TELEPHONE OR TELEGRAPH - USIA Warehouse, Mrs. MARGUERITE MEETH - CODE 202 Sterling 8-5000 Ext. 365 or 387, if for any reason delivery is delayed beyond the above deadline date.

Sincerely yours,


Fritjof Jonnassen
Logistics Section
U. S. Information Agency



INTEROFFICE MEMORANDUM

DATE October 26, 1966

SUBJECT SECURITY OF BUILDING #11-2, TRAINING AREA, and BUILDING
#11-1, SILK SCREEN AREA
TO Ken Olsen FROM Loren Prentice
cc: Allen Hanson

Bob Lassen has agreed to provide you with a plan for the installation of a time clock and the security measures to be taken on the first floor of building #11. The present plan that I agreed on with Bob Lassen for the second floor of building #11 is as follows:

A fire lock will be placed on the rear exit in building #11 under the clock tower and the door will be marked with a sign "Emergency Exit Only".

At present, if we accommodate all the people that Bob wants to accommodate, this will take approximately 10 keys to this door. These are spread from among the training personnel to Bob Lassen to the Field Service area (2), John Culkins (1), Drafting (3). The three keys now held by drafting could be given up as soon as the drafting area is moved to 6A; when that area is vacated by Bob Lane and Mike Ford. They have asked for a buzzer for this area which Bob and I agreed we could get along without. If people find they can enter here with a buzzer, the traffic will be almost as great as if the door was open. I have impressed to Bob, the necessity that these people not allow anyone to accompany them when they open the place via their key or to pass the key to others or in any way to bridge the security held on this door. He has agreed with me that his people will not allow this and will so inform his people that access is to be had only through the front door (This is the people in the training area.) We can make arrangements for the guard to open the front entrance of the building at any hour that Bob Lassen and his training people desire. Access of the drafting group now has to be through this front door area.

If you believe that the ten keys outstanding are too great a number to maintain security on this area, will you please communicate with me and I will see what can be done to cut down the amount of access. Everybody seems to think it is a terrible hardship to have to go out of doors between building #12 and Building #11.

INTEROFFICE
MEMORANDUM

DATE October 26, 1966

SUBJECT SEQUENCE OF MOVES

TO Allen Hanson. FROM Loren Prentice
cc: Product Line Managers Tim McInerney
Larry Portner Ted Johnson

In this memo I will attempt to list: 1) The major moves, those that are a per cent completed; 2) Things to be done in the areas partially complete; 3) A list of other jobs pertinent to the maintenance of the building too small to be included in the sequence moves, and; 4) Jobs that are sensitive to weather conditions and should be completed as soon as possible.

- I. Sequence summary of moves as was proposed August 15, 1966.
- A. Move sheet metal and machine shop from building #4 to 6D and 7 - Approximately 90% complete.
 - B. Move Larry Portner's programmers into building #12-2 - Approximately 80% complete
 - C. Move training from building #3 to building #11-2 - Approximately 80% complete
 - D. Move Accounting from building #5-5 to building #3-4 - Approximately 50% complete
 - E. Move Tim McInerney and Ted Johnson to 12-3. Building will start tomorrow. This should be completed 11/12/66.
 - F. Move Win Hindle, Bob Savell, Bob Lane, etc., (PDP-10 Engineering and Marketing) from building #5-5 to building #4-5. Allen Hanson is now making an estimate of the costs and will make a presentation to the Works Committee as soon as possible.
 - G. Move Jack Smith's storage from building #5-4 to building #4-5.
 - H. Remove all of the offices at the top floor of building #5 and exchange Field Service and PDP-8 Production area.
 - I. Move Bill Long's display group from building #5-3 to 5-5.
 - J. Move Mike Ford from building #6A to #5-3.

- K. Move Drafting from #8A to #6A.
 - L. Make the changes to building #12-1.
 - M. Make changes to the lobby in building #12-1.
*
2. Things to be done in the areas partially complete:
- A. The shops still have some plumbing to be done, particularly heating. Also painting is not complete in the women's toilet and some of the partitions. Insulate the wall between the shops and the loading dock and install 3/4" plywood bumper strips around this area to prevent this partition from being smashed. Install a new garage door which we have in stock to replace the old one now there. Install a barrier to protect the electrical services from being damaged. Patch and repair and seal the concrete floors in this area.
 - B. Paint the fronts of the offices for Larry Portner's area, building #12-2. Complete the painting around the stairwell and staining of the door partitions in that area and painting the wall in the coffee area. A work order was written for this. The painting contractor promises to start this as soon as he can possibly get men here. This should be toward the end of this week.
 - C. Dick Ward's area should be finished today.
 - D. The training area, building #11-2 has the installation of one five ton air conditioner with accompanying ducts, a small partition outside #8A, including a set of doors and a small partition to protect the electrical service entrance in building #11. These are all minor and should take two carpenters two to three days to complete. The plumber is also needed to connect the five ton air conditioner. Install fire extinguishers in this area and install five small window air conditioners.
 - E. Accounting area - The plumbing has been installed. A stall has to be installed in the ladies toilet in bldg. #3. The floor has to be layed and electrical outlets run to this area. The floor should be completed by Wednesday, October 26th. A door has to be cut through to allow fire exit access to this area through into Bob Brown's area. Harry Mann, Bob Dill and one other will occupy offices temporarily in the area that will soon become Bob Brown's area in building #3. Mort Ruderman

will be moved to building #4-5 as soon as space there is available (4-6 weeks).

3. Small jobs to be completed by the Plant Engineer. These are not necessarily in the right order of sequence.
 - A. Building #11-1, Install two 9,000 gallon tanks for etch material. Ferric Chloride due to arrive November 4th.
 - B. Provide additional office space for the personnel department.
 - C. Installation of PDP-8/S production overhead conveyor and build one production stockroom in this area.
 - D. Bob Brown's area - Complete as per his plan; some partition work, particularly in the white room and the area behind the white room.
 - E. Renovation and removal of some partitions in Mort Ruderman's area to allow use of this by Harry Mann and company.
 - F. Building #5-3 includes the shipping room area and install a blower heater to prevent cold from sweeping into the entire 3rd floor of building #5. Complete the area around Alexanian's office; one additional area - erection of some fences, etc.
 - G. PDP-9 area, lighting and power. I believe this to be about 90% completed. Ventilation for the above area has not been started.
 - H. Build an enclosure around the 50 cycle generator building 5-5.
 - I. Building #4-4 - Rearrange engineering offices - some partition work but this is minor.
 - J. Henry Crouse has again requested that we consider doing the ceiling in building #5 lobby.
 - K. Larry Portner has made a request that we look into a drop ceiling to cover the area in building #12 to occupy the computers. In Larry's instance, Allen will look into this.

The most expensive item here is the ducting of the air conditioning.

4. Jobs that are sensitive to weather conditions and should be completed as soon as possible.

- A. Finish painting the parking lot.
- B. Cut the brush in the areas adjacent to the parking lot to prevent scratching of cars parking in the periphery of the lot.
- C. Erect signs in the parking lot ("Stop", etc.)
- D. Erect steel barrier fence in the upper parking lot.
- E. Clean up the back areas; raking down the grass and removing the debris.
- F. Completing access to the fire exits in building #5.
- G. Completing dock stops at the top dock, building #5.

*1-N. Build partitions and install air conditioner, pond water for cooling, drop ceiling, and tile floor for Gardner Denver Machine, (due to arrive December 16th, 1966). This must have decisions no later than November 7th if work is to be complete by December 16th, 15 HP compressor to be installed.

dec

INTEROFFICE
MEMORANDUM

DATE October 25, 1966

SUBJECT Engineering Drawing Questionnaire Reply

TO Drafting Committee FROM J. Smith

cc: K. Olsen ✓

REFERENCE: Engineering Drawing Questionnaire Dated October 11 -
Requesting Reply by October 21

Question 1: Are you being provided with enough engineering
drawing information to properly fabricate, assemble
and test an item?

Answer: No

- A. To fabricate we have to order parts; we need parts lists in advance of prototype requirement.
- B. When engineering changes are made, we require better follow through from originating engineer insuring that Production does indeed have the most recent prints.
- C. The engineer should check the availability of parts before designing around them. We cannot assemble unobtainable components. Parts available in small quantities to the engineer are not necessarily obtainable in quantity for mass production.
- D. At present, the designer does not provide built in maintenance facility in the basic design.

Question 2: Are you receiving engineering drawings which are of
no valid use in the manufacture of an item?

Answer: No

- A. There is a tendency toward duplication in the various production stages when prints are partially ordered and then in turn ordered again for check-out or customer purposes; maybe a necessary evil.

- B. Before a print can be used in Production environment, it is usually finalized.
- C. If Production starts before prints are finalized, the prints should be so identified. The originating engineer is responsible.
 - 1. Identify preliminary release - "Not For Production".
 - 2. Identify preliminary release - "For Production".
 - 3. Identify final release - "For Production".
 - 4. Identify ECO input on prints.

After Final Release:

- 5. Identify unique changes on system basis.

Question 3: What level of documentation and of what drawing quality is needed for:

Answer:

- 1. One-Shot Item: Not a Production Item
- 2. Prototype: Not a Production Item
- 3. Pilot Production: Preliminary Production Release
- 4. Full Production: Production Release Prints

Production release prints are required on a scheduled basis, why not schedule Reproduction output.

Question 4: Specify the information that Drafting requires to properly provide the necessary documentation to the various department users.

Answer:

Immediate input and follow through by the originating engineer for:

- A. Engineering Holds
- B. Engineering Changes
- C. Engineering Releases

On an Option Basis:

2. Reproduction demand by product line (schedules) and the ability or means to produce.

Question 5: When models are used in the manufacturing process, what types of engineering drawings are needed? And what provisions are made for making and recording changes?

Answer: Models are usually a prototype made from unreleased prints.

Models must be serialized and modified, or be discarded by engineering changes, and replaced when necessary - a required engineering input before Production. A Production/engineer combined effort when in Production.

In conclusion, when a given system is completed and ready to be shipped, the pertinent changes in prints are hand drawn -

One copy to the customer..

One copy to Drafting (for finalizing and subsequent forwarding to the customer)..

Systems that are ready to ship must have priority for prints. When a customer set of prints is received "incomplete", the make-up problem is immediate - Drafting must (Reproduction) co-operate.



INTEROFFICE MEMORANDUM

DATE October 25, 1966

SUBJECT Capital Equipment Program

URGENT

TO Ken Olsen ✓
Win Hindle
Nick Mazzaresse
Stan Olsen
Ted Johnson

FROM Harry S. Mann

We appear to be in trouble on our capital equipment program. It is my recommendation that we take immediate steps to control future commitments in order to stay within the agreed upon budget.

The budget was set at a rate of \$100,000 per month or a total of \$1,200,000 for the year. As of October 24 we had committed for programs totaling \$473,440 and in addition we have new requests totaling \$148,639. On this basis we have \$578,000 available for commitment for the balance of the year (to July 1, 1967). Only a small part of the leasehold expenditures have been reflected to date.

I propose that we immediately recheck the capital equipment program by having everyone again check their expected requirements. If these requests exceed the available balance of \$578,000, we should then cut out the least important items on the lists.

Another area of capital equipment giving us trouble relates to the decision to roll-over demonstration and training equipment within a 3 month period. The training area seems to be having the most trouble in this regard.

Finally, it should be remembered that our budget was based on a sales volume of \$39,000,000. If we are not going to achieve this level, we should revise our budget downward.

I would like to discuss this problem at the next Product Line Meeting.

Harry S. Mann

HSM/clw

Report of the Chairman of the PDP-8/S
Marketing Review Committee

Members: J. Jones, Chairman
N. Mazzaresse
R. Lane
T. Johnson
M. Ruderman
D. Cotton.

24 October 1966

Meetings
held with: S. Olsen
H. Painter
S. Dinman

General Comments

It is the intent of the 8/S group to concentrate their marketing efforts in the OEM area. In light of the machine's appeal to this market and the group's limited personnel resources in the areas of marketing, field salesmen, and sales support, this seems appropriate. (Another viewpoint on the OEM marketing decision is being prepared by Dave Cotton.) It is reasonable to expect that they can better support a few large customers than many small ones.

The critical area for 8/S marketing is personnel. No individual is committed to either the support of the field salesmen or the development of specific market areas. We recommend that this field sales support position be filled immediately - by taking someone from module marketing; and that the hiring of personnel for market development work be given top priority by the 8/S group.

There is an inconsistency between projected shipments, manpower availability, and the OEM market objective. The PDP-8/S group should resolve the inconsistency at an early date since it will affect both profitability and cash flow. The concern arises from the following assumptions:

1. In the next 12 months we are planning to ship 650 PDP-8/S systems. Presumably production, capital equipment, and cash flow is being planned accordingly.

2. The machine will be sold to OEM customers.

3. A competent OEM customer can probably use one machine per month, once they get started, which can take anywhere from six to 18 months.

Report on the PDP-8/S
Marketing Review

24 October 1966

4. It takes a long time, and a lot of home-office effort to close an OEM account.

5. If we had 50 OEM accounts today, with each using one machine a month, we'd still have machines left over.

Therefore, we are concerned that if the 8/S meets its production schedule, a large negative back-log could result. We suggest that although the ultimate goal of 80 machines per month is probably reasonable, that the build-up to this amount should be more gradual. In any event, the inconsistency should be resolved.

Marketing Components

The following areas were discussed. Our conclusions are given in each area.

1. Marketing Organization - Covered in general comments.
2. Market Areas
 - a. desk calculator - (1) if 8/S is really competitive.
(2) move through an OEM customer; but could also be sold by our salesmen (if we ever had a spare marketing man.)
 - b. instrumentation - OEM customers will initially come to us. Real market penetration will require considerable in-house support.
 - c. machine tool control - Must have marketing personnel to develop the application.
3. Budget goals - Discussed in general comments. Note, the assumed bookings of \$450/year/salesman is low for our industry. SDS does \$1,000K/year/salesman on computers.

Report on the PDP-8/S
Marketing Review

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4. Peripherals
 - Some conscious decisions of what will and won't be offered are required.

The decision to add DECTape is inconsistent with the OEM market plan. (Only 5% of OEM PDP-8 computers have DECTape!)
5. Policy on special systems - O.K.
6. Programming Support
 - Won't code for customer's jobs
Burkhardt's group will be used
This resource is in short supply, but all OEM's want it.
Use caution.
7. Promotional literature
 - The handbook will ultimately be printed in the company Computer Handbook. F-85/S will also be printed on 8½ X 11 (3-hole) for customer software package.
8. Advertising
 - O.K.
9. Distribution
 - Use normal DEC salesmen. No unusual approaches seem very desirable.
10. Sales Support
 - a. sales notebook
 - No sales notebook - particularly undesirable without home-office marketing people. (A notebook is now being prepared.)
 - b. demonstrators
 - Only needed as you approach off-the-shelf delivery.
 - c. applications engineers
 - Will come from module group; will degrade this group's effectiveness on modules.

Report on the PDP-8/S
Marketing Review

24 October 1966

d. hand holding

- Home office man is definitely needed for customer and salesman support. Some present applications engineer should take this job.

11. Training

- Self teaching machines would really help this situation (at \$100 cost/machine/course with 1,000 machines per year this could save company \$200K/year).

PROPOSED
PRICE LIST
PDP-10

| | |
|---|------------|
| PDP10/10 | \$110,000. |
| 8,192 Words Core Memory (1.0 μ sec) | |
| Paper Tape Reader/Punch (300/50 cps) | |
| Console Teleprinter | |
| 2 Level Priority Interrupt | |
| PDP-10/20 | \$130,000. |
| 8,192 Words Core Memory (1.0 μ sec) | |
| Paper Tape Reader/Punch (300/50 cps) | |
| Console Teleprinter | |
| DEC Tape Control | |
| 2 - DEC Tape Units | |
| I/O Bus & 7 Level Priority Interrupt | |
| PDP-10/30 | \$170,000. |
| 16,384 words Core Memory (1.0 μ sec) | |
| or 16,394 Words Core Memory (1.6 μ sec) | \$160,000. |
| Paper Tape Reader/Punch (300/50 cps) | |
| Console Teleprinter | |
| DEC Tape Control | |
| 2 - DEC Tape Units | |
| I/O Bus & 7 Level Priority Interrupt | |
| PDP-10/40 | \$196,000. |
| 16,384 Words Core Memory (1.0 μ sec) | |
| or 16,384 Words Core Memory (1.6 μ sec) | \$186,000. |
| Paper Tape Reader/Punch (300/50 cps) | |
| Console Teleprinter | |
| DEC Tape Control | |
| 2 - DEC Tape Units | |
| I/O Bus & 7 Level Priority Interrupt | |
| Memory Protection & Relocation | |
| Extended Order Code | |
| 8 - Line Teletype Scanner | |
| 2 - KSR-33 Teletypes | |

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| | |
|--|------------|
| PDP-10/50 | |
| 32,768 Words Core Memory (1.0 μ sec) | \$329,000. |
| 32,768 Words Core Memory (1.6 μ sec) | \$309,000. |
| Paper Tape Reader/Punch (300/50 cps) | |
| Console Teleprinter | |
| DEC Tape Control | |
| 2 - DEC Tape Units | |
| I/O Bus & 7 Level Priority Interrupt | |
| Memory Protection & Relocation | |
| Extended Order Code | |
| 8 - Line Teleprinter Scanner | |
| 4 - KSR-33 Teleprinter | |
| Selector/Multiplexer Channel | |
| Disc File Control | |
| Disc File (440,000 words) | |

Processor Options

| | |
|--------------------------------------|------------|
| Additional Processor | \$ 75,000. |
| Extended Order Code (Byte & F.P.) | 12,000. |
| I/O Bus & 7 Level Priority Interrupt | 3,000. |
| Memory Protection & Relocation | 4,500. |
| Fast Memory | 9,000. |

Core Memory Options

| | |
|-----------------------------------|---------|
| 8,192 Words, 1.0 μ sec cycle | 40,000. |
| 16,384 Words, 1.0 μ sec cycle | 72,000. |
| 16,384 Words, 1.6 μ sec cycle | 62,000. |

I/O Options

| | |
|--|---------|
| DEC Tape Control | 15,000. |
| DEC Tape Unit | 2,350. |
| Magnetic Tape Control (545/570) | 18,000. |
| Magnetic Tape Control (IBM 729/DATAMEC 3029) | 22,000. |
| Magnetic Tape Unit (40 inches/sec, 800 bpi) | 12,000. |
| Line Printer and Control (600 lpm/132 cols) | 35,000. |
| Card Reader and Control (200 cpm) | 15,000. |
| Teleprinter Scanner, 8 lines | 7,500. |

Disc Files & Selector Channel Options

| | |
|------------------------------|------------|
| Selector/Multiplexer Channel | \$ 17,000. |
| Disc File Control | 12,000. |
| Disc File (440,000 words) | 32,500. |

Teleprinter Options

| | |
|--------|--------|
| KSR-33 | 900. |
| KSR-35 | 2,500. |
| ASR-33 | 1,200. |
| ASR-35 | 4,000. |

Multiprocessor Options

| | |
|---------------------------------|---------|
| PDP-8 Interface Control | 5,000. |
| PDP-8 Processor | 18,000. |
| *Teleprinter Control (16 lines) | 16,500. |

*Requires PDP-8



INTEROFFICE MEMORANDUM

DATE October 20, 1966

SUBJECT TRANSFER OF PERSONNEL TO MANUFACTURING OR PRODUCTION

TO Ken Olsen

FROM Loren Prentice

The following are personnel in shops to be transferred to the new manufacturing or production supervisor.

DICK RICHARDSON

This man has many fine qualities for leadership and has an excellent background of experience; thoroughly broad in scope, immediately applicable to the kind of experience and background needed in this plant. This applies to both the technique of management and the technical knowledge of shop procedures, however, he does have problem areas.

1. He is pressing a little too hard for personal advancement. This is never done in an offensive manner, but this tends to lead to other problems; namely, more effort is spent in proposing than in doing.
2. Insufficient attention is given to detail and planning and detail of execution.
3. Not close enough contact with his personnel and what they are doing.
4. A tendency to assign responsibility subordinate without sufficient indoctrination and follow-up on their training and performance.
5. The meetings he holds with his leaders are too long and tend to become argumentative.
6. Promises things beyond his ability to provide. This makes him appear to his people, to disappear into vagueness and half truth.
7. Takes too long in getting answers to their legitimate requests and does not turn off those requests that are unrealistic.

He has had a tragic home life during the past two years. His wife had a miscarriage November, 1964, and he lost his only

son June, 1965, after approximately six months of leukemia. His wife was completely distraught and has been under medical and psychiatric care for well over the past year. His wife, now much improved, has just given birth to a daughter, Friday, October 14th.

The above problems have caused considerable absence over the past year and one half. He has not handled these absences in the best manner and I believe he could and should have made better arrangements to cut them to a minimum and taken appropriate steps to have Dick Hebden and others cover these absenteeisms in a better manner and make sure people in management and those in contact with him were aware that he would be away. All of the above items have been discussed with Dick and response to them has been a little bit less than favorable,

RON CAJOLET

This man is being transferred to manufacturing to take charge of the Gardner Denver wire wrap operation. Ron has been with us for several years. He is a graduate of the University of Mass. and has a degree in Mechanical Engineering. I believe that we were his first and only employer and, because of his service, he was rather older than most mechanical engineering students at the time of his graduation. He made a rather slow start; took a long time to get his feet solidly planted and decide which of our different facets of engineering he was both satisfied with and most content in doing. But during the past 18-24 months, he has made remarkable progress. He is now an outstanding contributor in ideas and performance of his duties. He is all that needs to be desired and has a high degree of enthusiasm for his work. He is very enthusiastic about this new job. It is an opportunity to work with people and is the best suited man by both temperment and previous contact with this type of work for this job. He has not had experience in working with and supervising personnel and will need backing and counsel in this area. I do not believe this to be a serious problem, just one to have an awareness of.

MACHINE SHOP

This is comprised of a small machine shop and a somewhat larger sheet metal shop of approximately 35 to 40 people. These shops have grown slowly during the growth of the company and no time during the growth were they adequate to do all of the required work. At all times, work has been sent out to vendors, partly to take care of peak loads and partly our inability to ever properly staff these shops. Probably the most vital

contribution that these shops have made to the company has been the ability to produce new designs via prototypes and limited production in a comparatively short time, usually not longer than 3 months, of new computers, new products, in peripheral and so forth. The shops in general (and most particularly the machine shop) have been engineering oriented rather than production oriented. If they are to make the proper contribution to manufacturing, a change of attitude must be made with the personnel in these shops. This means a new type of indoctrination of the leaders, supervisors and foreman in the approach to better production techniques and more production orientation in general.



INTEROFFICE MEMORANDUM

DATE October 20, 1966

SUBJECT

TO K. Olsen

FROM J. Smith

Cy requires someone to set up the organization and information feedback of module lots in process. We discussed this at a meeting last week and could not decide on a man for the job.

Module availability is my most pressing problem and limiting schedule factor. Can we convince Cy that I should work with him on this problem for a month or so? I am confident that my group can function effectively without me for this period of time.

DEC

INTEROFFICE
MEMORANDUM

DATE October 20, 1966

SUBJECT TELARE (Representative in Sweden)

TO Ken Olsen ←
Stan Olsen
Nick Mazzaresse
Win Hindle
John Jones
Mike Ford
Mort Ruderman
Pat Greene

FROM Ted Johnson

We have made an arrangement with our representative in Sweden, Telare, to discontinue our contract as of December 20th of this year. This arrangement was concluded amicably with the new head of that organization, Mr. Walstam.

We have hired the sales engineer from Telare, Mr. Kjell Reistedt, who will be joining us on January 1st. A number of you have met him and he is considered by the customers in Sweden to be very capable technically and we have noticed that the interest in our products, and the confidence in our company, has gone up since we have taken steps to force more competent technical service in Sweden. We also have a field service engineer going to Stockholm in the near future, Mr. Sven-Olaf Martin, who is also regarded here in the plant as being extremely capable.

Recent inquiries from ASEA are very encouraging. They are the G.E. of Sweden and apparently Kjell Reistedt has been doing a good job there. They could be a Foxboro for European business and we will work to see that their top management is brought together with our management in the near future to encourage their continued interest in our business. ASEA, AGA, ARENCO and TELARE are all part of the Wallenberg family in Sweden, and I think it was a tribute to John Leng's diplomacy that we were able to come to such a businesslike resolution of this matter, without disturbing our potential interests. As it turns out, AGA was not very pleased with the performance of Telare and Telare, as most of you know, had, in fact, been complicating our business endeavors. It is very likely that without our account Telare will probably cease to exist since they have been losing enormous amounts of money over the last few years anyway.

TJ/mr

cc: John Leng

5/2,300
\$ 500 K.

TO: M. Ford C. Kendrick
 J. Jones N. Mazzaresse

FROM: J. Smith

cc: K. Olsen ✓

DATE: October 20, 1966

Attached you will find a detailed breakdown of the receipt activity to the Small Computer Stock Room for the past seven weeks. The numbers within parenthesis indicate the figures for the first and second weeks of October; however, these numbers have been included in the seven-week figures.

Outlined below is a comparison of receipts against requests for both the first two weeks of October and the total seven weeks.

| <u>Weeks 1 and 2 of October</u> | | | <u>Seven-Week Total</u> | | |
|------------------------------------|--------|-----|------------------------------------|--------|------|
| Types Ordered: | 208 | | Types Ordered: | 223 | |
| Types Received: | 112 | 54% | Types Received: | 173 | 78% |
| Weeks' Request: | 12,508 | | Weeks' Request: | 37,553 | |
| Quantity Received Against Request: | 7,378 | 59% | Quantity Received Against Request: | 28,735 | 77% |
| Number Ordered: | 12,508 | | Number Ordered: | 37,553 | |
| Number Received: | 11,760 | 94% | Number Received: | 40,554 | 108% |

Outlined below is the progression of "module mix" over the past seven-week period.

| | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 |
|-----------------|--------|--------|--------|--------|--------|--------|--------|
| Type | 26% | 42% | 58% | 69% | 74% | 82% | 78% |
| Quantity | 29% | 43% | 56% | 70% | 69% | 72% | 77% |
| Overall Numbers | 130% | 102% | 103% | 123% | 115% | 112% | 108% |

MODULE RECEIVAL STATUS REPORT

Week Ending: October 14, 1966

Weeks 1, 2, 3, 4, 5, 6 and 7

Please Note: Numbers within parenthesis represent weeks 1 and 2 of October.

| TYPE | QTY. ORDERED | QTY. RECEIVED | TYPE | QTY. ORDERED | QTY. RECEIVED |
|------|--------------|---------------|------|--------------|---------------|
| A100 | 38 (38) | | G603 | 779 (240) | 756 (356) |
| A101 | 2 | | G620 | 22 (10) | |
| A502 | 16 (6) | 22 (12) | G622 | 9 | |
| A601 | 110 (50) | 15 | G800 | 3 | 27 |
| A604 | 47 (24) | 9 | G802 | 15 | 24 |
| A704 | 18 (16) | 55 (21) | G804 | 8 (2) | |
| B104 | 177 (136) | 334 (224) | G805 | 19 (6) | |
| B105 | 521 (274) | 727 (24) | G808 | 45 (16) | 58 |
| B113 | 134 (59) | 113 (91) | G850 | 144 (66) | 224 (164) |
| B115 | 216 (80) | 229 (79) | G851 | 91 (8) | 10 (10) |
| B117 | 72 (20) | 71 (48) | G852 | 114 (66) | |
| B123 | 1 (1) | 46 | G882 | 46 (26) | 70 (46) |
| B124 | 22 (2) | 18 | G900 | 24 (14) | 32 |
| B130 | 18 | 55 | G903 | 5 | 11 |
| B131 | 47 (25) | 42 (12) | G904 | 4 (4) | |
| B141 | 356 (120) | 377 (48) | G920 | 9 (2) | |
| B155 | 16 (12) | 33 | R001 | 151 (80) | 301 (96) |
| B169 | 141 (67) | 285 | R002 | 959 (452) | 1362 (250) |
| B171 | 207 (45) | 259 (33) | R105 | 23 (10) | |
| B200 | 46 (4) | 72 | R107 | 887 (332) | 868 (223) |
| B201 | 935 (209) | 623 (189) | R111 | 772 (542) | 687 (306) |
| B204 | 147 (44) | 117 (30) | R113 | 131 (38) | 100 |
| B210 | 200 (13) | 188 (83) | R121 | 110 (36) | 116 |
| B213 | 241 (130) | 209 | R122 | 14 (7) | 108 |
| B301 | 60 (43) | 48 | R123 | 336 (186) | 636 (197) |
| B310 | 14 (3) | | R131 | 13 (6) | 7 |
| B360 | 230 (24) | 221 | R141 | 606 (156) | 725 (175) |
| B401 | 26 (10) | 12 | R151 | 162 (52) | 187 (78) |
| B405 | 12 (7) | 14 | R181 | 40 (30) | 111 (68) |
| B602 | 423 (136) | 420 (237) | R201 | 713 (256) | 786 (1) |
| B620 | 70 | 254 | R202 | 1225 (259) | 1018 |
| B684 | 261 (82) | 285 | R203 | 285 (124) | 423 (98) |
| G007 | 881 (360) | 651 (321) | R205 | 526 (147) | 594 (192) |
| G008 | 149 (36) | 136 (22) | R210 | 1208 (286) | 576 (181) |
| G009 | 7 (7) | 31 (31) | R211 | 1134 (264) | 577 (142) |
| G010 | 11 (3) | 8 | R220 | 578 (140) | 410 (290) |
| G081 | 64 (28) | 82 (36) | R284 | 26 (14) | 110 |
| G202 | 121 (24) | 217 (50) | R302 | 493 (176) | 100 (48) |
| G208 | 424 (180) | 397 (51) | R401 | 186 (62) | 124 |
| G209 | 858 (296) | 798 (108) | R405 | 73 (42) | 112 |
| G210 | 9 (3) | | R450 | 41 (16) | 28 |
| G211 | 51 | | R601 | 36 (34) | 62 (49) |
| G283 | 77 (28) | 90 (7) | R602 | 279 (108) | 237 (150) |
| G601 | 37 (3) | 37 | R603 | 554 (142) | 385 (231) |
| G602 | 41 (2) | 29 | R650 | 1188 (293) | 961 (371) |

| TYPE | QTY. ORDERED | | QTY. RECEIVED | | TYPE | QTY. ORDERED | | QTY. RECEIVED | |
|------|--------------|-------|---------------|-------|-------|--------------|-------|---------------|-------|
| S107 | 988 | (266) | 864 | (457) | 1110 | 1 | (1) | 1 | (1) |
| S111 | 1271 | (563) | 398 | (398) | 1113 | 11 | (8) | | |
| S151 | 5 | (5) | 13 | (13) | 1150 | 6 | (5) | 8 | (8) |
| S181 | 241 | (99) | 318 | (318) | 1201 | 26 | (26) | | |
| S202 | 196 | (70) | 643 | (205) | 1213 | 10 | (10) | 12 | (12) |
| S203 | 429 | (187) | 380 | (209) | 1304 | 15 | (15) | 7 | |
| S205 | 203 | (59) | 124 | (3) | 1310 | 1 | (1) | | |
| S284 | 200 | (44) | 211 | (143) | 1501 | 17 | (7) | 3 | (2) |
| S602 | 629 | (194) | 223 | (23) | 1534 | 23 | (6) | 14 | (12) |
| S603 | 1662 | (315) | 943 | (419) | 1535 | 42 | (13) | 6 | (6) |
| W005 | 234 | (106) | 318 | (87) | 1537 | 4 | (4) | | |
| W011 | 207 | | 1577 | (196) | 1562 | 1 | (1) | | |
| W016 | 2 | | | | 1567 | 35 | (14) | 22 | |
| W017 | 2 | | | | 1568 | 11 | (11) | | |
| W019 | 2 | (2) | 14 | | 1571 | 6 | (6) | 3 | (3) |
| W020 | 8 | (8) | 154 | | 1575 | 31 | (14) | 27 | (27) |
| W021 | 788 | | 2426 | (995) | 1579 | 33 | (13) | | |
| W023 | 98 | (98) | 987 | (378) | 1609 | 30 | (11) | | |
| W025 | 861 | (84) | 322 | (200) | 1663 | 14 | (6) | 12 | (12) |
| W026 | 116 | (116) | 551 | (351) | 1669 | 1 | (1) | | |
| W027 | 71 | (38) | 209 | | 1677 | 29 | (29) | 22 | (22) |
| W033 | 87 | (46) | 191 | | 1685 | 18 | (8) | 24 | (24) |
| W034 | 1733 | (333) | 2276 | (512) | 1703 | 31 | (14) | 36 | |
| W040 | 384 | (182) | 409 | (6) | 1705 | 17 | (8) | | |
| W042 | 17 | (7) | | | 1802 | 6 | (6) | 10 | (6) |
| W050 | 151 | (103) | 312 | (223) | 1978 | 1 | (1) | 9 | (9) |
| W051 | 34 | (14) | 20 | | 4102 | 232 | (105) | 104 | (11) |
| W070 | 193 | (43) | 305 | (30) | 4106 | 4 | (4) | | |
| W103 | 270 | (106) | 259 | (96) | 4113 | 202 | (64) | 37 | (33) |
| W300 | 177 | (60) | 259 | | 4114 | 8 | (8) | 13 | |
| W500 | 4 | | 4 | | 4115 | 39 | (27) | 8 | (8) |
| W501 | 78 | (53) | 124 | (49) | 4127 | 288 | (108) | 156 | (61) |
| W511 | 68 | (16) | 97 | | 4141 | 18 | (18) | 20 | |
| W513 | 19 | (19) | | | 4151 | 23 | (13) | | |
| W520 | 11 | (11) | 64 | | 4215 | 116 | (52) | 44 | (37) |
| W601 | 7 | (7) | 10 | | 4217 | 16 | (16) | 40 | |
| W602 | 40 | (7) | 58 | | 4218 | 4 | (4) | 23 | (23) |
| W607 | 173 | (47) | 92 | (30) | 4220 | 24 | (14) | 4 | (4) |
| W612 | 72 | (33) | 121 | (72) | 4221 | 16 | (10) | 5 | (5) |
| W640 | 688 | (123) | 615 | (152) | 4222 | 64 | (18) | 21 | (9) |
| W681 | 6 | (3) | 10 | | 4225 | 5 | (4) | 12 | |
| W684 | 1 | (1) | | | 4227 | 9 | (4) | 13 | (10) |
| W700 | 85 | (28) | 124 | | 4228 | 71 | (32) | | |
| W701 | 37 | (33) | 107 | (24) | 42281 | 36 | (12) | 36 | |
| W750 | 358 | (225) | 197 | (21) | 4260 | 8 | (7) | | |
| W802 | 85 | (7) | 9 | | 4261 | 9 | (7) | | |
| W980 | 22 | (22) | 261 | | 4301 | 9 | (6) | 13 | (3) |
| W985 | 12 | (7) | | | 4303 | 78 | (38) | 30 | (30) |
| W990 | 172 | (71) | 182 | | 4304 | 9 | (9) | | |
| W991 | 3 | (3) | 12 | (12) | 4306 | 11 | (8) | | |
| 1011 | 32 | (16) | 40 | | 4320 | 1 | (1) | | |
| | | | | | 4321 | 1 | (1) | | |

| TYPE | QTY. ORDERED | QTY. RECEIVED |
|------|--------------|---------------|
| 4401 | 8 (8) | 10 |
| 4410 | 4 (4) | 9 (5) |
| 4523 | 92 (37) | |
| 4526 | 21 (14) | |
| 4529 | 2 (2) | 7 |
| 4530 | 6 (6) | 61 (12) |
| 4531 | 4 (4) | 31 (12) |
| 4603 | 35 (10) | 4 (4) |
| 4604 | 52 (52) | |
| 4605 | 53 (30) | 44 (29) |
| 4606 | 17 (17) | |
| 4656 | 5 | 5 (5) |
| 4667 | 2 (2) | |
| 4671 | 4 (4) | |
| 4678 | 2 (2) | |
| 4688 | 15 (8) | 3 (3) |
| 4689 | 49 (8) | 52 (28) |
| 4706 | 10 (10) | 7 (7) |
| 4707 | 11 (11) | 18 (14) |
| 4903 | 25 (2) | 23 (3) |
| 4904 | 14 (14) | |
| 4905 | 106 (16) | 103 (17) |
| 4910 | 85 (10) | |
| 4912 | 155 (50) | 54 (13) |
| 4915 | 18 (18) | |
| 6102 | 148 (48) | 59 |
| 6106 | 6 (6) | 1 |
| 6122 | 6 (2) | |
| 6202 | 1 | 1 (1) |
| 6203 | 4 (4) | |
| A702 | | 11 |
| B681 | | 13 |
| G001 | | 164 |
| G091 | | 4 |
| G201 | | 20 (20) |
| G809 | | 10 (10) |
| R212 | | 31 (31) |
| R303 | | 14 |
| S211 | | 200 |
| W002 | | 24 |
| W032 | | 684 |
| W071 | | 368 |
| W101 | | 46 (22) |
| W505 | | 1 |
| W600 | | 13 |
| W989 | | 140 |
| 1000 | | 7 |
| 1115 | | 20 |
| 1607 | | 9 |
| 1973 | | 2 (2) |

| TYPE | QTY. ORDERED | QTY. RECEIVED |
|------|--------------|---------------|
| 1987 | | 11 (11) |
| 4112 | | 48 (15) |
| 4117 | | 1 (1) |
| 4214 | | 10 |
| 4407 | | 2 (2) |
| 4505 | | 2 (2) |
| 4659 | | 3 (3) |
| 4680 | | 21 |
| 4702 | | 4 |
| 4902 | | 9 (9) |

digital

EQUIPMENT

G. M. B. H.

K O L N

INTEROFFICE

MEMO

SUBJECT Signature required
TO Ken Olsen

DATE Oct. 20, 1966
FROM Cologne Office

Please sign the enclosed letter to the Postscheckamt München,
between the two exclamation marks, and return it to us.

This letter simply states that the company has changed its
address from Munich to Cologne, but requires the signature
of the "Geschaeftsfuehrer".

Thanks in advance.

*File
10/25/66*

Margret Bensberg

Margret Bensberg

Encl.

A. Olsen

dec INTEROFFICE
MEMORANDUM

DATE 20 October 1966

SUBJECT PDP-8/S Design Review Committee Report

| | |
|---|--|
| TO K. Olsen T. Johnson H. Mann S. Dinman Product Line Managers PDP-8/S Review Committee | FROM L. Seligman, Chairman E. DeCastro A. Kotok J. Shields |
|---|--|

1. OVERALL DESIGN CONCEPT & ORGANIZATION -

The overall design and processor organization seem to be quite well thought out. The comments below should be taken from that perspective.

- a - It is necessary to re-arrange the basic system when options such as extra memory are added. This will prove to be inconvenient.
- b - Location of the teletype control in the base of the ASR-33 is both awkward and expensive. The teletype becomes incompatible with other DEC ASR-33's and is not easily remoted from the processor.
- c - The design of the teletype control does not properly account for long term stability requirements on the clocks. A R450 clock should be substituted for the R401's.
- d - The derivation of IOP pulses from a variable delay chain has proven to be less than satisfactory on previous computers. Alternate 8/S bit time pulses should be used to generate the IOP's.

2. CIRCUITS -

Most circuits are standard and are known to operate satisfactorily. The new modules, in general, appear very well designed with the following exceptions:

- a - W506 - bringing 115 VAC on to the module is unnecessary and dangerous. It should be removed.
- b - W706, W707 - these teletype modules have the same special problems found in previous large modules. They are difficult to test and repair. Further, they are the first FLIP-CHIP modules with internal jumper lugs.
- c - PDP-8/S engineering must take steps to insure proper incoming inspection and test of the integrated circuits it plans to use.

3. MEMORY

Margins on the memory, especially timing are extremely impressive. Its cost, circuiting, and packaging speak of an excellent engineering job. We suspect that the variable cycle time will be undesirable for the programmer and, hence, the memory control in the basic machine should be changed to be compatible with the control in the extended memories.

4. INTERFACE AND OPTIONS

Cabinet size constraints have made the attachment of certain options (and the teletype) unwieldly. Data break, normally almost free, has become quite expensive.

- a - The basic decision to keep the IO interface compatible with the PDP-8 is sound. To maintain this compatibility, the data break option should include the MB gateing required to keep the data break interface compatible with the PDP-8.
- b - Since small computer users grow less and less sophisticated as system prices drop, an interface manual clearly specifying all lines and giving examples of typical designs should be written. Much of the PDP-8 interface manual is directly applicable.
- c - The IO bus cable type & maximum length needs to be specified. Cable deliveries are very slow, especially if a new type is needed.

5. SPECIFICATIONS AND ACCEPTANCE TESTING

This area is generally undefined and should be pinned down as quickly as possible. Preliminary information in the hands of Field Service should be formalized by PDP-8/S engineering.

- a - Machines going to shows should be acceptance tested for the experience.
- b - We are afraid that the pressure of early deliveries will curtail acceptance testing. Such testing is desirable because it helps find machine bugs early in their life.

6. DIAGNOSTIC PROGRAMMING, MAINTAINABILITY

The diagnostic programming aspect seems very well under control.

- a - PDP-8/S engineering must explain its new drafting conventions, perhaps by adding a print which describes the symbology.

PDP-8/S Design Review Committee Report
20 October 1966

- b - The maintenance manual is rather important and should be given high priority in the schedule.

7. DEVELOPMENT AND PILOT PRODUCTION SCHEDULE

- a - The development and initial production schedule has been pushed up unreasonably. Delivery schedules have very little likelihood of being met.
- b - The option schedule seems quite reasonable. It should not be pushed up or the items in No. 8, will be hurt even more.
- c - There has been no pilot production run. Hence, machines will be shipped before sufficient refinement of manufacturing and confidence in test procedures has been achieved.

8. PRODUCTION ENGINEERING

There has been essentially no production engineering work done on the 8/S because of a shortage in personnel. Thus, although the basic engineering and design is very sound, we anticipate production delays due to myriads of minor, avoidable problems. The current production facilities and staff seem wholly inadequate for the projected production rates.

Although an automated test facility is planned, the planning is not sufficiently concrete at this time to warrant optimism. We feel that the computerized test facility as envisioned is feasible, but we are afraid the personnel resources allocated the project are inadequate to meet the time scale.

We feel that as in PDP-7 and early PDP-8, too much burden has been placed on one man. Saul's accomplishments are extraordinary, indeed, but one man cannot carry design, sales, checkout, documentation, etal. himself. Now that we are a production company, play-it-by-ear development methods are insufficient. Production lines must run smoothly, computer after computer, or we will not be able to capture all of the small computer market.



INTEROFFICE MEMORANDUM

DATE October 20, 1966

SUBJECT ACQUISITION OF THE REMAINDER OF BUILDING #5

TO Ken Olsen
Harry Mann
Al Hanson

FROM Loren Prentice

In light of the development that American Can is going to cease operations on February 15th, 1967, and that we will probably acquire by lease, this portion of the plant, the following items which now belong to American Can Company must be considered.

1. The first and probably most important is the electrical power distribution system. Power is being furnished by an underground line from a sub station in West Concord at 48,000 to 49,000 volts to a block-house located outside the plant on Thompson Street. This is conducted from the block-house into the plant at high voltage, to a transformer bank enclosed in cinder blocks on the first floor of building #5. Some of these transformers have already been moved. I believe this distribution system would be large enough to accommodate our whole operation in this building.
2. Water Processing Plant - They possess two systems of stainless steel water treatment plants for treating water pumped in from the pond, used for cooling purposes, and returned to the pond.
3. Compressed air distribution system - This is comprised of a single stage system of Worthington compressors and receivers located in the basement of building #5 on the Walnut Street end. These compressors have not had any preventative maintenance in about three to four years and they are deemed to be in bad shape and would need immediate overhaul.
4. Process Steam - They own small cyclo therm boilers located in the boiler house. I believe there are eight of these small boilers providing process steam for their area. These are used for heating, dryers, jackets of extruders, blow molders, etc. Most of this has been changed over the electric heating and some of it may not have been used for several years.

Not only does this upset and change our outlook on the use of the present buildings, but an immediate survey should be made of this building to find out what other facilities exist

and accommodation should be reached with Bradley Sun, if possible, to install our first Gardner Denver machine in that area. Also, we should consider all of the present moves in light of this new possibility. I suggest that an immediate task force be set-up, comprising of Harry Mann, Ken Olsen, Allan Hanson and Pete Kaufman to explore the possible strategy and use of this area.



INTEROFFICE MEMORANDUM

DATE October 20, 1966

SUBJECT Proposed Eight Week
Firm Module Order

TO Product Line Managers FROM Galen Davis

Purpose:

In order that the Module Production Department can look ahead and plan with more confidence.

Proposal:

The four week firm order system does not allow enough time to plan and build 100% of the need and guarantee deliveries within the scheduled period.

The time involved to complete the mfg. cycle is estimated to be as follows:

1. One Week
 - A. To collect product line requirements.
 - B. Explode and order materials.
 - C. Make sequence schedules.
2. Two Weeks
 - A. Bring into stock, raw and mfg. materials plus items not anticipated on forecasts.
 - B. Prepare production starts.
 - C. Expedite delayed raw and mfg. materials.
3. Fourth to Eighth Weeks
 - A. Make starts on daily basis.
 - B. Allow for normal turnover time.
 - C. Test and deliver within desired weekly requests.

After four weeks of each cycle another months requirement will be requested. The ordering schedule would appear:

First Tuesday in Nov. - Dec. Firm
Plus Projection

Third Tuesday in Nov. - Jan. Firm

Third Tuesday in Dec. - Feb. Firm
Plus Projection

Third Tuesday in Jan. - March Firm
Plus Projection

Third Tuesday in Feb. - April Firm
Plus Projection

We realize, this system, because of the long firm order will require a degree of flexibility, which we are prepared to build into it. Sound planning by the product lines should keep these alterations to a minimum.

GD/nlf

INTEROFFICE MEMORANDUM

DATE October 20, 1966

SUBJECT PDP-6/PDP-10/360-67 - Misc. Notes

TO Win Hindle

FROM Gordon Bell

CC: R. Lane
L. Portner
R. Savell
J. Shields
K. Olsen ✓

Summary

I spent 2 hours Friday talking with Ed Feigenbaum, Head of the Stanford Computation Centers. He has commented on the PDP-6, 10, the 360 software, etc. I've added some stuff on marketing, etc. of PDP-10.

IBM 360/67

Basic results of Stanford simulation of the IBM 360/67 revealed that their computer would deliver only 3% of its capacity to customers (30 consoles) while the remaining time is spent pushing files up and down through the core-drum-disc heirarchy whether it needed it or not. They worked on their configuration, and IBM's monitor, and feel its possible to get it to 20% useful capacity to customers. Needless to say, everyone is waiting to "try" the system. CIT's hardware arrives in Dec. '66, the model 67 software won't be available (pre Beta-level) until March '67.

Lincoln Lab. has received their dual processor 67, are happy, due to high reliability, and operation is under the Basic Operating System (non Time Shared Monitor).

PDP-6 Stanford

He discussed PDP-6 at Stanford, and said that the "PDP-6 Time Sharing Software was the worst possible". Later, I got him to admit that the IBM Software, as it was proposed and they were getting, was worse. His complaints were:

1. Awkward command language. His example was DTAZ: lZ, because he would rather say CLEAR DTAZ
2. Not enough CUSPS. "You can't do anything."
3. LISP not too good.

4. He didn't know about TECO.
5. I'm not sure he knows about Fortran IV, or Small Cobol.
6. MTBF (hardware & software) = 1 hour.

"It's unreliable, but no one cares because it's being used experimentally."

He says McCarthy plans on rewriting the software for PDP-6. He says that Chuck Baker is having an awful time at RAND, and he told me about the "Red & Green calendar". It seems that a higher level type working with Jack Shields might be useful here. I seriously doubt if Chuck is programming enough data checks. It may be necessary to do disc/drum complete read checks.

PDP-10

He told me about PDP-10, and that McCarthy was pleased that DEC was planning to market a PDP-10. He commented that the speed looked comparable to a Model 67. Stanford computation center (Amdahl of IBM is there) has made several studies to determine the worth of paging and segmentation, and have concluded that it's debateable. After lots of simulation, etc. the only way to settle the question is to wait until the 67 is running, and try it.

The PDP-6 order code, according to Chuck, (and Stanford feels the same way) is about a factor of 2 better than the 360. (For a given program, it takes $\frac{1}{2}$ the instructions to do the same job.) I suspect they are over-rating the '6, but from the coding I've seen here, the "Base address register concepts" is questionable, and lots of overhead is involved in coding, besides being painful to organize.

It would be worth while visiting him, and getting him to make his comments. Hopefully, Win might meet with him at FJCC. The reliability questions should be resolved - so he and Chuck believe the hardware is as reliable as any that size. They could both be rather helpful as sales people. It is certain that they will be anti-sales people. The Stanford people travel and talk a lot. At least demonstrate TECO and Fortran IV quality to him.

Fortran IV

I believe the Fortran IV Compiler is one of the best compilers ever written in terms of space, speed, and code quality.

Digitek is doing the advanced Fortran IV for the 360, and as such should be able to do better because of the '6 experience.

I would like a sample of the Fortran IV code generated, which could be shown to the people here. This could also provide the basic text for a sales brochure on the software. Please send me a sample program which illustrates the goodies.

Bob Floyd, an Associate Professor in computer science here, would like a FIV listing (documentation too) to study, if possible.

L⁶ (ACM Communications June or July or August 1966

This language I mentioned when at Maynard has got the Computer Science and Computation Center departments excited here. They've implemented their version, *1, by defining a bunch of MACROS. I'll send the stuff on it. This language is the basis for implementing other systems languages. They have writing IPL V, in it and may write LISP, and COMIT. They also are writing a program, CABAL, in it which they intend to use for building all their compilers.

My guess is that L⁶ will run in $\frac{1}{2}$ the space of a 360. It's not a difficult program, and is especially good for writing the above, and also automated design.

ALGOL

People here are ALGOL enthusiasts, but not as closed minded as I expected.

They are supplying the 360 ALGOL, and it's already running, but they are doing a better one after the 360 gets installed. I'm quite impressed with ALGOL, but Fortran does have the universality.

CDC has been here to talk 3300, 6400, and 6600 and has been squelched by my inane comment "What's the phone number to your system so we can try it?" I've tried to get GE-645 information, but the word is that it's off the market.

PDP-10, and DECUS

An active DECUS could provide a great deal of sellable system software. For the first time, the '6 system software provides a framework which is reasonably independent of hardware configuration, and thus then should be a great deal of interest in sharing the generation of software. This would include everything from MATRIX, statistical packages, PDP-8 assemblers, to the routine that drives the Calcomp plotter for our own drawing program.

A strong user's group could provide more sales than the sales force.

PDP-10 at CIT

I'm giving a couple of sessions on PDP-6 systems software in a programming seminar course. There's currently talk of a couple more computers here, including one to do hybrid computation. I'd like the above stuff to arouse interest. Also, when the PDP-10 announcement occurs, I'd like a couple of people to come and give a talk on Hardware & Software.



INTEROFFICE
MEMORANDUM

DATE October 19, 1966

SUBJECT Paper Ash Trays

TO Robert Lassen

FROM Peter Waldron

cc: Ken Olsen ✓
T. McInerney

Attached is a sample paper ash tray, that is available through a local paper house (Stimpson Incorporated).

It is 4 1/2" square; aluminum foil laminated on paperboard. Packed 1M per shipping case priced as follows:

| | | | |
|------|---|---|--------------|
| 0-9M | . | @ | \$9.95 per M |
| 10M | | @ | \$7.39 per M |
| 50M | | @ | \$6.95 per M |

Presently, we have been purchasing 4 3/4" square glass ash trays. The annual usage figures are, roughly, 350 @ \$.24 each.

Ken thought there is a possibility that it might be less expensive for us to use paper ash trays. Since there is a cost savings, we could also pass these out at our trade shows and attach a colorfull presure sensitive label on the inside bottom.

Pete Waldron



INTEROFFICE MEMORANDUM

DATE October 19, 1966

SUBJECT Yesterday's Meeting - "Module Mix"

TO K. Olsen

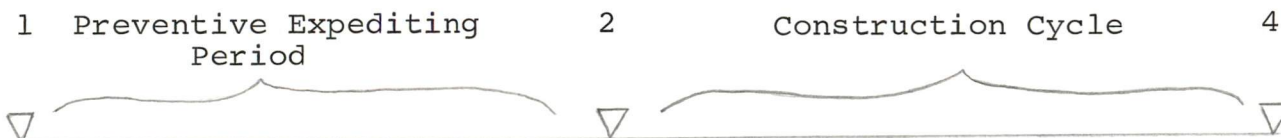
FROM J. Smith

I met with Cy and Galen after yesterday's meeting and below is my conclusion.

There is a basic problem in our present methods and procedures for the ordering and issues of module production starts to the floor. The present method calls for the issuance to the floor of module lots two weeks prior to the requested dates by the product lines. With the present two-weeks' cycle time to build modules, this does not allow time for "preventive expediting" of missing material. Material is not drawn until the day it is due to be issued to the floor. This leads to a huge shortage situation (currently over 100 lots in stock).

In order for a scheduling system to be effective, there must be a period of time allowed for "preventive expediting". Material should be drawn and a missing parts list generated two weeks prior to a planned production start. With the present two-week construction and test cycle, this would be four weeks prior to the product lines requested delivery. If this can be accomplished, actual lot material availability is known two weeks in advance of its need. Thus, a two-week "preventive-expediting" period for missing material. Once we have a computerized system, lots do not physically have to be put up; "material reserves" can be set up through the computer. Graphically the system would be as depicted below:

Product Line Requested Delivery - Week 4



Draw Material:
Missing List
Generated:

Production
Start:

Requested
Delivery:

From my discussion with Cy and Galen, I find this system cannot be incorporated with our present procedure for ordering modules. Information collection and data processing time take two weeks, which in essence is the two weeks required for "preventive expediting". In order for the system to work, only a slight change would be required in the module-ordering procedure. Instead of the product lines submitting orders the first of each month, orders would be submitted two weeks prior to this date. This would allow two weeks of data processing, two weeks of "preventive expediting" and two weeks for the construction cycle. I will discuss this with Dave Packer.

It seems to rub people the wrong way to voluntarily report they have problems and are behind schedule. For this reason, an effective reporting procedure must be developed by Management that will point to problem areas. We have encountered this in the Computer Manufacturing area and through a series of reports, we feel we are on the way to resolving the problem. Examples of reports are included.

It would clarify the situation if Module Production issued a weekly report stating what planned "production starts" were not completed and what were the limiting factors. This is an "exception" type report and would indicate the problem areas. They could start by listing the current lots in stock.

Cy is greatly under staffed in the scheduling organization expediting and reporting area. Until he is sufficiently staffed, we will continue to experience problems.

October 19, 1966

Capital Equipment Appropriation on Gardner Denver Machine

John Trebendis

R. Dill

C After you called yesterday, I looked up the approved request for the wire wrap machine and the approved amount is \$152,250. I suggest that you contact J. Smith and have another capital appropriation form submitted for approval of the additional \$40,000 of accessories that you have been requested to order.

O
P RFD/clw

CC: K. Olsen ✓
H. Mann
H. Crouse

Y



INTEROFFICE MEMORANDUM

DATE October 18, 1966
SUBJECT Construction time for Mechanical parts
for Engineering Projects
TO Loren Prentice FROM Bob Savell

One of the problems on PDP-10 has been getting quick delivery on mechanical items to use to construct the prototype cabinets.

The problem seems to be that the shops treat all work somewhat alike, both routine production and engineering, as far as scheduling is concerned. I believe that if DEC is to continue to be able to engineer new products on short schedules that the service groups must be set up to provide faster than normal production lead times for engineering items.

cc: W. Hindle
K. Olsen
D. Nevala
D. Richardson

OCT 19 1966

INTEROFFICE
MEMORANDUM

DATE October 18, 1966

SUBJECT New Three C's Computer

TO Ted Johnson

FROM Perry Harris

I have come across the following information about the new CCC Computer.

Name - CCC 516
Size - 16 bits & parity & guard (guard may be for 256 word blocks)
Cycle Time - 950 nanoseconds
Price - 23K with 4K memory

It will be integrated circuit and similar in concept to DDP-116. It will have larger instruction set with character manipulation instructions (half word moves, swaps, I/O etc.).

They will have already delivered one to Stromberg-Carlson upon announcement, (supposedly October 25). The advertising campaign will be "No Paper Tiger" one is already delivered, etc. Price is \$23,000. with 4K memory. Approximately 33K with 8K memory.

There will be a stripped version called the CCC 416. It will be slanted toward communications market. Many of the 516 options will not be offered. Price 19K.

Information comes from a former 3C marketing type. He says 3C is trying to push into the small machine OEM market and away from systems field.

This information of course could change before announcement so take it for what it's worth. It looks as though we have already lost one PDP-9 sale in N. E. to this machine.

CC: Dave Cotton
John Jones
Mike Ford ✓
Howie Painter

cc

→ KHO ✓

File

Brochure in file "Letter Enclosures"



INTEROFFICE MEMORANDUM

SUBJECT ASEA, Sweden

DATE October 18, 1966

TO Ken Olsen 

FROM Ted Johnson

Ken:

For your information I am sending you the attached brochures on ASEA, Sweden.

If later this Fall you are planning another trip to Europe, I think it would be most appropriate if you would pay a call to ASEA management and possibly if Harry goes, he might be interested in doing the same. I think they are very interested in talking to our senior people to assure them of our interest in doing business with them.

When you are finished with the brochures, please return them to Margaret for our file on ASEA and Dr. Kredell's visit.

TJ/mr

Attachment

dec

INTEROFFICE
MEMORANDUM

DATE October 17, 1966

SUBJECT

TO Ken Olsen

FROM Jack MacKeen

Reference: Your memo of 10/12/66 - Evening Works Committee Meetings

I feel that the topics you wish to cover at these meetings, "How to use our secretaries," "How we get our work done," would also be of value to most of the staff personnel. I know that I would be interested.

Could these meetings be broadened to include those people?

JM:ds

CC: Pat Greene



INTEROFFICE MEMORANDUM

DATE October 17, 1966

SUBJECT MECHANICAL REVIEW MEETING OF THE PDP-8/S, October 13, 1966

TO Stan Olsen

FROM Ron Cajolet

The following are topics which were discussed at the Mechanical Review Meeting of the PDP-8/S, held October 13.

Castings seem to be the right approach, however, we must look into a better way of machining them. At the moment the limitations of our Bridgeport make it a fairly costly operation.

There are two areas related to the hinged cover which should be looked into. One is the notches at the back of the cover; these we could eliminate with a slight change in design. The other is the tight tolerances which are called out on the machined parts which act as pivots.

The subject of a vacuum formed cover was brought up, however, it was not obvious that this would be cost saving and it was commented that it would be less sturdy and be more subject to damage.

Cut outs at the back of the lower side panel could be eliminated also with a small change in design.

A smoke test or an air velocity test should be made to determine the air flow and the necessity of covering one of the slotted side panels.

Replacing the studs on the back panel and or side panel with screws would be cheaper and might not change the overall appearance of the machine.

There is some problem in chromacoating the frame casting as it has to be degreased at a high temperature and there is possibility of stress relieving at this point. We could use unchromacoated panels until we receive stress relieved ones.

continued---

Painting the lower part of the front bezel black can be accomplished by using a masking fixture. There is no necessity for using tweed over tweed. This could be an over spray of black enamel.

We should look into the cost of the glass panel again, especially since there is a possibility of ordering large quantities of these. (five hundred to a thousand) In the event that a redesign of the machine comes up, we did discuss the possibilities of giving the pin area more protection. This could be accomplished by adding a couple of bars that run from front to back either as a permanent part of the machine or a temporary guard. Another possibility is to have the cover fixed on the bottom and hinged out so that you could only open it when the machine was tilted on its side. Another possibility is to have the cover hinge as the top does. In the event of a redesign, we could make a casting for the back corner which would act as a gusset and support and also a hinge point for the cover or covers. This could be a symmetrical piece so that only one casting was necessary. Also, a frame work could be made up for the hole back section including these castings. The machine could sit one half inch up off the table which would give the pin protection that we need.

cc: Ken Olsen
Dick Richardson
Dick Hebden
Dave Nevala
Jim Jordan
Paul Rawson - Van Dyke Associates



INTEROFFICE MEMORANDUM

DATE October 17, 1966

SUBJECT ANSWER TO QUESTIONNAIRE

TO K. Olsen
Drafting Review Committee

FROM R. W. Richardson

1. Yes
2. Yes. Many times when we are fabricating parts for a system or complete unit we will receive final assembly drawings that pertain to operations we do not perform. It is my opinion that these should go to the pertinent department direct and not to us. Often they get dirty or lost in transit and have to be reissued.
3.
 - 3.1 Rough sketch, verbal or sample item.
 - 3.2 Sketches as drawn by the engineer on a limited release basis.
 - 3.3 Pilot runs up to ten units could be built from prints as supplied from the engineer or sketches from drafting on a limited release basis and unchecked depending on the complexity of the unit.
 - 3.4 Final prints checked and signed off for production.
4. Drafting should be given a list of all purchased parts, model numbers and specs of items used in the unit along with sketches and types of prints desired depending on the end use of the product.
5. If models are used, there should not be a need for prints also. There may be a need, however, for a parts list or other means of identifying hardware, etc. Models should be changed only by the model shop and not production. If changes are required, the model shop should keep an up-to-date file of the changes or the obsolete models.

My personal feeling is that models should only be used for engineering evaluation and production should be trained to use prints.

General

I highly endorse the use of isometric drawings for the assembly of complex units such as cabinets, TU55, etc. This type drawing makes assembly much easier and reduces the training time when hiring new employees.

digital MEMO

DATE October 17, 1966

TO K. H. Olsen FROM Personnel
H. Mann
S. Olsen
N. Mazzaresse
W. Hindle

Attached is the Monthly Employment Report for August and September of this year. Monthly reports such as these will be prepared by this office for your review in an attempt to summarize our employment activities for the month. Subsequent reports will also include our projected personnel requirements as of the end of the month.

JDM/jfr

CONFIDENTIAL



INTEROFFICE
MEMORANDUM

CONFIDENTIAL

DATE September 30, 1966

SUBJECT Monthly Employment Report (domestic)

TO FROM

1. TOTAL EMPLOYMENT

| | |
|----------------|------|
| Permanent..... | 1163 |
| Part-time..... | 238 |
| Co-op..... | 4 |

2. ADDITIONS TO PAYROLL (9/1/66 - 9/30/66)

| | |
|----------------|-----|
| Permanent..... | 74 |
| Part-time..... | 103 |
| Co-op..... | 2 |

3. NEW HIRES BY VOCATION (permanent) (9/1/66 - 9/30/66)

| | |
|---------------------------------------|----|
| Field Service Engineers..... | 2 |
| Applications Engineers (Sm. Comp.)... | 2 |
| Technicians..... | 6 |
| Mechanical Technicians..... | 2 |
| Wiremen..... | 6 |
| Programmers..... | 2 |
| Salesmen (Ted Johnson)..... | 2 |
| Promotional Writer (Lg. Comp.)..... | 1 |
| Marketing - Display (Sm. Comp)..... | 1 |
| Instructors (Training)..... | 1 |
| Mailman..... | 1 |
| Machine Operators..... | 2 |
| Maintenance Mechanic..... | 1 |
| Junior Expediter..... | 1 |
| Draftsmen..... | 1 |
| Junior Tech. Writer..... | 1 |
| Clerical..... | 16 |
| Female Assemblers..... | 25 |
| Matron..... | 1 |

4. NEW HIRES BY VOCATION (part-time) (9/1/66 - 9/30/66)

| | |
|--------------------------------|----|
| Female Assemblers 6-10..... | 29 |
| Female Assemblers 9-3..... | 56 |
| General Production (male)..... | 16 |
| Clerical..... | 2 |
| Co-op..... | 2 |

5. TERMINATIONS

Permanent.....30
Part-time.....16

6. MONTHLY TURNOVER RATE

Permanent..... 2.64%

7. REASONS FOR TERMINATIONS (permanent)

Dissatisfied..... 6
Return to School..... 4
Military Service..... 4
Terminated by Company..... 4
Husband transferred..... 3
Marriage..... 2
Better Position..... 2
Relocation..... 2
More Money..... 1
Travels Distance..... 1
Family Problems..... 1

8. TERMINATIONS BY DEPARTMENT (permanent)

Module "A"..... 5
Small Computer Prod. Eng..... 2
U.S. Sales..... 3
Sub Assembly..... 3
Accounting..... 2
Module Marketing..... 1
General Administration..... 1
Drafting..... 2
Mechanical Engineering..... 2
Sm. Computer Checkout..... 2
Maintenance..... 1
Sm. Computer Marketing..... 3
Personnel..... 1
Field Service..... 1
Module "D"..... 1



INTEROFFICE
MEMORANDUM

DATE August 31, 1966

SUBJECT Monthly Employment Report (Domestic)

CONFIDENTIAL

TO

FROM

1. TOTAL EMPLOYMENT

| | |
|----------------|------|
| Permanent..... | 1119 |
| Part-time..... | 151 |
| Summer..... | 47 |

2. ADDITIONS TO PAYROLL (8/1/66 - 8/31/66)

| | |
|----------------|----|
| Permanent..... | 67 |
| Part-time..... | 26 |

3. NEW HIRES BY VOCATION (permanent)-(8/1/66-8/31/66)

| | |
|--------------------------------|----|
| Nurse's aid..... | 1 |
| Salesmen (Ted Johnson)..... | 3 |
| Instructors (training)..... | 1 |
| Male Production (Kendrick).... | 3 |
| Female Production..... | 17 |
| Clerical..... | 15 |
| Personnel Assistants..... | 1 |
| Programmers..... | 4 |
| Field Service Engineers..... | 5 |
| Technicians..... | 5 |
| Mechanical Technicians..... | 1 |
| Exhibits Coordinators..... | 1 |
| Draftsmen..... | 1 |
| Components Engineers..... | 1 |
| Wiremen (Jack Smith)..... | 1 |
| Electrical Inspectors (female) | 1 |
| Expediter..... | 1 |
| Computer Operators..... | 1 |
| Administrative Assistants..... | 1 |
| Engineers (Bob Savell)..... | 1 |
| Technical Typists..... | 1 |

4. TERMINATIONS

| | |
|----------------|----|
| Permanent..... | 27 |
| Part-time..... | 17 |

5. MONTHLY TURNOVER RATE

Permanent..... 2.47%

6. REASONS FOR TERMINATIONS (permanent)

Dissatisfied..... 7
Better Position..... 2
More Money..... 3
Military..... 1
Return to School..... 4
Marriage..... 2
Family Problems..... 2
Travel Distance..... 1
Terminated by Company..... 1
Husband Transferred..... 1
Pregnant..... 2
Join Peace Corp..... 1

7. TERMINATIONS BY DEPARTMENT

Module "A"..... 6
Accounting..... 3
Module "D"..... 2
Tech. Pubs..... 3
Board Processing..... 1
Small Computer Check-out..... 2
Purchasing..... 2
Computer Programming..... 2
Strate Processing..... 1
Module Sales..... 1
National Sales..... 2
Small Computer Administration.. 1
Large Computer Engineering..... 1



INTEROFFICE MEMORANDUM

DATE 14 October 1966

SUBJECT PDP-9 Manufacturing Cost

TO Ken Olsen **FROM** Larry Seligman

Attached is August 22, 1966 cost estimate on the PDP-9; it is now being revised. This cost is known to be approximately \$1,000 higher than the actual manufacturing cost due to the reduction in memory stack price.

Larry

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PLEASE DO NOT REPRODUCE

THE ATTACHED

Distribution List:

J. A. Jones
L. Seligman
N. Mazzaresse
E. Harwood

PDP-9 MANUFACTURING COST

| | |
|--------------------------------|---------------|
| Cabinetry (detail A) | \$ 720.00 |
| Reader/Punch | 800.00 |
| Teletype | 500.00 |
| Processor Wing (detail B) | 3,340.46 |
| Memory Wing (detail C) | 6,413.93 |
| I/O Wing (detail D) | 2,201.95 |
| Power Supply (detail E) | 814.35 |
| Assembly/Final Test (detail F) | <u>445.00</u> |
| Total | \$15,235.69 |

22 August 1966

CABINETY (detail A)

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| | | |
|----------------------------|-------|-----------|
| CONSOLE | \$ | 175.00 |
| BAY (basic) | | 305.00 |
| MISC. HARDWARE (9 special) | | 80.00 |
| TABLE & FRAME | | 80.00 |
| CHAIR | | 80.00 |
| | Total | \$ 720.00 |

CONSOLE PARTS-BREAKDOWN

| No. Req'd | Part Description | Unit Cost | Total Cost |
|--------------|---|--------------|---------------|
| 1 | Lower switch bracket | \$ 3.00 | \$ 3.00 |
| 12 | Toggle and rotary switches | 1.60 | 19.20 |
| 5 | Stackpole switch bracket assy. with 9 switches @ .26 | 10.00 | 50.00 |
| 2 | Mounting brackets | 3.00 | 6.00 |
| 1 | Etch board | 7.00 | 7.00 |
| 6 | 18 Pin Connectors (12-18 PCC) | 1.20 | 7.20 |
| 60 | Bulbs | .10 | 6.00 |
| 1 | Etch board assembly labor | 8.00 | 8.00 |
| 2 | Control panel assembly & wiring | 6.00 | 12.00 |
| 1 | Pexiglass panel | 28.00 | 28.00 |
| 1 | Benelex glass support | 13.00 | 13.00 |
| 1 | Sheet metal trim (painted) | 5.00 | 5.00 |
| 1 | Lower switch panel | 10.00 | 10.00 |
| | Total | \$ | 174.40 |

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BAY PARTS - BREAKDOWN

| No REQ'D | PART DESCRIPTION | UNIT COST | TOTAL COST |
|-------------|------------------------|--------------|---------------|
| 1 | 31" Cabinet Frame | | 100.00 |
| 2 | Cover Screens | 5.00 | 10.00 |
| 4 | Casters | 1.50 | 6.00 |
| 4 | Levelers | 1.20 | 4.80 |
| 2 | End Panels | 30.00 | 60.00 |
| 1 | Rear door (Louvered) | | 35.00 |
| 2 | Door Spacer | .30 | .60 |
| 1 | Vent Strip | | 5.00 |
| 4 | Door Hinge Pin | .35 | 1.40 |
| 2 | Door Magnets | | .75 |
| 2 | Door stop | 2.50 | 5.00 |
| 4 | Trim strips (Standard) | 2.00 | 8.00 |
| | Cabinet Assembly | | 65.00 |
| TOTAL: | | | \$301.55 |

MISCELLANEOUS HARDWARE BREAKDOWN

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| NO REQ'D | PART DESCRIPTION | Unit COST | TOTAL COST |
|-------------|----------------------------------|--------------|---------------|
| 1 | Plenum door post | 5.00 | 5.00 |
| 1 | Plenum door latch plate | 1.00 | 1.00 |
| 1 | Striker plate | 1.00 | 1.00 |
| 1 | Plenum door latch pin | 1.75 | 1.75 |
| 2 | Panel dividers | .75 | 1.50 |
| 2 | Table support brackets | 1.20 | 2.40 |
| 2 | Horizontal support bars | 3.00 | 6.00 |
| 1 | Vertical support bar | 4.00 | 4.00 |
| 1 | Small door | 13.00 | 13.00 |
| 2 | Hinge pins | .50 | 1.00 |
| 1 | Magnets | .75 | .75 |
| 1 | Door Stop | 3.00 | 3.00 |
| 1 | Striker plate | 1.00 | 1.00 |
| 1 | Detachable cover with kick plate | 17.00 | 17.00 |
| 2 | Detachable cover brackets | .50 | 1.00 |
| 4 | 5 $\frac{1}{4}$ " Plastic covers | 5.00 | 20.00 |
| | | | <hr/> |
| | | | \$ 79.40 |

PROCESSOR (detail B)

| | |
|------------------|---------------|
| MODULES | \$ 2,540.46 |
| WIRE WRAPPING | 250.00 |
| FRAME (detail G) | 400.00 |
| ASSEMBLY | 50.00 |
| TEST | <u>100.00</u> |
| | \$ 3,340.46 |

MODULE BREAKDOWN

| <u>Module Type</u> | <u>Number of Modules Used</u> | <u>Unit Cost</u> | <u>Total Cost</u> |
|--------------------|-----------------------------------|------------------|-------------------|
| B104 | 1 | \$ 4.29 | \$ 4.29 |
| B105 | 18 | 5.33 | 95.94 |
| B131 | 19 | 20.52 | 389.88 |
| B169 | 41 | 9.28 | 380.48 |
| B213 | 76 | 12.64 | 960.64 |
| B210 | 2 | 19.19 | 38.38 |
| B602 | 7 | 10.44 | 73.08 |
| G210 | 2 | 11.50 | 23.00 |
| G920 | 1 | 200.00 | 200.00 |
| R002 | 15 | 1.93 | 28.95 |
| R111 | 27 | 4.66 | 125.82 |
| R302 | 1 | 18.37 | 18.37 |
| R401 | 2 | 14.47 | 28.94 |
| S107 | 1 | 8.42 | 8.42 |
| S202 | 3 | 9.60 | 28.80 |
| S603 | 2 | 10.39 | 20.78 |
| W005 | 5 | 4.66 | 23.30 |
| W050 | 2 | 4.69 | 9.38 |

PROCESSOR (detail B) Continued

MODULE BREAKDOWN

| <u>Module Type</u> | <u>Number of Modules Used</u> | <u>Unit Cost</u> | <u>Total Cost</u> |
|--------------------|-----------------------------------|------------------|-------------------|
| | | | \$ 2,458.45 |
| W505 | 1 | 11.39 | 11.39 |
| W612 | 6 | 11.77 | <u>70.62</u> |
| | | | \$ 2,540.46 |

MEMORY (detail C)

| | |
|------------------|---------------|
| Modules | \$2,708.93 |
| Wire Wrapping | 250.00 |
| Frame (detail G) | 400.00 |
| Stack | 2,850.00 |
| Stack Mount | 10.00 |
| Assembly | 75.00 |
| Test | <u>120.00</u> |
| Total | \$6,413.93 |

Stack Breakdown

| | |
|------------------------------|--------------|
| 150,000 bits @1.8 | \$2,700.00 |
| Diodes | 100.00 |
| 20 connector boards @ \$2.50 | <u>50.00</u> |
| | \$2,850.00 |

MEMORY MODULE BREAKDOWN

| <u>Module Type</u> | <u>Number of Modules Used</u> | <u>Unit Cost</u> | <u>Total Cost</u> |
|--------------------|-----------------------------------|------------------|-------------------|
| B104 | 3 | \$ 4.29 | \$12.87 |
| B105 | 5 | 5.33 | 26.65 |
| B169 | 9 | 9.28 | 83.52 |
| B213 | 16 | 12.64 | 202.24 |
| B301 | 6 | 18.06 | 108.36 |
| B602 | 1 | 10.44 | 10.44 |
| G008 | 1 | 28.51 | 28.51 |
| G009 | 18 | 30.70 | 552.60 |
| G010 | 2 | 20.00 | 40.00 |
| G209 | 42 | 27.47 | 1,153.74 |
| G620 | 8 | 20.00 | 160.00 |
| G804 | 1 | 30.00 | 30.00 |
| G805 | 4 | 30.00 | 120.00 |
| R002 | 1 | 1.93 | 1.93 |
| R111 | 1 | 4.66 | 4.66 |
| W025 | 12 | 1.45 | 17.40 |
| WOXX | 2 | 1.50 | 3.00 |
| W612 | 13 | 11.77 | <u>153.01</u> |
| | | | \$ 2,708.93 |

I/O (detail D)

| | |
|------------------|---------------|
| MODULES | \$ 1,276.95 |
| WIRE WRAPPING | 250.00 |
| FRAME (detail G) | 400.00 |
| ASSEMBLY | 75.00 |
| TEST | <u>200.00</u> |
| | \$ 2,201.95 |

MODULE BREAKDOWN

| Module Type | Number of Modules Used | Unit Cost | Total Cost |
|-------------|---------------------------|-----------|------------|
| B213 | 5 | \$12.64 | \$63.20 |
| B301 | 1 | 18.06 | 18.06 |
| G903 | 1 | 12.33 | 12.33 |
| R002 | 9 | 1.93 | 17.37 |
| R111 | 28 | 4.66 | 130.48 |
| R141 | 19 | 4.94 | 93.86 |
| R302 | 4 | 18.37 | 73.48 |
| R303 | 1 | 14.97 | 14.97 |
| R401 | 1 | 14.47 | 14.47 |
| R450 | 1 | 29.25 | 29.25 |
| S107 | 13 | 8.42 | 109.46 |
| S202 | 25 | 9.60 | 240.00 |
| S203 | 7 | 10.33 | 72.31 |
| S205 | 7 | 11.12 | 77.84 |
| S602 | 4 | 10.17 | 40.68 |
| S603 | 6 | 10.39 | 62.34 |
| W005 | 5 | 4.66 | 23.30 |
| W040 | 6 | 10.90 | 65.40 |

I/O (detail D) Continued

MODULE BREAKDOWN

| <u>Module Type</u> | <u>Number of Modules Used</u> | <u>Unit Cost</u> | <u>Total Cost</u> |
|--------------------|-----------------------------------|------------------|-------------------|
| | | | \$ 1,158.80 |
| W050 | 7 | 4.69 | 32.83 |
| W501 | 2 | 7.35 | 14.70 |
| W612 | 6 | 11.77 | <u>70.62</u> |
| | | | \$ 1,276.95 |

POWER SUPPLY (detail E)

| | |
|------------------|---------------|
| Electrical Parts | \$ 599.35 |
| Mechanical Parts | 15.00 |
| Assembly/Wiring | <u>200.00</u> |
| Total | \$ 814.35 |

ELECTRICAL PARTS BREAKDOWN

| <u>Number</u> | <u>Unit</u> | <u>Unit Cost</u> | <u>Total Cost</u> |
|---------------|----------------------------|------------------|-------------------|
| 4 | 728 | \$ 54.20 | \$216.80 |
| 1 | 738 | 67.08 | 67.08 |
| 1 | 778 | 108.21 | 108.21 |
| 1 | 779 | 83.50 | 83.50 |
| 1 | 841 A | 53.38 | 53.38 |
| 1 | Marginal Check Panel | 61.45 | 61.45 |
| 1 | 25' Line Cord | 6.93 | 6.93 |
| 1 | Real Time Clock XFormer | 2.00 | <u>2.00</u> |
| | Total | | \$599.35 |

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FINAL TEST (detail F)

| | |
|---|------------------|
| System Assembly - 3½ hrs. @ 6.00 | \$ 20.00 |
| Cabling -12 hrs. @ 6.00 + \$100.00 | 175.00 |
| Final Check Out/Heat Margins - 24 hrs. @ \$6.00 | 150.00 |
| Paperwork/Acceptance - 8 hrs. @ \$6.00 | 50.00 |
| Crating - 8 hrs. @ \$6.00 | 50.00 |
| Total | <u>\$ 445.00</u> |

FRAME (Detail G)

| | | |
|----------------------------------|--------------------------|-------------|
| Frame | | \$ 25.00 |
| Bars | - 3 @ \$1.64; 1 @ \$1.71 | 6.63 |
| Blocks | -40 @ \$4.50 | 180.00 |
| Assembly (includes bussing) | | 74.87 |
| Marginal Check/Fan Housing Parts | | 115.37 |
| Assembly | | <u>9.37</u> |
| | | \$ 400.00 |

MARGINAL CHECK/FAN HOUSING PARTS BREAKDOWN

| Type | Cost |
|----------------|-------------|
| Fan Housing | \$ 36.50 |
| Assembly | 5.41 |
| Marginal Check | 41.76 |
| Assembly | 23.24 |
| Misc. Parts | <u>3.46</u> |
| | \$ 115.37 |



INTEROFFICE MEMORANDUM

DATE October 14, 1966

SUBJECT Flip-Chip Modules using -3V Strates

TO Ken Olsen ✓
Stan Olsen
Dick Best
Mort Ruderman
Steve Mikulski
Dick Dresilinski
Frank Fortin
Tom Stockebrand
Larry Seligman
Ed DeCastro
Bob Savell
Saul Dinman
Jim Cudmore
Jack Shields
Cliff Pitz

FROM Dick Clayton

In the course of LINC-8 production we have found that a substantial number of modules (especially R107 & S107 modules) have been put in machines with the defective -3V clamp supplies. The problem is apparently due to faulty -3V strates. The pin which connects -15V to the resistor, that provides current to hold 3V across the diode string, breaks loose. This leaves the module in a state of 0V across the clamp supply unless at least one inverter is cut off. Because there is a .01 uf capacitor across the diode string this condition can be rather difficult to detect.

I currently understand that R107 and S107 modules are being tested for this problem, but that other modules can slip by the automatic testing procedure. The entire problem is further confounded because the nature of the contact break is such that it may be intermittent.

I feel this is one of the most serious type of quality control problems the Company can see. It means that systems are checked out as good, but when modules are switched around to other locations they may not work at all.

--2--

Test samplings of modules in systems currently in production indicate sufficiently high rates of faulty modules (approximately 5%) with -3V strates that we find it necessary to retest every such module.

Dick

djc



INTEROFFICE MEMORANDUM

DATE October 13, 1966

SUBJECT I. C. Standardizations

TO 10 MC IC Committee
R. Savell
R. Sogge
J. Sutton

FROM Henry J. Crouse

cc: K. Olsen
P. McGaunn

I wish to add the Purchasing viewpoint to your initial report, specifically, in the areas of availability, cost and standardization.

The availability of any IC configurations is a matter of matching our needs to the vendor's capabilities. I don't mean to oversimplify, except to point to the level of activity that all IC manufacturers are participating in with all the Committee's reviews. Digital Equipment Corporation is a significant customer of semiconductors — near three million dollars last year, so I believe we will have available to us what we want.

Cost is going to be determined by the design simplicity, yield factor and volume.

Standardization, as history indicates, is a matter of high volume production. The prime example of standardization is the 2N2894 PNP plastic transistors we buy for twenty-five cents. Digital Equipment Corporation is the prime user of these devices, in fact, Fairchild made a special wafer diffusion to get designed in. We were the only customer, but a one million piece customer.

Conclusion: We can buy IC's now in packages or as chips, inexpensively — volume, competition and negotiations will insure a low price.

Henry J. Crouse



INTEROFFICE MEMORANDUM

DATE October 12, 1966

SUBJECT Your memo to Stan Olsen dated 10/4/66

TO Ken Olsen

FROM Frank Kalwell

cc: Stan Olsen

In regard to your memo to Stan dated 10/4/66 on the subject of preferential treatment to Allied Radio vs "old customer Battelle-Northwest", I looked into the situation and discovered the following:

Periods 7/9/65 to 12/30/65, our deliveries to Allied vs Battelle were delivery periods 6 to 10 weeks after receipt of order. This included all purchase orders in the house regardless of the customer. I initially felt we may have given Allied preferential treatment on their first large stocking order but, after checking, I discovered it was 10 weeks prior to completion. A year ago, our deliveries were identical to our present status (6 to 10 weeks).

I've talked with Ken Larsen and he feels that Mr. Jim Russell, of Battelle Northwest, is content for the time being with DEC and its deliveries. The Module Sales group will insure that Mr. Russell gets proper delivery information on all his outstanding orders.

Frank A. Kalwell



INTEROFFICE MEMORANDUM

DATE October 12, 1966

SUBJECT Lead Solderability

TO C. Kendrick
D. Widder

FROM H. Brockington

cc: R. Best
H. Crouse
K. Olsen ✓

Lead solderability tests were conducted per EIA standard RS-178-A, Solderability Test Standard. Fresh components, including Allen Bradley carbon composition resistors, El-Menco dipped mica capacitors, some diodes and some transistors with gold plated leads were used.

The test included dipping in rosen-alcohol flux and then immersion in a solder bath for the prescribed five seconds. Test temperatures of 237 and 273°C were used. All results were very good, with better results obtained at 277°C. Much more of the rosen was evaporated away at the higher temperatures.

Further tests will be conducted with other fluxes and component leads that have been exposed to corrosive atmosphere.

A supplement to this memo will be issued reporting on these results in the near future.

Harry F. Brockington



INTEROFFICE MEMORANDUM

DATE October 12, 1966

SUBJECT

TO Ken Olsen

FROM Mike Ford

The IBM Composer does not perform the same functions that our PDP-8 Typesetting System performs. This machine will badly hurt such products as the Friden Justowriter and the ATF Model B-8.

The literature claims automatic hyphenation capability, but I don't believe it. We will see the equipment, I think, at the ITCA Show this week in Philadelphia, and be able to evaluate it better then. Reports I have on it state first deliveries in 24 months! For these reasons, I do not feel the IBM Composer will hurt us.

IBM is slated to imminently announce a photo-composition machine of unknown price and specs. This tied into the IBM 1130 could hurt us somewhat depending on the price. It is for this reason we have been so friendly with Photon, and are hustling the Photon 513 and 713 programs.

Mike

ejb



INTEROFFICE MEMORANDUM

DATE October 12, 1966

SUBJECT DISCS

TO Ken Olsen
Win Hindle
B. Savell
L. Prentice

FROM Ken FitzGerald
Steve Lambert

1. Since March Steve and I have designed 4 different 32K word, disc units.
2. Models of all of them were made and tried out-all worked to our design specs.
3. We will have 2 prototypes completed before the end of this month.
4. These units were designed with simplicity, low cost, reliability, and 416,000 bit size as prime factors. Therefore no attempts were made to push the state of art by crowding bits per inch or tracks per inch.
5. In designing and building these units we have determined the parameters that will control the design of bigger and better disc systems. The following is a list of general specs that we feel can be delivered in a larger system. Note that this system will fit a standard 19" rack mounting and can be built from mechanical & logic components that have been produced or are presently being produced for either ourselves or others:

5,250,000 Bits
17" Disc
128 Tracks, one side
32 Head shoes, (4 heads per shoe for the present)
10.5" Inner track dia
15.54" Outer track dia
12" High 19" rack mounting
Retractable Heads
Rated for 1200 BPI
1.2 Microsecond Bit to Bit transfer rate N.R.Z.I. (Serial)
1800 RPM 33.3 Millisecond worst case access time
44,000 Bits/track 36,800 data bits
300 Nanosecond B-B transfer rate 4 track parallel
for PDP-10 only (additional \$100.00 approximate cost
increase in electronics)

If we were to start building this larger unit our present schedule for the small disc would not allow us to actively work full time on it until 1st of January. However, there are items of design that will take longer than others to be resolved, and they might be started sooner. They are:

1. Disc material & quality
2. Head configuration (No. of heads/shoe)
3. Head Gimbaling & retraction
4. Dynamic disc parameters
 - A. Balance

- B. Runout
- C. Wobble
- D. Maximum RPM.

5. Suggested control paramets

These problems necessitate equipment design or purchase, and materials searches.

The equipment needed is mostly in the nature of testers such as:

1. Disc surface tester
 - A. To scan the complete surface to be used for dropouts & signal losses
2. Head Tester
 - A. To determine head electrical uniformity
 - B. To determine correct dynamic flying specs
3. Head alignment tester
 - A. To determine correct interleaving
4. Disc Dynamic Tester
 - A. Wobble
 - B. Runout
 - C. Balance
 - D. Speed Limit
5. Disc Static Tester
 - A. Flatness

- B. Finish
- 6. Life testers
 - A. Retraction
 - B. Disc Surface
 - C. Motor

ESTIMATED COST

| | |
|---|---------------|
| 128 Heads @ \$15.00 /hd approximately | \$1,920.00 |
| Disc | 250.00 |
| Motor | 150.00 |
| Mtg Plate Disc & Motor | 100.00 |
| Head Mtg. Plate | 250.00 |
| Shock Mounts, slides, covers, etc. | 250.00 |
| Mechanical Assembly | 250.00 |
| Diode Matrix Board | 50.00 |
| Readers Writers timing & format Cont. (Serial track R/W) | <u>400.00</u> |
| | \$ 3,620.00 |

DEC INTEROFFICE MEMORANDUM

TO: M. Ford C. Kendrick
 J. Jones N. Mazzaresse

FROM: J. Smith

DATE: October 12, 1966

cc: K. Olsen ✓

Attached you will find a detailed breakdown of the receival activity to the Small Computer Stock Room for the past six weeks. The numbers within parenthesis indicate the figures for the first week of October; however, these numbers have been included in the six-week figures.

Outlined below is a comparison of receivals against request for both the first week of October and the total six weeks.

| | <u>Week 1 of October</u> | | <u>Six-Week Total</u> |
|------------------------------------|--------------------------|--|-----------------------|
| Types Ordered: | 203 | | 218 |
| Types Received: | <u>64</u> 32% | | <u>178</u> 82% |
| Week's Request: | 6,254 | | 31,299 |
| Quantity Received Against Request: | <u>2,605</u> 42% | | <u>22,579</u> 72% |
| Number Ordered: | 6,254 | | 31,299 |
| Number Received: | <u>6,229</u> 100% | | <u>35,023</u> 112% |

Outlined below is the progression of "module mix" over the past six-week period.

| | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 |
|-----------------|--------|--------|--------|--------|--------|--------|
| Type | 26% | 42% | 58% | 69% | 74% | 82% |
| Quantity | 29% | 43% | 56% | 70% | 69% | 72% |
| Overall Numbers | 130% | 102% | 103% | 123% | 115% | 112% |

MODULE RECEIVAL STATUS REPORT

Week Ending: October 7, 1966

Weeks 1, 2, 3, 4, 5 and 6

Please Note: Numbers Within
Parenthesis Represent
Week 1 of October

| TYPE | QTY. ORDERED | QTY. RECEIVED | TYPE | QTY. ORDERED | QTY. RECEIVED |
|------|--------------|---------------|------|--------------|---------------|
| A100 | 19 (19) | | G620 | 17 (5) | |
| A101 | 2 | | G622 | 9 | |
| A502 | 13 (3) | 22 (12) | G800 | 3 | 27 |
| A601 | 85 (25) | 15 | G802 | 15 | 24 |
| A604 | 35 (12) | 9 | G804 | 7 (1) | |
| A704 | 10 (8) | 55 (21) | G808 | 37 (8) | 58 |
| B104 | 109 (68) | 334 (224) | G805 | 16 (3) | |
| B105 | 384 (137) | 703 | G850 | 111 (33) | 60 |
| B113 | 105 (30) | 37 (15) | G851 | 87 (4) | |
| B115 | 176 (40) | 229 (79) | G852 | 81 (33) | |
| B117 | 62 (10) | 71 (48) | G882 | 33 (13) | 24 |
| B124 | 21 (1) | 18 | G900 | 17 (7) | 32 |
| B130 | 18 | 55 | G903 | 5 | 11 |
| B131 | 34 (12) | 42 (12) | G904 | 2 (2) | |
| B141 | 296 (60) | 329 | G920 | 8 (1) | |
| B155 | 10 (6) | 33 | R001 | 111 (40) | 205 |
| B169 | 108 (34) | 285 | R002 | 733 (226) | 1362 (250) |
| B171 | 184 (22) | 259 (33) | R105 | 18 (5) | |
| B200 | 44 (2) | 72 | R107 | 721 (166) | 745 (100) |
| B201 | 831 (105) | 523 (89) | R111 | 501 (271) | 481 (100) |
| B204 | 125 (22) | 87 | R113 | 112 (19) | 100 |
| B210 | 193 (6) | 105 | R121 | 92 (18) | 116 |
| B213 | 176 (65) | 209 | R122 | 11 (4) | 108 |
| B301 | 39 (22) | 48 | R123 | 243 (93) | 439 |
| B310 | 13 (2) | | R131 | 10 (3) | 7 |
| B360 | 218 (12) | 221 | R141 | 528 (78) | 550 |
| B401 | 21 (5) | 12 | R151 | 136 (26) | 109 |
| B405 | 8 (3) | 14 | R181 | 25 (15) | 111 (68) |
| B602 | 355 (68) | 183 | R201 | 585 (128) | 786 (1) |
| B620 | 70 | 254 | R202 | 1095 (129) | 1018 |
| B684 | 220 (41) | 285 | R203 | 223 (62) | 423 (98) |
| G007 | 701 (180) | 330 | R205 | 452 (73) | 594 (192) |
| G008 | 131 (18) | 136 (22) | R210 | 1065 (143) | 481 (86) |
| G009 | 3 (3) | 31 (31) | R211 | 1002 (132) | 491 (56) |
| G010 | 10 (2) | 8 | R220 | 508 (70) | 410 (290) |
| G081 | 50 (14) | 82 (36) | R284 | 19 (7) | 110 |
| G202 | 109 (12) | 217 (50) | R302 | 405 (88) | 52 |
| G208 | 334 (90) | 346 | R401 | 155 (31) | 124 |
| G209 | 710 (148) | 758 (68) | R405 | 52 (21) | 112 |
| G210 | 8 (2) | | R450 | 33 (8) | 28 |
| G211 | 51 | | R601 | 19 (17) | 13 |
| G283 | 63 (14) | 83 | R602 | 225 (54) | 87 |
| G601 | 35 (1) | 37 | R603 | 483 (71) | 154 |
| G602 | 40 (1) | 29 | R650 | 1042 (147) | 889 (299) |
| G603 | 659 (120) | 662 (262) | S107 | 855 (133) | 672 (265) |

| TYPE | QTY. ORDERED | QTY. RECEIVED | TYPE | QTY. ORDERED | QTY. RECEIVED |
|------|--------------|---------------|-------|--------------|---------------|
| S111 | 989 (281) | 102 (102) | 1150 | 3 (2) | |
| S151 | 2 (2) | | 1201 | 13 (13) | |
| S181 | 192 (50) | | 1213 | 5 (5) | |
| S202 | 161 (35) | 643 (205) | 1304 | 7 (7) | 7 |
| S203 | 336 (94) | 380 (209) | 1310 | 1 (1) | |
| S205 | 174 (30) | 124 (3) | 1501 | 13 (3) | 1 |
| S284 | 178 (22) | 68 | 1534 | 20 (3) | 2 |
| S602 | 532 (97) | 200 | 1535 | 36 (7) | |
| S603 | 1504 (157) | 725 (201) | 1537 | 2 (2) | |
| W005 | 181 (53) | 301 (70) | 1567 | 28 (7) | 22 |
| W011 | 207 | 1577 (196) | 1568 | 6 (6) | |
| W016 | 2 | | 1571 | 3 (3) | |
| W017 | 2 | | 1575 | 24 (7) | 12 (12) |
| W019 | 1 (1) | 14 | 1579 | 26 (6) | |
| W020 | 4 (4) | 154 | 1609 | 25 (6) | |
| W021 | 788 | 2426 (995) | 1663 | 11 (3) | 12 (12) |
| W023 | 49 (49) | 955 (346) | 1669 | 1 (1) | |
| W025 | 819 (42) | 122 | 1677 | 14 (14) | 22 (22) |
| W026 | 58 (58) | 351 (151) | 1685 | 14 (4) | |
| W027 | 52 (19) | 209 | 1703 | 24 (7) | 36 |
| W033 | 64 (23) | 191 | 1705 | 13 (4) | |
| W034 | 1566 (166) | 1864 (100) | 1802 | 3 (3) | 10 (6) |
| W040 | 293 (91) | 403 | 4102 | 180 (53) | 93 |
| W042 | 14 (4) | | 4106 | 2 (2) | |
| W050 | 100 (52) | 238 (149) | 4113 | 170 (32) | 13 (9) |
| W051 | 27 (7) | 20 | 4114 | 4 (4) | 13 |
| W070 | 171 (21) | 305 (30) | 4115 | 26 (14) | |
| W103 | 217 (53) | 259 (96) | 4127 | 234 (54) | 141 (46) |
| W300 | 147 (30) | 259 | 4141 | 9 (9) | 20 |
| W500 | 4 | 4 | 4151 | 16 (6) | |
| W501 | 52 (27) | 124 (49) | 4215 | 90 (26) | 7 |
| W511 | 60 (8) | 97 | 4217 | 8 (8) | 40 |
| W513 | 9 (9) | | 4218 | 2 (2) | 23 (23) |
| W520 | 5 (5) | 64 | 4220 | 17 (7) | 4 (4) |
| W601 | 4 (4) | 10 | 4221 | 11 (5) | |
| W602 | 37 (4) | 58 | 4222 | 55 (9) | 12 |
| W607 | 149 (23) | 92 (30) | 4225 | 3 (2) | 12 |
| W612 | 56 (17) | 121 (72) | 4227 | 7 (2) | 3 |
| W640 | 626 (61) | 615 (152) | 4228 | 55 (16) | |
| W681 | 5 (2) | 10 | 42281 | 30 (6) | 36 |
| W700 | 71 (14) | 124 | 4260 | 4 (3) | |
| W701 | 20 (16) | 83 | 4261 | 6 (4) | |
| W750 | 246 (113) | 197 (21) | 4301 | 6 (3) | 13 (3) |
| W802 | 82 (4) | 9 | 4303 | 59 (19) | |
| W980 | 11 (11) | 261 | 4304 | 5 (5) | |
| W985 | 8 (3) | | 4306 | 7 (4) | |
| W990 | 136 (35) | 182 | 4321 | 1 (1) | |
| W991 | 2 (2) | 12 (12) | 4401 | 4 (4) | 10 |
| | | | 4410 | 2 (2) | 4 |
| 1011 | 24 (8) | 40 | 4523 | 73 (18) | |
| 1110 | 1 (1) | | 4526 | 14 (7) | |
| 1113 | 7 (4) | | 4529 | 1 (1) | 7 |

| TYPE | QTY. ORDERED | QTY. RECEIVED | TYPE | QTY. ORDERED | QTY. RECEIVED |
|------|--------------|---------------|------|--------------|---------------|
| 4530 | 3 (3) | 59 (10) | | | |
| 531 | 2 (2) | 31 (12) | | | |
| 4603 | 30 (5) | | | | |
| 4604 | 26 (26) | | | | |
| 4605 | 38 (15) | 15 | | | |
| 4606 | 8 (8) | | | | |
| 4656 | 5 | | | | |
| 4667 | 1 (1) | | | | |
| 4671 | 2 (2) | | | | |
| 4678 | 1 (1) | | | | |
| 4688 | 11 (4) | | | | |
| 4689 | 45 (4) | 47 (23) | | | |
| 4706 | 5 (5) | 7 (7) | | | |
| 4707 | 6 (6) | 4 | | | |
| 4903 | 24 (1) | 23 (3) | | | |
| 4904 | 7 (7) | | | | |
| 4905 | 98 (8) | 86 | | | |
| 4910 | 80 (5) | | | | |
| 4912 | 130 (25) | 41 | | | |
| 4915 | 9 (9) | | | | |
| 6102 | 124 (24) | 59 | | | |
| 6106 | 3 (3) | 1 | | | |
| 6122 | 5 (1) | | | | |
| 6202 | 1 | | | | |
| 6203 | 2 (2) | | | | |
| A702 | | 11 | | | |
| B123 | | 46 | | | |
| B681 | | 13 | | | |
| G001 | | 164 | | | |
| G091 | | 4 | | | |
| G809 | | 10 (10) | | | |
| R303 | | 14 | | | |
| S211 | | 200 | | | |
| W002 | | 24 | | | |
| W032 | | 684 | | | |
| W071 | | 368 | | | |
| W101 | | 46 (22) | | | |
| W505 | | 1 | | | |
| W600 | | 13 | | | |
| W989 | | 140 | | | |
| 1000 | | 7 | | | |
| 1115 | | 20 | | | |
| 1607 | | 9 | | | |
| 978 | | 9 (9) | | | |
| 4112 | | 33 | | | |
| 4214 | | 10 | | | |
| 4680 | | 21 | | | |
| 4702 | | 4 | | | |



INTEROFFICE MEMORANDUM

DATE October 12, 1966

SUBJECT Telephone Call from Gordon Bell

TO Ken

FROM Elsa

Gordon requests that you send him two tape units for experiment. He was disappointed that you said he couldn't have one. One of them he wants to use to record audio. Besides the tape units, he would like a DECTape reader/writer of FLIP CHIP variety.

The rest of this, Ken, I took down in shorthand as he talked.

"I don't intend to put very much feet of tape on it. In fact, only about one minute's worth of tape at 10 inches a second, about 400 bits maximum to the inch, 240,000 bits around the loop. That is just about the right size (even a little large for this application) for what we want to use it for - to store PDP-8 programs. The way we get the reliability is to read the tape one track at a time, which ~~limit~~ eliminates skew. Probably record at a phase less than 33 or 35 Teletype. If we find out the tape won't read too well; namely that there is a lot of noise on the tape, we can have the density redundant and do air correcting."



INTEROFFICE MEMORANDUM

DATE October 11, 1966

SUBJECT Customer Alienation

TO Ken Olsen
Nick Mazzaresse
Mike Ford
Howie Painter
Dave Brown

FROM R. Handy

One of DEC's greatest ally's is Ted Glaser at MIT, Project MAC. Having achieved renown as a designer of computer systems, Ted's influence is considerable. In addition to being a very enthusiastic PR man for DEC in his spare time, Ted has contributed substantially to the design concept of the 338.

Besides the physical handicap of loss of eye sight, Ted has a human failing; he is too GOOD NATURED!! On countless occasions he has condescended to accept second rate treatment so that DEC could satisfy pressing demands elsewhere. Continual expediencies by DEC have caused Ted's project to suffer immeasurably.

It is difficult for Ted to vent his wrath. You see, he genuinely likes all of the DEC people he deals with and he knows the DEC system concepts to be the best in the business. With Ted, I believe it is purely a case of bewilderment, chagrin, and perhaps a feeling of personal affront.

Recommended steps to right a serious wrong are as follows:

- A. Return a solid, reliable PDP-8 system to Ted as soon as possible.
- B. Replace the 338 prototype with the production model before Christmas.
- C. Replace the 555 DEctapes with a TC01/TU55 system ASAP. (Don't force him to wait 'til the end of current back orders).
- D. Consider offering the 2nd 4K memory module at an attractive price.

SUMMARY:

DEC's shabby treatment of a first-rate customer (reviewed on Page 3 of this memo) seems to be one example of a serious flaw in its mode of operation. To achieve long range goals, we must seriously evaluate our policy

regarding the manner in which we will fulfill our
future committments.

338 HISTORY AT MIT, MAC

1. To counter competition of DDP-24 from CCC, DEC offered loan of PDP-5 (with DECTapes) until PDP-8 available.
2. DEC delivered used PDP-5 in "as is" condition (contrary to usual policy of refurbishing unit in Maynard). Three months of extremely poor reliability ensued. DECTapes did not accompany PDP-5.
3. Cabinet-mounted 4K PDP-8 replaced PDP-5 in the spring of 1965. Still no DECTapes.
4. Customer repeatedly told DECTapes unavailable to him because of DEC's more pressing prior commitments.
5. Dual DECTapes (555) finally delivered, virtually the same day DEC announced new, improved TU55 transport.
6. Catastrophic DECTape failures on daily frequency for two months following delivery.
7. Because of sizeable slippage in delivery of initial 338 production system, DEC delivered the prototype to customer.
8. To satisfy customer desire for the EAE option, DEC replaced customer's computer with engineering PDP-8 (8K) which had been used by design team to develop 338 system.
9. PDP-8 was delivered to MIT without undergoing formal acceptance by field service.
10. Four months of extremely unreliable computer performance followed delivery.
11. Customer agreed to help DEC out by keeping prototype 338 until August, so DEC can honor more pressing commitments.
12. As November approaches, customer still has prototype, and his 338 is not in sight.
13. On September 28th, DEC finally concedes that the PDP-8 is in deplorable shape; decides to take same back to plant for thorough "wringing out" after promising return to MIT no later than October 7.

14. System remains in Maynard untouched for five days because of end-of-month pressure to deliver PDP-8's.
15. Customer notified afternoon of October 7th that system in worse shape than we thought and needs at least three more days' work.
16. Customer presently has hands completely tied, having to date already suffered 10 months' delay on project.



INTEROFFICE MEMORANDUM

DATE October 11, 1966

SUBJECT ENGINEERING DRAWING QUESTIONNAIRE

TO C. Kendrick
B. Long
J. Shields
P. Greene
J. Smith
D. Richardson
B. Maxcy
cc: K. Olsen

FROM Roger Melanson, Chairman

A Drafting Review Committee has been formed to review our engineering and drafting procedures and to make recommendations which will make our engineering drawings more efficient.

Before we make proposals on facts which we feel at this time to be inadequate, I am asking your assistance.

Will you please answer the enclosed questions and return one copy to Ken Olsen and one copy to the Drafting Committee by Friday, October 21, 1966.

Your cooperation will be sincerely appreciated.

QUESTIONNAIRE

If possible, please answer all the following questions.

There may be other comments which you will want to make - please feel free to do so.

1. Are you being provided with enough engineering drawing information to properly fabricate, assemble and test an item?

(If No) explain what sort of information is missing.

2. Are you receiving engineering drawings which are of no valid use in the manufacture of an item?

(If Yes) explain what types of engineering drawings that are not needed.

3. What level of documentation and of what drawing quality is needed for:

- | | |
|------------------|---------------------|
| 1. One Shot Item | 3. Pilot Production |
| 2. Prototype | 4. Full Production |

4. Specify the information that Drafting requires to properly provide the necessary documentation to the various department users.

5. When models are used in the manufacturing process what types of engineering drawings are needed? And what provisions are made for making and recording changes?

10 October 1966

UC LRL/PROCUREMENT INQUIRY LETTER INQ-0058-LVH

STAN OLSEN

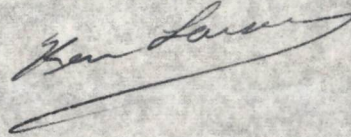
KEN LARSEN

I am enclosing a copy of the above referenced letter from the University of California-LRL, Livermore. This letter arrived much earlier than I had anticipated and requires immediate attention.

LRL has solidified their ideas in terms of requirements for integrated circuits for all new work to be done. This requires almost instant product line development; however, when you realize they purchased approximately \$350,000 worth of Flip Chip Modules during the period of 1 October 1965 to 30 September 1966, it may well be worth our concerted effort to submit an answer by the due date of 31 October 1966.

Please call me as soon as you receive this letter and, if there is any additional information you will need, we can discuss it at that time. I am anxious to work as closely as possible with you to help put together a satisfactory response.

Regards,



KL:mg

cc; K. Olsen

COPY



INTEROFFICE MEMORANDUM

DATE October 10, 1966

SUBJECT Disc Availability

TO Ken Olsen

FROM Ken FitzGerald

At the present time we have designed a disc module utilizing a ten inch disc with the following characteristics:

1. Rack mounted 19" X 10½"
2. 32,768 13 bit words (425,784 bits)
3. 2,048 words per track (26,624 bits per track)
4. There is enough space to mount four additional tracks on this unit to bring word capacity to 40,960 (530,280 bits)
5. Five of these units may be mounted in a standard 19" rack for a total of 2,661,400 bits per rack.
6. Approximate manufacturing cost will be \$1500.00 each.

With the existing head design and experience we have gained to date it would be possible to build a larger unit with the following specification:

1. 1200 BPI at 11.5" minimum diameter
2. 40 TPI of radius
3. 2,048 words per track (44,000)
4. 21 bits per 18 bit word (one parity and 2 control bits)

5. 1.2 microsecond bit to bit
6. 1800 RPM (33.6 milli-second worst case access time)
7. Word address format
8. Largest track diameter 15.5 inches (for 19" cabinet)
9. Both disc surfaces may be utilized.

This means approximately 160 tracks at 333,000 words but we recommend 128 tracks at one quarter million words and use multiple units for additional capacity.



INTEROFFICE MEMORANDUM

DATE October 9, 1966

SUBJECT Notes on Dr. Brian Macefield's Visit

TO Ken Olsen ✓ John Leng FROM Ted Johnson
Nick Mazzaresse Harvey Shepard

Dr. Macefield was very open and pleasant and indicated new problems and offered a few suggestions.

1. He felt the main problem was in turn-around time for answers to questions which had to be referred to Maynard on processing the software questions. Hopefully, our new services group and DECUS activity will help to radically improve this situation.
2. He definitely felt that their best users should get any symbolic tapes at a nominal charge, if necessary. They had some problem with DECSYS program which they dug into and solved and I feel careful coordination with some of our best users would actually be very beneficial in smoothing out some of our software problems. I believe some of our intelligent users recognize there will be problems but expect this kind of service from Digital. As he puts it, often our type of users buy from us because we offer the opportunity to push the machine to its limits and not be as restricted as they would be by most other companies.
3. He felt a lot of worries on the part of the customer would go away if they received their programming manuals and information at order time so that they are not in a position of waiting for everything before they get their computer. Apparently, he feels that a number of our customers have been twiddling their thumbs until they actually see the equipment.
4. He agreed that a clear directory on what we have to offer in software routines would be a big help.
5. He emphasized that our image is that our hardware is very good and our salesmen know their business. If we smoothed out some of the support activity, such as information on programming, we could remove many problems.
6. He felt that we were not using DECUS for circulating our product literature, which he felt was perfectly in order. Although we shouldn't interfere with the management of DECUS, he felt it was definitely desirable that our users be kept up-to-date on all of our product releases. I think we should make sure that we are not avoiding using such a powerful medium especially when we are concerned about getting information on product developments to our European customers quickly.
7. He felt we can expect the European DECUS organization to be more outspoken than what he feels our domestic DECUS group is.
8. Although he asked about bonded warehousing, the net conclusion was that we must make it known to our users that we are trying to achieve goals of providing fast

response to them which is independent of the final system that we selected.

9. We should look into the Pulse Amplifier W640 and W607 which he felt they had by far the most problems with in modules.
10. He is quite impressed with the ease of use of our modules where they have built some quite complicated logic systems very easily.

cc: Angela Cossette

TJ/mr

Information

DEC INTER-OFFICE MEMORANDUM

TO: *Ken Olsen* FROM: Harry S. Mann
SUBJECT: DEC Terms and Conditions DATE: October 7, 1966

This memorandum is to clarify some of the aspects of our terms and conditions. As you know, our terms are F. O. B. Maynard, Massachusetts. These terms are very important to the company and have many advantages. A few of these advantages are:

1. Legal title passes to the customer when the equipment is given to the freight carrier in Maynard, Massachusetts.
2. Our terms, Net 30 days, start from the date of billing which coincides in most cases with shipment thus minimizing time when we collect our money.
3. The Accounts Receivable Department, unless notified in writing by a properly authorized person (i.e., Product Line Manager), starts its collection process.
4. Problems related to damage, loss, or delay in shipment become those of the customer although we expect to assist him in this regard.

The conditions of sale (i.e., customer purchase order and DEC acceptance according to DEC Terms & Conditions) call for payment 30 days from the date of invoice. If all equipment has been delivered but a few "bugs" must be cleaned up, the customer still is expected to pay within the 30 day period starting from date of invoice. Documentation should not hold up payment particularly on special programs which are not specified in the contract. The warranty period (except for OEM) starts after acceptance of machine but payment date is not affected by date of acceptance. Any exceptions must have Product Line Managers' approval.

Insurance should be carried by the customer in all cases as the equipment is legally his as soon as it is in transit. After the sale has been consummated (i.e., receipt of a P. O. by the salesman) the proper personnel, normally the Purchasing Agent, should be made aware that most air and trucking firms limit their liability to a poundage basis. For example, on the shipment of a table top PDP-8 weighing approximately 300 lbs. and costing \$18,000 the carrier, if by air, would be liable for 50 cents per pound in most cases which would permit the customer to collect only \$150. If the carrier was a trucking facility, the poundage limitation would drop as low as 35 cents per pound.

October 7, 1966

As a practical matter, we realize that equipment is sometimes lost or damaged in transit. In many of these instances, the customers are disturbed and feel justified in extending payment. Payment may not be extended, however, the following service is offered:

If material is lost in transit, we will advise the customer who the carrier is and assist him in any manner to expedite the receipt of his goods. We expect (and pressure) the customer to pay according to the terms of the contract - F. O. B. Maynard. If goods are damaged in shipment, we will assist the customer's insurance carrier in any manner and, when available, will forward and invoice a new machine to the customer. The customer has recourse to the carrier for the first damaged machine and should pay according to the terms of the contract - F. O. B. Maynard.

If you have any questions regarding our terms, please address them to the attention of R. Dill, Accounting and he will try to clarify the point in question.

HSM/clw



INTEROFFICE MEMORANDUM

DATE October 7, 1966

SUBJECT Electronic Data Systems (Consultants for Pepsico)

TO Ken Olsen
Stan Olsen
Mike Ford

FROM Ron Smart

Electronic Data Systems will be visiting Maynard on Monday, October 10 for demonstration of PDP-8/S doing part of the trial program, followed by lunch in Ken Olsen's office at approximately 1:00.

The purpose of the visit is to convince DEC of their genuine desire to go with us, and to understand the extent of the cooperation DEC is able and willing to give.

From E.D.S. there will be Milledge ("Mich") A. Hart, III, Vice President, Jack Archer, computer man with responsibility to choose the computer for Pepsico, and possibly one or two other men.

E.D.S. has mailed a letter signed by Mr. Hart expressing their intent regarding our computer (this is addressed to Ron Bassin, New York Office, who is the responsible salesman).

INTEROFFICE MEMORANDUM

TO: Ken Olsen ←
Win Hindle
Nick Mazzaresse
Stan Olsen
Dave Cotton
Pat Greene
Mort Ruderman

FROM: Ted Johnson

DATE: October 6, 1966

I have decided to postpone my trip to Japan until early-mid November. Rikei suggested that I try to be there around the 10th or 11th of November. I will probably spend some time on the West Coast at that time also .

I will be leaving for Australia on October 12th and plan to stop in Tel-Aviv to evaluate the representatives there and meet European people in Munich at the Electronica Show on the 22nd. I will then go on to Cologne for part of the DECUS Convention and our Sales Meeting in Cologne. I will visit London for a day and leave from there on the 29th for Boston.

/mr

INTEROFFICE MEMORANDUM

TO: John Leng
Tom Dalzell
Ken Olsen 
Nick Mazzaresse
Stan Olsen
Jack Shields

FROM: Ted Johnson

DATE: October 6, 1966

SUBJECT: Dr. Bengt Kredell - ASEA, Sweden

Dr. Kredell, Manager, Information Processing Department, visited the plant on October 3rd and 4th. This is the GE of Sweden and they are very interested in our PDP-8 and -8/S.

They have been using G-Pak computers and systems to date and were the first customer for GE 625. They have been approached strenuously by many companies for licensing purposes. As Kredell put it, they are the last bachelor in Europe among the large electrical people. They have lost bids to GE, U.K., DEC, U.K., with SDS computers and it would appear they are keen competition to GE, in terms of selling their machines. He said that RCA is rumoured to be coming out with a whole line of process control computers. Their sales in 1965 were approximately 460,000,000 dollars so they are an extremely large organization, with 19,696 employees in the parent company, 9,652 employees in subsidiaries in Sweden and 4,984 in subs outside of Sweden. They are a member of the Wallenberg family, which includes Arenco, AGA and Telare. He mentioned that we have not established an image in Sweden yet but he was aware of our activities with AGA and machines at the University, particularly the Von Hamos PDP-7 (on both machines his image is of good electronics and very bad problems with teletype units).

Apparently their Managing Director, Mr. Nicolis, is a very powerful and pragmatic man who established a legend by spending a year straightening out SAS. He was written up in Business Week. Nicolis sets an attitude in the company of distrust for the computer business based on their observations of the EDP companies. I feel that their company philosophy would be very much in line with our own. In fact, Dr. Kredell was impressed by our philosophies which he thought were compatible with the European philosophies. He said that the impression is that American companies have much power and little elegance and the European companies have much elegance and little power. He meant that American companies tend to explain their activities in terms of numbers of people doing a project, rather than emphasizing the ability of the individuals in a group and creative approaches to problems.

Perhaps this is one philosophy we should be sensitive to in terms of this contribution to our success in Europe although I am sure that this philosophy could be expressed more completely.

We discussed quantity discount on the -8 and -8/S. He queried me on the possibility of licensing and accepted our position. He asked about our ability to respond to them on special designs and emphasized the large quantity of computers they might be in the market for. I get the impression that they plan to be aggressive in Europe after they get a little more experience and, so far, they have not installed any computer systems outside of Sweden.

I believe the chances here are excellent to build up a good relationship and that Dr. Kredell was quite pleased by his visit. Other people from ASEA management will be visiting us in the near future and he encouraged a visit by somebody in top management of our company to them later this Fall. If possible, it would be nice if Ken could visit them and I think someone like Saul Dinman should also pay them a visit, if convenient.

They are quite satisfied to deal with John Leng and our European people and I assured them that we would be more active in soliciting there in the future. They seem to have a high regard for our people in Europe.

I hope that our new field serviceman, Sven-Olaf Martin, will be able to concentrate on the problems on teletype units. Both ASEA and AGA have stressed the value of having a demonstrator PDP-8/S and, with current potential volume in Sweden, I hope we can work out a program which will give some of these OEM customers and other prospects a strong feeling that we are going to support their sales and programs.

I have some brochures on ASEA which you can get from Margaret if you wish to read them.

TJ/mr

RECEIVED

1966 OCT -6 PM 8: 10

DIGITAL EQUIPMENT CORP.
SALES DEPARTMENT

*Copy sent to Dick
10/8/66
sc* *Phoned*

10-6-66 K378

TO: ALLAN KLUCHMANN / KEN OLSEN
FROM: PETER HERKE

ON SEPT. 13 IN MSG K250 I REQUESTED THAT THE PDP-8/S LETTERS
BE SENT TO US ASAP. YOU HAVE HAD THE DRAFT SINCE 8-20-66.
INSPIRE OF TWO REMINDERS SINCE THEN WE HAVE NOT BEEN GETTING
ANY REPLY FROM YOU SINCE THEN. WE ARE EXPERIENCING MORE
INCONVENIENCE THAN HELP THROUGH THIS DELAY.



INTEROFFICE MEMORANDUM

DATE October 6, 1966

SUBJECT

TO

M. Ford
J. Jones
C. Kendrick
N. Mazzaresse

FROM

J. Smith

cc:

K. Olsen ✓

Outlined below is the progression of "module mix" over the past five-week period. This is actually a summary of the report you have been receiving on a weekly basis. Actual receipts versus projected weekly requests are listed by type, quantity and overall numbers.

| | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 |
|-----------------|--------|--------|--------|--------|--------|
| Type | 26% | 42% | 58% | 69% | 74% |
| Quantity | 29% | 43% | 56% | 70% | 69% |
| Overall Numbers | 130% | 102% | 103% | 123% | 115% |

In order to realize effective schedules at a reasonable inventory level, a 90 per cent output in all three categories must be achieved.

MODULE RECEIVAL STATUS REPORT

Week Ending: September 30, 1966

(Weeks 1, 2, 3, 4 and 5)

| TYPE | QTY. ORDERED | QTY. RECEIVED | TYPE | QTY. ORDERED | QTY. RECEIVED |
|------|--------------|---------------|------|--------------|---------------|
| A101 | 2 | | G808 | 29 | 58 |
| A502 | 10 | 10 | G805 | 13 | |
| A601 | 60 | 15 | G850 | 78 | 60 |
| A604 | 23 | 9 | G851 | 83 | |
| A704 | 2 | 34 | G852 | 48 | |
| B104 | 41 | 100 | G882 | 20 | 24 |
| B105 | 247 | 703 | G900 | 10 | 32 |
| B113 | 75 | 22 | G903 | 5 | 11 |
| B115 | 136 | 150 | G920 | 7 | |
| B117 | 52 | 23 | R001 | 71 | 205 |
| B124 | 20 | 18 | R002 | 507 | 1112 |
| B130 | 18 | 55 | R105 | 13 | |
| B131 | 22 | 30 | R107 | 555 | 645 |
| B141 | 236 | 329 | R111 | 230 | 381 |
| B155 | 4 | 33 | R113 | 93 | 100 |
| B169 | 74 | 285 | R121 | 74 | 116 |
| B171 | 162 | 226 | R122 | 7 | 108 |
| B200 | 42 | 72 | R123 | 150 | 439 |
| B201 | 726 | 434 | R131 | 7 | 7 |
| B204 | 103 | 87 | R141 | 450 | 550 |
| B210 | 187 | 105 | R151 | 110 | 109 |
| B213 | 111 | 209 | R181 | 10 | 43 |
| B301 | 17 | 48 | R201 | 457 | 785 |
| B310 | 11 | | R202 | 966 | 1018 |
| B360 | 206 | 221 | R203 | 161 | 325 |
| B401 | 16 | 12 | R205 | 379 | 402 |
| B405 | 5 | 14 | R210 | 922 | 395 |
| B602 | 287 | 183 | R211 | 870 | 435 |
| B620 | 70 | 254 | R220 | 438 | 120 |
| B684 | 179 | 285 | R284 | 12 | 110 |
| G007 | 521 | 330 | R302 | 317 | 52 |
| G008 | 113 | 114 | R401 | 124 | 124 |
| G010 | 8 | 8 | R405 | 31 | 112 |
| G081 | 36 | 46 | R450 | 25 | 28 |
| G202 | 97 | 167 | R601 | 2 | 13 |
| G208 | 244 | 346 | R602 | 171 | 87 |
| G209 | 562 | 690 | R603 | 412 | 154 |
| G210 | 6 | | R650 | 895 | 590 |
| G211 | 51 | | S107 | 722 | 407 |
| G283 | 49 | 83 | S111 | 708 | |
| G601 | 34 | 37 | S181 | 142 | |
| G602 | 39 | 29 | S202 | 126 | 438 |
| G603 | 539 | 400 | S203 | 242 | 171 |
| G622 | 9 | | S205 | 144 | 121 |
| G620 | 12 | | S284 | 156 | 68 |
| G800 | 3 | 27 | S602 | 435 | 200 |
| G802 | 15 | 24 | S603 | 1347 | 524 |
| G804 | 6 | | W016 | 2 | |

| TYPE | QTY. ORDERED | QTY. RECEIVED | TYPE | QTY. ORDERED | QTY. RECEIVED |
|------|--------------|---------------|-------|--------------|---------------|
| W017 | 2 | | 4222 | 46 | 12 |
| W005 | 128 | 231 | 4225 | 1 | 12 |
| W011 | 207 | 1381 | 4227 | 5 | 3 |
| W021 | 788 | 1431 | 4228 | 39 | |
| W025 | 778 | 122 | 42281 | 24 | 36 |
| W027 | 33 | 209 | 4260 | 1 | |
| W033 | 41 | 191 | 4261 | 2 | |
| W034 | 1400 | 1764 | 4301 | 3 | 10 |
| W040 | 202 | 403 | 4303 | 40 | |
| W042 | 10 | | 4306 | 3 | |
| W050 | 48 | 89 | 4523 | 55 | |
| W051 | 20 | 20 | 4526 | 7 | |
| W070 | 150 | 275 | 4603 | 25 | |
| W103 | 164 | 163 | 4605 | 23 | 15 |
| W300 | 117 | 259 | 4656 | 5 | |
| W500 | 4 | 4 | 4688 | 7 | |
| W501 | 25 | 75 | 4689 | 41 | 24 |
| W511 | 52 | 97 | 4903 | 23 | 20 |
| W602 | 33 | 58 | 4905 | 90 | 86 |
| W607 | 126 | 62 | 4910 | 75 | |
| W612 | 39 | 49 | 4912 | 105 | 41 |
| W640 | 565 | 463 | 6102 | 101 | 59 |
| W681 | 3 | 10 | 6122 | 4 | |
| W700 | 57 | 124 | 6202 | 1 | |
| W701 | 4 | 83 | | | |
| W750 | 133 | 176 | A702 | | 11 |
| W802 | 78 | 9 | B123 | | 46 |
| W985 | 5 | | B681 | | 13 |
| W990 | 101 | 182 | G001 | | 164 |
| | | | G091 | | 4 |
| 1011 | 16 | 40 | R303 | | 14 |
| 1113 | 3 | | S211 | | 200 |
| 1150 | 1 | | W002 | | 24 |
| 1501 | 10 | 1 | W019 | | 14 |
| 1534 | 17 | 2 | W020 | | 154 |
| 1535 | 29 | | W023 | | 609 |
| 1567 | 21 | 22 | W026 | | 200 |
| 1575 | 17 | | W032 | | 684 |
| 1579 | 20 | | W071 | | 368 |
| 1609 | 19 | | W101 | | 24 |
| 1663 | 8 | | W505 | | 1 |
| 1685 | 10 | | W520 | | 64 |
| 1703 | 17 | 36 | W600 | | 13 |
| 1705 | 9 | | W601 | | 10 |
| 4102 | 127 | 93 | W980 | | 261 |
| 4113 | 138 | 5 | W989 | | 140 |
| 4115 | 12 | | | | |
| 4127 | 180 | 95 | 1000 | | 7 |
| 4151 | 10 | | 1115 | | 20 |
| 4215 | 64 | 7 | 1304 | | 7 |
| 4220 | 10 | | 1607 | | 9 |
| 4221 | 6 | | 1802 | | 4 |

| TYPE | QTY. ORDERED | QTY. RECEIVED |
|------|--------------|---------------|
| 4112 | | 33 |
| 4114 | | 13 |
| 4141 | | 20 |
| 4214 | | 10 |
| 4217 | | 40 |
| 4401 | | 10 |
| 4410 | | 4 |
| 4529 | | 7 |
| 4530 | | 49 |
| 4531 | | 19 |
| 4680 | | 21 |
| 4702 | | 4 |
| 4707 | | 4 |
| 6106 | | 1 |



INTEROFFICE MEMORANDUM

DATE October 6, 1966

SUBJECT -- College Recruiting

TO

FROM J. Gaffney

K.H. Olsen
H. Mann
S. Olsen
N. Mazzaresse
W. Hindle
W. Long
R. Best
R. Lane
M. Ford
J. Jones
D. White
R. Brown
D. Cotton
R. Savell

S. Dinman
P. Greene
E. Harwood
H. Painter
A. Titcomb
C. Crocker
J. Shields
T. Johnson
L. Portner
J. Cudmore
E. deCastro
S. Mikulski
L. Prentice
M. Ruderman

I. Jacobs
R. Handy
D. Denniston
R. Smart
J. Jorgensen
H. Doyle
R. Lindsay
T. Quinn
R. Frank
D. Henderson
A. Liveris
K. Larsen
G. Olson
D. Wilkinson
C. Hickman

Attached is the college recruiting schedule for 1966-67. This year's recruiting effort will be the most extensive to date. To attract young, bright engineers and to make this a successful recruiting effort, we will need the cooperation and support of all departments. You can be most helpful by:

1. Providing us with engineers who can assist in "selling" the company and interviewing candidates.
2. Informing us of any meaningful contacts you may have at the colleges listed.
3. Listing your projected engineering requirements for the coming year. (We also intend to recruit at several of the leading graduate business schools. If you anticipate any need for this type of employee, please include in your requirement list.)
4. Providing us with Field Sales Office support where applicable.

To finalize these recruiting plans and to ascertain your needs for engineering graduates, I will be meeting with you in the near future.

NOVEMBER, 1966

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|--------|--|---|------------------------------------|-----------------------------------|-------------------------------------|----------|
| | | 1. MIT | 2. University of Alabama | 3. | 4. Oregon State University | |
| | 7. Carnegie Inst. of Technology | 8. University of Massachusetts (Computer Science) | 9. | 10. Northeastern University | 11. | |
| | University of Texas | | | | | |
| | 14. Michigan State University | 15. | 16. | 17. | 18. | |
| | 21. | 22. | 23. | 24. | 25. | |
| | 28. Stanford University | 29. Northwestern University | 30. University of Maryland | | | |
| | | | Community Coll- ege of New York | | | |

DECEMBER, 1966

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|--------|--------|--|-----------|---------------------------------------|--------|----------|
| | | | | 1. Texas A & M | 2. | |
| | 5. | 6. | 7. | 8. | 9. | |
| | 12. | 13. Milwaukee School of Engineering | 14. | 15. University of New Hampshire | 16. | |
| | 19. | 20. | 21. | 22. | 23. | |
| | 26. | 27. | 28. | 29. | 30. | |

JANUARY, 1967

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|--------|--|--|---|--|---|------------------------------------|
| | 2. | 3. | 4. | 5. | 6. | |
| | 9. Brigham Young University | 10. North Carolina State | 11. Colorado School of Mines (Physics) | 12. | 13. Boston College | 14. Iowa State University |
| | 16. Virginia Polytechnic Institute <hr/> University of Washington | 17. University of Denver <hr/> Drexel Insti- tute of Tech- nology | 18. | 19. | 20. | |
| | 23. Babson Institute | 24. | 25. California Tech. | 26. Rochester Institute of Technology | 27. University of Chicago - Grad. Business School <hr/> Northwestern Grad. Business School | |
| | 30. | 31. Boston University | | | | |

FEBRUARY, 1967

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|---------------|---|---------------------------------|------------------|---------------------------|-----------------------------------|-----------------|
| | | | 1. | 2. Tufts University | 3. | |
| | 6. | 7. | 8. | 9. Duke University | 10. Northeastern University | |
| | 13. Holy Cross <hr/> University of Texas | 14. | 15. | 16. Stevens Tech. | 17. | |
| | 20. | 21. MIT | 22. | 23. | 24. | |
| | 27. Clark University <hr/> Georgia Tech. | 28. University of Alabama | | | | |

MARCH, 1967

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|--------|---------------------------------|--|-----------------------------------|--|--|----------|
| | | | 1. | 2. Newark College of Engineering | 3. Worcester Polytechnic <hr/> University of Colorado | |
| | 6. University of Michigan | 7. University of Michigan (Grad. School of Business) <hr/> Amos Tuck Grad. School of Busi- ness | 8. University of Minnesota | 9. | 10. University of Pittsburgh | |
| | 13. | 14. | 15. Cornell University | 16. University of Maine | 17. John Hopkins University <hr/> University of Illinois | |
| | 20. | 21. | 22. University of Wisconsin | 23. Illinois Insti- tute of Tech. ?? | 24. | |
| | 27. | 28. Milwaukee School of Engineering | 29. | 30. University of Maryland <hr/> Community Col- lege of New York | 31. Rutgers <hr/> Harvard Business School | |

APRIL, 1967

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|--------|---|---------|---|----------|--------|----------|
| | 3. Bucknell University | 4. | 5. | 6. | 7. | |
| | 10. | 11. | 12. | 13. | 14. | |
| | 17. Purdue University | 18. | 19. Carnegie Institute of Technology | 20. | 21. | |
| | 24. Rensselaer Polytechnic Institute | 25. | 26. | 27. | 28. | |
| | | | | | | |



INTEROFFICE MEMORANDUM

DATE October 6, 1966

SUBJECT SKETCH DRAWINGS

TO Ken Olsen
Loren Prentice

FROM Roger Melanson

One place where we can immediately eliminate unnecessary drafting is in the Small Computer Special System group. A good percentage of the work that is being done in this area is for "one shot" items. The general practice of drafting has been to convert rough sketches to "finish" drawings. If, however, certain freehand drafting points are made clear to the engineers from the start there is no reason why the sketches should not be retained in the files. By doing this we would have two draftsmen available for more productive work.

I talked to Bill Long about this and he is all for it. He feels that it will help his engineers get their work out faster.

We are going to write some certain points to follow for preparing an acceptable freehand sketch, and give them to Bill for his acceptance and for his group to use as reference. If he can get his engineers to make good sketches, there would be no need for spending additional drafting time and money in the preparation of these drawings.

In the meantime I plan to take this matter up with the drafting task force.



INTEROFFICE MEMORANDUM

DATE October 5, 1966

SUBJECT DESIGN REVIEW COMMITTEES

TO Ken Olsen

FROM Jim Jordan

Yesterday, I saw the memo concerning establishment of Design Review Committees. Good idea!

For some time, the lack of early direction and review has bothered me; not only in Engineering but the Industrial Design area as well. This committee should be the answer. I see this committee reviewing Industrial Design from concept to finished product.

In addition, I feel that various persons in the company's assorted product lines should be made aware of the many aspects of the quickly developing products being designed. The purpose for this is to allow suggestions which will improve configuration, add or delete features, and evaluate these products, components or details for use with their own systems. To this end, I have written a product design memo to be sent to product line managers and other interested parties which will outline the latest product developments. This memo will be sent periodically. The first one of the series concerns the mobile stand for the PDP-8 when it is used with the PMA-8. Hopefully, other product lines can make use of this accessory. A copy is enclosed.



INTEROFFICE MEMORANDUM

DATE October 3, 1966

SUBJECT PRODUCT DESIGN MEMO #1

TO Win Hindle
Nick Mazzaresse
Bill Long
Stan Olsen

FROM Jim Jordan

PMA-8/PDP-8 MOVEABLE STAND

Industrial Design is currently developing a moveable cart for the PDP-8 when it is used with the PMA-8 Memory Test System. While it has been designed for this particular system, we have engineered it in such a way that it will be suitable for use as a stand for the table top 8/S, scopes, teletypes, and typewriters. It will also accept four (4) logic racks below the table. All of the details have not been worked out, but the covers are removable for complete access to pins and modules.

Enclosed is a sketch showing the configuration of the stand. If any of you have any comments or suggestions for improving this product, please contact me.

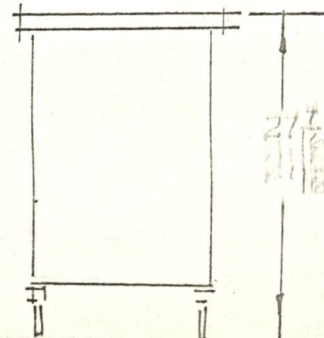
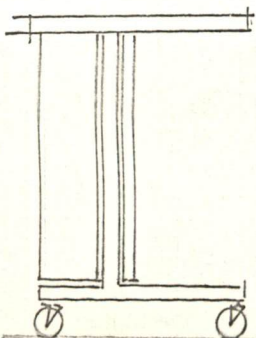
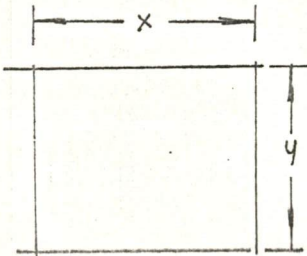
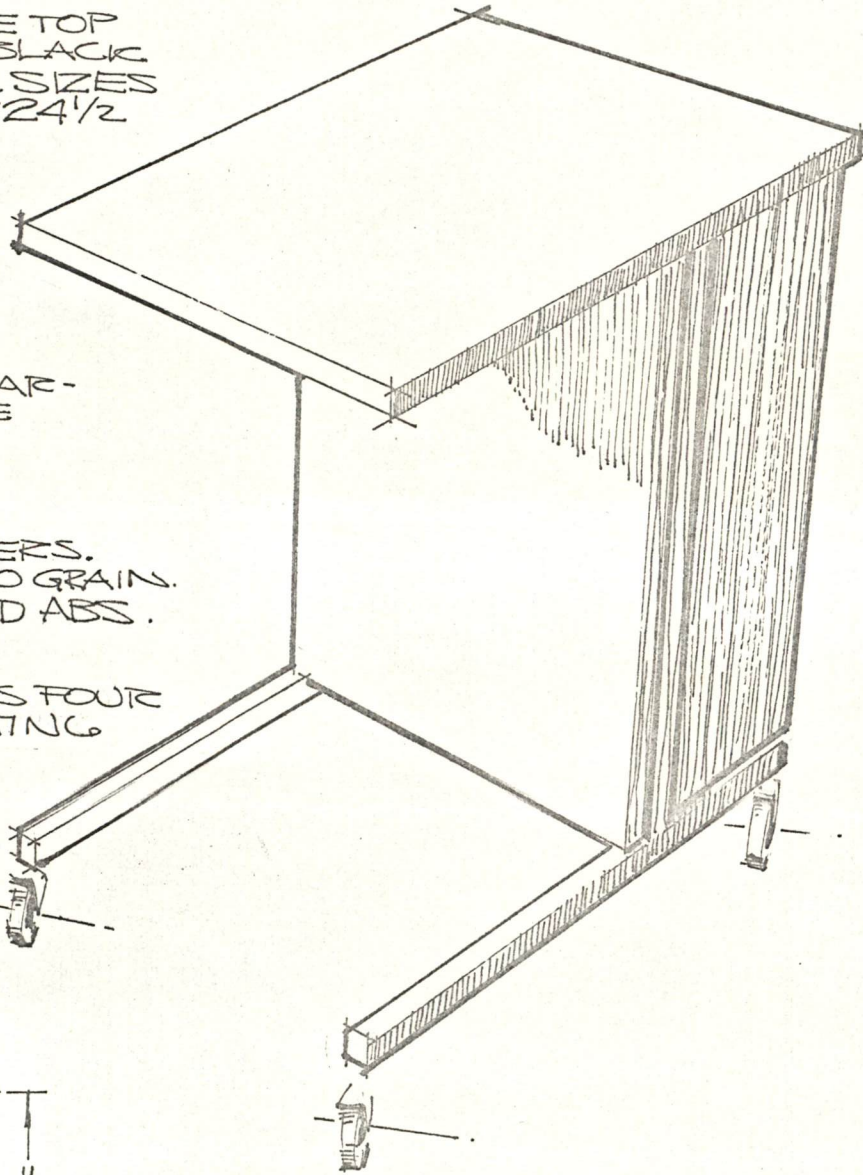
OPTIONAL TABLE TOP
LT. GRAY TOP .BLACK
SELF EDGE .2 SIZES
22 1/2 X 20.22 X 24 1/2

BLACK, TUBULAR-
STEEL FRAME

REMOVABLE COVERS.
BLACK, MOROCCO GRAIN.
VACUUM FORMED ABS.

FRAME ACCEPTS FOUR
3 INCH MOUNTING
PANELS

BASIC 2 INCH,
HARD RUBBER
CASTERS





INTEROFFICE MEMORANDUM

DATE 10-5-66

SUBJECT MTBF DATA

TO Mike Ford
Win Hindle
Ted Johnson
John Jones
Nick Mazzaresse
Ken Olsen
Stan Olsen
Jack Shields

FROM Lee Fryer

PDP-7 and PDP-8 Systems have been examined in detail to get meaningful MTBF Data. This information is attached and a few words of explanation are in order.

A PDP-7 System consists of the C. P., Memory, Reader, Punch and Teletype. The reader, punch and teletype control logic are considered part of the C. P.

A PDP-8 System is the C. P., Memory and Teleprinter. I used newspaper installations, but did not consider the readers, punches and associated logic as part of the system.

The MTBF report "Range" column is an interval of hours during which failures may have occurred. The number of failures which did occur appears in the columns to the right of the "Range" column.

The "Tot. Machine Hrs." column is necessary because not all machines examined have run sufficient hours to be counted in each Range interval. As an example, the first listing on the PDP-7 report is "2200". This means that all eleven (11) systems examined have run the entire 200 hour interval. In fact, all eleven machines have run through the 400 hour point. Some machines have not run for 600 hours so the "Tot. Machine Hours" is 1984 instead of 2200.

Failures divided by "Tot. Machine Hours" yields fail rate/hour. The MTBF report graph is a plot of fail rate/hour vs. machine life (in hours).

Contrary to our recent opinions, mechanical devices are not the villains destroying our high MTBF. It is our module reliability.

PDP-7 C. P. Failures

Thirty-three of the total (38) C. P./Memory failures were modules. Of these thirty-three, nine (9) were clearly reported as bad solder connections. These nine were (2) G601, (2) G602, (2) B684, (1) G001, (1) R201 and (1) R202.

PDP-8 Failures

Typesetting I/O on the teletype is almost non-existent. A true measure of solid state vs. mechanical reliability can be gleaned from the "Non - T.S.S." column.

Module failures (bad solder or other) were not as clearly defined as on the PDP-7. The only significant point is the comparison between R210 and R211 modules. These units are similar in construction and usage, but one is four times as reliable as the other. Don White is currently gathering data on these units.

General

The information presented from these systems represents our quality over the past 6 - 12 months.

Our quality improvement can be measured if we examine recent machines in detail. I intend to do this in the near future.

Machine MTBF is a function of our production/production engineering capabilities. Our greatest problems are with over-sized boards. Of the five modules in each of the PDP-7 and PDP-8 with the highest probability of failure, only the B115, G202 and R220 are single width boards. The B115 and G202 have reasonable MTBF's (around 100,000 hours) and appear on this list only because of the large quantities in each machine. "G" series modules have given trouble because of pulse transformer mounting and/or solder connections.

Module MTBF data on all modules used in the PDP-7 and PDP-8 are included for your information. The last column on the Module Statistics Report is the number of modules used in the PDP-7 and PDP-8.

Summary

- (1) Machine MTBF improves with machine age.
- (2) Machine MTBF can be improved significantly by eliminating module problems (production, loose connections due to shipping vibrations, etc.)

(3) Mechanical hardware does not significantly alter PDP-7 MTBF.

(4) Improvement of ten module types can greatly improve PDP-7 and PDP-8 reliability.

I will answer any questions you may have on data, data generation or data interpretation.

PDP-7 MTBF REPORT

The PDP-7 system MTBF becomes about 1000 hours when the machine has been operating for 2000 hours. The summary of MTBF information is as follows:

| | | |
|------------------------|-------|-------------------------------|
| Module Failure | 33 | |
| Teletype Failure | 7 | |
| Punch Failure | 3 | |
| Reader Failure | 6 | |
| Misc. CP. Mem. Failure | 5 | |
| TOTAL Failures | 63 | |
| Number of Systems | 11 | |
| Number of Hours | 17860 | |
| CP/Mem. Trouble Calls | 26 | |
| Total Trouble Calls | 40 | |
| CP/Mem. MTBF | 686 | |
| System MTBF | 446 | |
| MTBF TREND | 1000 | MTBF @ 2000 hr. machine life. |

The distribution of failures is as follows:

| <u>RANGE</u> * | <u>CP/MEM</u> | <u>READER</u> | <u>PUNCH</u> | <u>TTY</u> | <u>TOT. HRS. ON MACHINES</u> |
|----------------|---------------|---------------|--------------|------------|------------------------------|
| 0-200 | 12 | | 1 | 1 | 2200 |
| 201-400 | 2 | 1 | | | 2200 |
| 401-600 | 4 | | | 1 | 1984 |
| 601-900 | 2 | | 1 | 1 | 1800 |
| 801-1000 | 7 | 1 | | 2 | 1516 |
| 1001-1600 | 5 | | 1 | | 3170 |
| 1601-2200 | 0 | 2 | | | 1800 |
| 2201-2800 | 4 | 1 | | 1 | 1400 |
| 2801-3400 | 1 | 1 | | | 1200 |
| 3401-3800 | <u>1</u> | | | <u>1</u> | <u>590</u> |
| TOTAL | 38 | 6 | 3 | 7 | 17860 |

* Note changes at 1000 hours and 3400 hours.

Five Modules With Lowest MTBF

| <u>TYPE</u> | <u>MTBF</u> |
|-------------|-------------|
| 4707 | 5990 |
| G601 | 7140 |
| G602 | 8930 |
| 4706 | 17860 |
| R201 | 17860 |

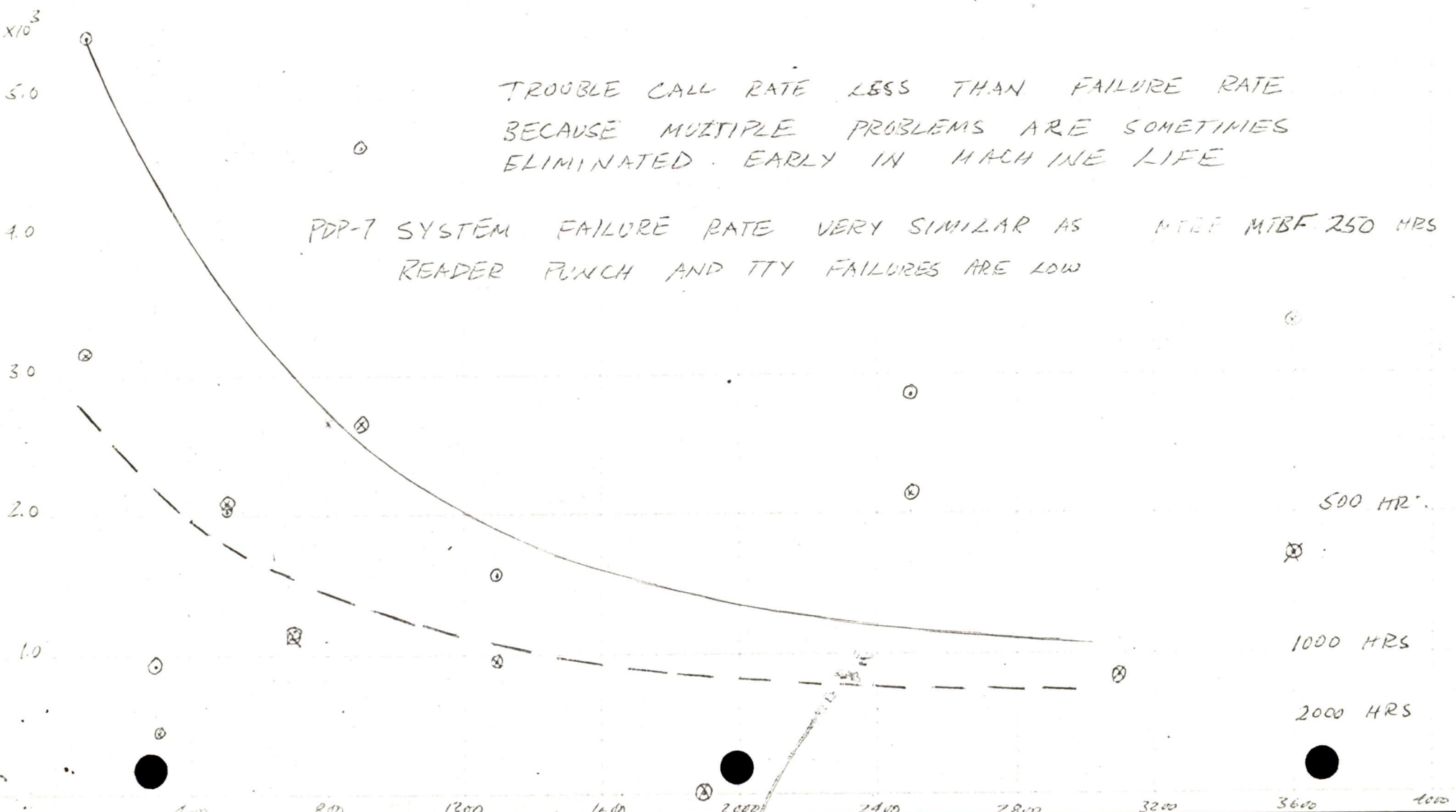
Five Modules with Highest Probability of Failure **

| <u>TYPE</u> | <u>QTY</u> | <u>MTBF/QTY</u> |
|-------------|------------|-----------------|
| G601 | 2 | 3570 |
| G602 | 2 | 4465 |
| G202 | 18 | 5950 |
| 4707 | 1 | 5990 |
| B115 | 11 | 8930 |

** Determined by MTBF and Qty in the PDP-7.

FAIL RATE / HR.

PDP-7 C.P.U. AND MEMORY SOLID STATE FAILURE RATES ———
TROUBLE CALL RATES - - - -



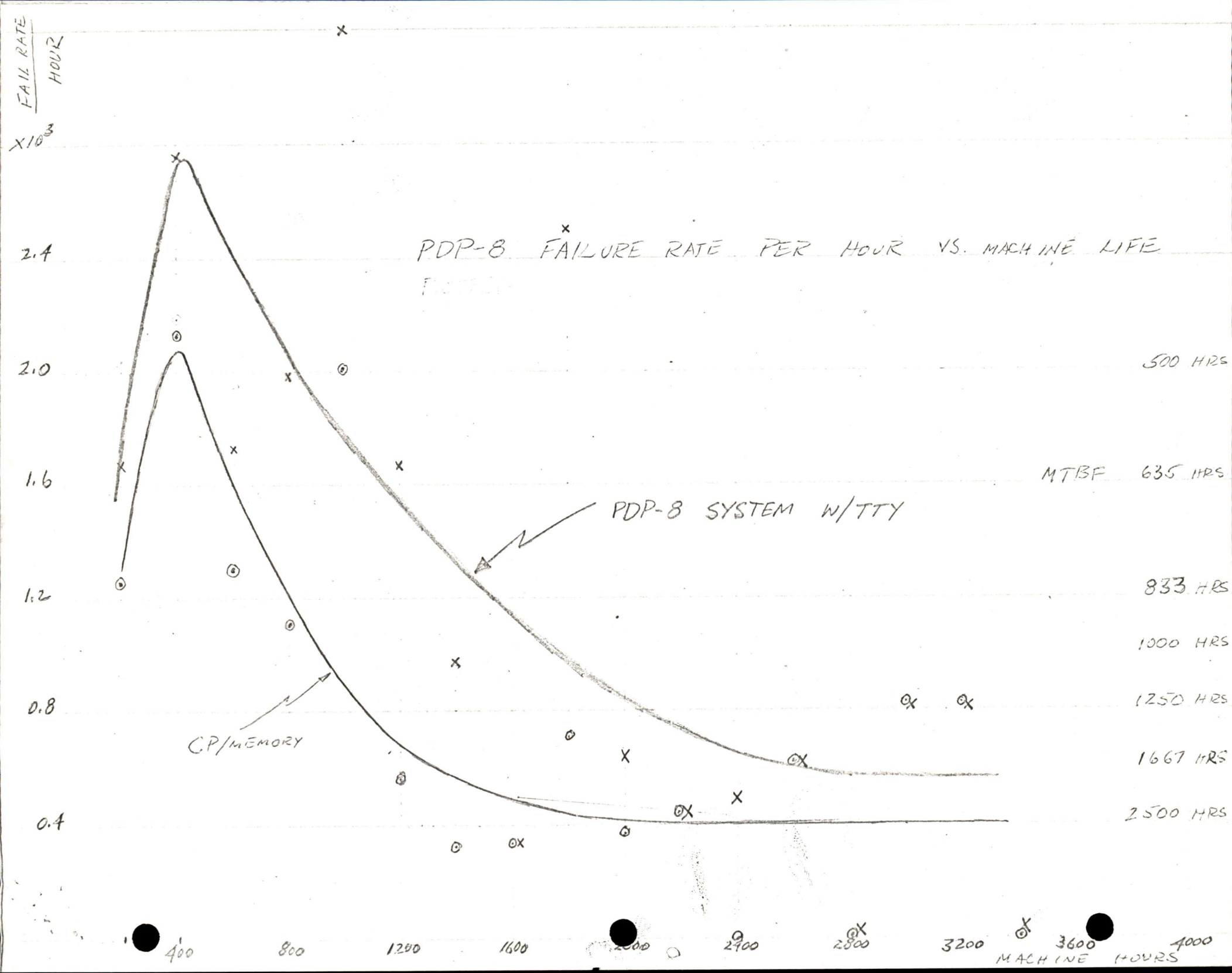
Five PDP-8 Modules with
Lowest MTBF

| <u>TYPE</u> | <u>MTBF</u> |
|-------------|-------------|
| B204 | 57620 |
| G603 | 65850 |
| G209 | 76820 |

Five Modules with Greatest
Probability of Failure *

| <u>TYPE</u> | <u>QTY.</u> | <u>MTBF/QTY.</u> |
|-------------|-------------|------------------|
| G209 | 8 | 9600 |
| R211 | 12 | 14410 |
| R220 | 6 | 14610 |

* Based on Module MTBF and no. of type in machine.



PDP-7 and PDP-8 MODULE STATISTICS

| <u># of Fail.</u> | <u>TYPE</u> | <u>TOTAL HOURS ON MODULE</u> | <u>MTBF</u> | <u>MOD. PER MACHINE PDP-7, PDP-8</u> |
|-------------------|-------------|----------------------------------|-------------|--|
| 3 | 4707 | 17860 | 5990 | 1-0 |
| 5 | G601 | 35720 | 7140 | 2-0 |
| 4 | G602 | 35720 | 8930 | 2-0 |
| 1 | 4706* | 17860 | 17860 | 1-0 |
| 1 | R201* | 17860 | 17869 | 1-0 |
| 16 | R210 | 749060 | 46820 | 0-13 |
| 1 | R205 | 57620 | 57620 | 0-1 |
| 1 | B204* | 57620 | 57620 | 0-1 |
| 7 | G203 | 460960 | 65850 | 0-8 |
| 6 | G209 | 460960 | 76820 | 0-8 |
| 4 | R220 | 345720 | 86430 | 0-6 |
| 2 | B115 | 196460 | 98230 | 11-0 |
| 3 | G202 | 321480 | 107160 | 18-0 |
| 3 | R203 | 355500 | 118500 | 7-4 |
| 4 | R202 | 488600 | 122150 | 8-6 |
| 2 | W607 | 261940 | 130970 | 12-1 |
| 3 | B684 | 486260 | 162090 | 24-1 |
| 4 | R211 | 691440 | 172860 | 0-12 |
| 2 | G208 | 345720 | 172860 | 0-6 |
| 1 | R107 | 200500 | 200500 | 8-1 |
| 3 | G007 | 691440 | 230480 | 0-12 |
| 1 | R181 | 230480 | 230480 | 0-4 |
| 1 | B602 | 271940 | 271940 | 12-1 |
| 1 | B360 | 271940 | 271940 | 12-1 |
| 2 | R602 | 602840 | 301420 | 8-8 |
| 1 | B620 | 303620 | 303620 | 17-0 |
| 1 | G201 | 321480 | 321480 | 18-0 |
| 1 | B210 | 339340 | 339340 | 19-0 |
| 3 | R650 | 1,189,820 | 396660 | 15-16 |
| 1 | R141 | 410780 | 410790 | 23-0 |
| 1 | R002 | 594060 | 594060 | 1-10 |
| 1 | B201 | 857280 | 857280 | 48-0 |
| 1 | R603 | 939780 | 939780 | 1-16 |

* Total hours on module considered to be too low to be significant for the number of failures recorded.

Module MTBF Data Calculated From a Poisson Probability Curve

| <u>FAIL</u> | <u>TYPE</u> | <u>TOTAL HOURS ON MODULE</u> | <u>MTBF</u> | <u>MOD/MACH. 7-8</u> |
|-------------|-------------|------------------------------|-------------|----------------------|
| 0 | 1404* | 17860 | 26400 | 1-0 |
| 0 | 4225* | 17860 | 26400 | 1-0 |
| 0 | 4407* | 17860 | 26400 | 1-0 |
| 0 | R601* | 17860 | 26400 | 1-0 |
| 0 | B124* | 17860 | 26400 | 1-0 |
| 0 | 4303* | 35720 | 52800 | 2-0 |
| 0 | W607* | 53580 | 79200 | 9-0 |
| 0 | RL21* | 57620 | 85000 | 0-1 |
| 0 | R401* | 57620 | 85000 | 0-1 |
| 0 | R405* | 57620 | 85000 | 0-1 |
| 0 | RL51* | 57620 | 85000 | 0-1 |
| 0 | R284* | 57620 | 85000 | 0-1 |
| 0 | W050* | 57620 | 85000 | 0-1 |
| 0 | G008* | 57620 | 85000 | 0-1 |
| 0 | B204 | 89300 | 132000 | 5-0 |
| 0 | W005 | 93340 | 138000 | 2-1 |
| 0 | B117 | 107160 | 158200 | 6-0 |
| 0 | B104 | 111200 | 164300 | 3-1 |
| 0 | W300 | 115240 | 170000 | 0-2 |
| 0 | B171 | 125020 | 184700 | 7-0 |
| 0 | W501 | 129060 | 190500 | 4-1 |
| 0 | W040 | 160740 | 237000 | 9-0 |
| 0 | W640 | 244300 | 361000 | 4-3 |
| 0 | R302 | 297880 | 439000 | 7-3 |
| 0 | B105 | 464360 | 684000 | 26-0 |
| 0 | B113 | 482220 | 711000 | 27-0 |
| 0 | R111 | 1672680 | 2466000 | 13-25 |

* Total number of hours considered too low for meaningful MTBF.



INTEROFFICE MEMORANDUM

DATE October 5, 1966

SUBJECT Module Delivery

TO Stan Olsen
Cy Kendrick
Frank Kalwell

FROM Ted Johnson

cc: Ken Olsen 

I feel responsible for stating once more that the current module delivery problem has, in my opinion, very seriously affected the module sales effort.

I believe our effort to get more manpower on modules beginning late Fall of last year had a great deal to do with the late Spring and ensuing summer bookings. Serious departure from an off-the-shelf (in my book, under 30 days) delivery, has stuck a huge pin in this effort and the customer confidence the sales people were building up. Saul Dinman's questionnaire points out that convenience and availability are ranked 2 and 3 as competitive advantages.

Without looking at the figures in detail, it is hard to see how any reasonable prediction for June - July - August could have resulted in such a long recovery period.

I have offered to improve forecasting, if that would help, and urge that no drastic production cutbacks be based on forecasted drops in sales without consulting the Sales Department.

TJ/mr



INTEROFFICE
MEMORANDUM

DATE October 4, 1966

SUBJECT Foxboro Status

TO Ken Olsen
N. Mazzaresse

FROM Ron Wilson

Enclosed are three separate reports on Foxboro/DEC Status.

1. Foxboro Report
2. DEC Report
3. Confidential Report

CC: D. Sogge
Ed DeCastro

FOXBORO REPORT

Wednesday, September 29, 1966, a Systems Schedule Review was held at Foxboro, at the request of their customer Esso Research, in which the schedules of two systems, Esso Fawley and Port Jerome, were discussed.

Both systems are over two (2) months late at this time and appear to be slipping even more. The systems have the following configuration:

Esso Fawley

| | | | |
|----|-------|------------|------------|
| 1. | PDP-8 | Supervisor | 12K Memory |
| 2. | PDP-8 | Master | 20K Memory |
| 3. | PDP-8 | Slave | 20K Memory |

Port Jerome

| | | | |
|----|-------|--------|------------|
| 1. | PDP-8 | Master | 12K Memory |
| 2. | PDP-8 | Slave | 24K Memory |

Mr. Roy Fine the Systems Division Manager of The Foxboro Company requested I attend as a representative of D.E.C., I had no alternative but to consent.

Mr. Paul Dubroff who is responsible for the design and specifications of the PCP88 system presented the following reasons and solutions to account for the delay.

I. That they, Foxboro, were continuously plagued with memory troubles due to:

1. The poor design of the G603 memory selection matrix boards. The transformers (M & M's) were continuously falling off the board.

2. The high failure rate of the G209 memory selector boards.

3. The poor design of the G808 control for 708 power supply, allowing Read/Write currents to drift. Thus preventing them from operating for periods greater than a week. It was admitted here that after the memory had been tuned by a D.E.C. Field Service Representative they were able to operate successfully for six (6) weeks but the memory had to be readjusted every week since.

4. Troubles with the break decoder selection signal, B SET. Which caused failures in the proper address selection.

5. The design of our Data Multiplexer (DMØ1) would not meet the operating speed specifications.

II. The schedule which D.E.C. gave Foxboro for the solutions and replacement modules was the controlling factor in establishing a new delivery date.

1. G603 - 50 by the end of September (not delivered), remaining 600 swapped at 50/week.

2. G808 - October 15th

3. G209 - D.E.C. claims some possible trouble had existed here in the early production lots but had been corrected. Foxboro will insure only the latest revision is used in Esso systems.

4. Solution to Break Decoder problem promised by the end of the week.

5. No mention was made of our schedule here.

III. Presentation of Plan to insure no further troubles existed.

1. To insure the design integrity of the PDP-8 a 32K

computer was being tested at D.E.C. The schedule is:

- a. One week of continuous running at room temperature.
 - b. One week of temperature tests where worse case checkerboard and the E.A.E. test would be operated alternate days while the temp. was elevated to 130°F between 0800 and 1700 and 0800 of the following day.
2. The completion of these tests on October 15, 1966, would insure Foxboro that all of the design bugs were out of the PDP-8.

DEC REPORT

In order to clarify exactly what I (we) have been doing for Foxboro I have arranged this report as an answer to each of Mr. Paul Dubroff's statements under Section I of the Foxboro Report.

1. The G603 memory selection matrix boards have caused some troubles because the transformers were not glued or fastened firmly to the board. This problem was investigated in April '66 by Ed DeCastro and we started gluing the transformers to the board. After having discussed the Foxboro situation with Stan Olsen, with his consent I ordered 50 G603 boards from production to replace 50 boards at Foxboro. We will return the 50 replaced boards to DEC, repair them and then exchange them for 50 more at Foxboro. Total boards equal 650 with a turn around time of three working days.

2. Foxboro has no data or numbers to support their contention that the G209 boards are failing at a high rate. Dick Sogge reported to me that a production problem was uncovered on the very earliest boards that caused some shorts or DC coupling on the transformers which was corrected. No further troubles have been experienced at DEC.

3. The G808 regulator control did have a very limited range adjustment pot. which was changed along with some other refinements that were added by D. Sogge when he was reviewing the circuit for use in the PDP-9. D. Sogge stated that there was no reason that the G808 should have caused Foxboro any trouble other than the concern over the range of the adjustment.

4. An ECO has been issued by Ed DeCastro on this problem and Paul Dubroff was verbally informed on the fix so that they would not be delayed by the paper work.

5. ECO #86 should correct the problems Foxboro has been experiencing with the DMØ1. It requires the exchange of 30 - B141's for the R141's and the addition of 2 - S107 modules for each DMØ1. Fox has 4 - DMØ1's.

SHOULDN'T A CUSTOMER WHO ALREADY HAS EQUIPMENT DELIVERED
(WHICH DOES NOT OPERATE TO SPEC) HAVE SOME PRIORITY OVER
NEW PRODUCTION?????

CONFIDENTIAL REPORT

During the last four months in trying to evaluate the problems at Foxboro, I have the following statements.

At first, believing that possibly our memory tuning procedure might be somewhat more explicit, I requested that we provide a more detailed tuning procedure - Nick Mazzaresse consented and one was produced.

Everyone who has reviewed or used it agrees that it is good and that the only requirements that a person must have in order to adjust memories is the ability to read a scope.

This produced no real results at Foxboro and it was not until I found that they were running Schmoos on memories in order to adjust them that I realized they really did not understand what our adjustment procedure was accomplishing.

Friday, September 30, 1966 I arranged with Dick Sogge to discuss our memory modules and techniques with Foxboro, who I would like to thank for his time and a most excellent presentation. The presentation was made to Mr. Paul Dubroff and Mr. George Woodley of Foxboro. Dick covered the theory, technical reasons and methods of adjusting memory. After listening to the questions and comments during the presentation it is my opinion that both of the Foxboro engineers were completely unfamiliar with memory operating characteristics or calibration requirements. I did feel that because of the excellent method Dick used in his presentation, both engineers left with a good understanding of memory adjustment techniques.

If they use the information they received in the presentation along with the new tuning procedure, ninety percent of our memory troubles will disappear at Foxboro.

From statements made to me during a phone conversation Monday, October 3, 1966, with Paul Dubroff, they might not.

Let's keep our fingers crossed.



INTEROFFICE MEMORANDUM

DATE 3 October 1966

SUBJECT Quarterly Training Department Activity Report

TO Ken Olsen ✓
Win Hindle
Bob Lassen
Nick Mazzaresse
Mike Ford
John Jones
Stan Olsen
Ted Johnson
Jack Shields
Harry Mann
Dave Edwards
Jim Davis

FROM Bob Pate

The following is a statistical summary of the Training Department activities for the quarter, July - September.

| | |
|---------------------------------------|-----------------------------|
| Number of Instructors Assigned | 8 |
| Number of Classrooms Available | 6 |
| Number of Courses Conducted | 26 |
| Customer | 17 |
| Basic Tech | 1 |
| Advance Tech | 8 |
| Number of Students Processed | 328 |
| Customer | 207 |
| Basic Tech | 39 |
| Advance Tech | 82 |
| *Twilight Tech | 14 (not included in totals) |
| Total Expenses | \$79,516* |
| Income (27 customers) | \$ 8,500 |
| Cost per Customer Student | \$ 188 |
| Cost per In-House Student | \$ 339 |
| (estimated to include student salary) | |

*September Costs Estimated---\$17,420.



INTEROFFICE MEMORANDUM

DATE October 3, 1966

SUBJECT Loan of a Tape Recorder.

TO Win Hindle

FROM Gordon Bell

CC: K. Olsen ✓
S. Olsen

At one time, Ken bought a bunch (w6), very low cost cartridge tape recorders for the DEC booths. Could I borrow 1, immediately? I haven't gotten a paper tape reader for the PDP-8 yet, and want to interface the recorder to the PDP-8, as a real low cost, reasonable storage I/O unit.