Box 15 1961
folder 24

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102750017

dec BIWEEKLY REPORT

COPY NUMBER 2

DATE June 29, 1961

G. Gerelds

Tester drawings and Test Data Sheets are now being stored outside of the plant by myself.

If any new Tester or Test Data Sheets are made, please see that I get a copy.

H. Crouse

A recent addition to the Purchasing Department personnel is Frank Kalwell. Frank's area of responsibility will be maintenance repair and operating supplies or defined by account numbers; 450, 455, 550, 555, and 850.

Several price changes are to be noted in semiconductors, effective July 1.

	OLD	NEW	
2N599 Philco	$3.40	$2.08	
2N1499 (T1961) Philco	.95	.90	
2N1427 (MA-80) Sprague	3.28	2.73	(to be confirmed)

Additional price reductions are to come on the four diodes (D001, D602, D003, D664) purchased to our specifications. The increasing volume, the falling silicon market, and strong competitive bidding are causes which will yield a good price structure.

R. Mills

Our annual audit started last Tuesday, so if you meet a man calling himself Dick Tracy it's o.k. He is from Lybrand Ross Bros. & Montgomery.

DEC continues to grow with factory space in Maynard now at 75,000 sq. ft. and sales offices in Los Angeles, Washington, D.C., and a new one not yet opened in Clifton, New Jersey.

We are air-conditioning the IBM room to eliminate card shrinkage from moisture - holes were being punched in one column of the card, but due to moisture conditions, were half in one column and half in another making read-out unpredictable.

E. Harwood

The most notable thing that happened the past bi-weekly period was the shipment of the PDP-1 to Itek. Although this machine was delivered approximately 3 weeks late, we feel it was well worth the extra time to get the pulses, levels and margins tuned up to a much higher degree than the one we shipped out to BBN. Due to the extra time spent

E. Harwood (cont'd)

on this machine, we hope that it will be more reliable than the first one.

At the present time, we have five more computers in the various stages of construction. Two of these, notably the ITT machine and the MIT machine, are presently up in the systems assembly area. The other three machines are in various stages of production downstairs in the production area. The ITT machine has had all its mounting panels constructed and checkout has just begun this week. We have two crews presently checking out the machine. One crew is checking out the central computer under the direction of Paul Gadaire. The other crew, Bob Reed and helper, will be checking out the special gear, such as the duplex switching and the special items that go with this machine. As yet, we do not have the new operating consoles, so we are checking out the machines using the old table and the test head that we had constructed previously. According to the last time schedule we had made for this computer, we are approximately 1 1/2 months behind schedule. This will necessitate two shifts in order to checkout the machine and get it operational so we will have a chance to deliver on its designated delivery date.

In parallel with the ITT machine, we are in the final stages of construction of the MIT machine, and we hope to be able to start checking out this machine in about another week. This will mean another checkout crew, which we'll have to pick from the technicians available at the present time. The checkout of the MIT machine should go much faster, since it has practically no special equipment on it and is basically just a standard PDP-1 with the three pieces of in-out gear, namely the reader, punch and typewriter. The MIT machine is the first one to have the new marginal check switches, which are on each mounting panel. This will eliminate one large marginal check switch panel and also simplify the power wiring considerably. Delivery schedule calls for the MIT machine to be completed by September 1, and we have high hopes of meeting this date.

M. Sandler

The closing of our fiscal year on Friday, June 30, 1961, has been a major activity during this month. Preparations for inventory-taking are completed, and approximately 20 people will be involved in the identification and counting operation Friday night and Saturday.

We are concentrating more effort on our Production and Inspection people on computer and systems work. Seven girls and two wiremen are now engaged full-time on panel wiring and two more people are to be trained during July.

L. Prentice

The period since the last bi-weekly report has been devoted to:

1. Refinement and completion of design for parts and variations of the tubular cabinet.
2. Design of a console to be incorporated in an N cabinet.

There are still many unanswered problems in this. However, drawings have been released and work has started on a final model for the ITT machine.

New equipment to extend the capabilities of the Sheetmetal Shop have been placed on order. These include the following:

1. HeliArc Welder. This is useful for welding both aluminum and steel and will provide at least a back up service for making all of the present planned frames and cabinets enclosures.

2. A new 40 ton Press Rig has been placed on order and should arrive the week of July 3rd. It will be possible to bend 16th inch steel up to 78 inches long. The gap has been arranged so that we can use multiple tooling so that large sections can be punched or a large number of holes can be punched at one time using the press brake as a press rather than the originally intended use.

3. Two notching units for the above press will allow us to quickly cut 5 x 5 notches and chassis sections from panels sections and like.

4. Another 10 ton Whitney-Jensen press has been ordered and is on hand.

All of these pieces of equipment recently ordered should be ready for operation as soon as we can move into the fourth floor of Building #4 recently vacated by The Rex Corporation. Shop layout for this is complete. Plans are under way for lighting power, wiring, plumbing and air distribution. These should all be completed within the next 10 days.

J. Cudmore

The 1608 P.A. package has been released to Production. This package contains 4 P.A. which are in two groups of two. Each group shares a common input terminal. The package also contains two inverters and two clamped loads.

I have started the paper work on the S.E.I. 4096 x 38 memory system. Using existing block diagrams and wiring diagrams for the PDP-1C as much as possible should simplify

J. Cudmore (cont'd)

this a great deal.

The 2N412 transistor has been phased out and its replacement, the 2N1305, has been performing beautifully. The 2N412 was used extensively in the 500 kc line and had a very high replacement rate.

The statistical analysis on transistor and diode replacement (see memo of June 15) makes it plain that an equally suitable replacement transistor should be found for the MD-27 which had an 11.4% failure rate.

B. Stephenson

Raytheon submitted a bid to the Federal Aviation Agency for radar bright display equipment, and we have submitted an estimate to Raytheon of the parts required for the digital section of this system. The quantity they are interested in is 1, 35, 55, or 90 complete systems. Each system includes two coordinate converters, two analog-to-digital converters, two sets of buffer registers, two synchronizers, two range mark generators, and sixteen symbol generators.

The coordinate converter (X, Y to RΘ) is quite interesting. The approach they suggested is successive axis rotations using the small angle approximation and repeatedly calculating new X and Y values until the X coordinate goes to ZERO. The converter is designed to handle up to 11 bits of each coordinate and the estimated price of the modules is under $4500.

The symbol generators are used to position four different open symbols over four different moving spots. This is the most awkward part of the system at present, and any suggestions on it would be greatly appreciated.

Another interesting application, (not connected with Raytheon) is a new method of doing binary rate multiplication. This is the multiplication of the unitary weighted pulse train by a binary number. It would be particularly useful in control systems. The product is a single precision pulse train where the pulses are uniformly weighted, but the weights depend upon the number of bits in the multiplier. A basic 16 bit multiplier can be built with four 4215's, two 4129's, and one 4603 plus four additional quadruple flip-flop packages to hold the multiplier.

D. Denniston

The application of DEC products in training seems to be a continually expanding field. I have recently talked with people from RCA, Federal Electric, Hazeltine Field

D. Denniston (cont'd)

Training Division, Lowry A.F.B., Federal Aviation Agency and, of course, Fort Monmouth Signal Corps School in relation to the educational use of both our Lab. Modules and Training Modules. I feel that when working modules of our classroom modules are available, there should be even greater interest.

J. Atwood

Bulletins in process or prospect include a comprehensive treatise on current drivers, rules for module integration, enlarged 4000 Series catalog, new short form catalog, new Training Module Classroom Modules, catalogs, and reprints of published material on ALGOL.

Specialties done or working include imprinted tape and paper for the computer, printed programming forms, and logic stamps.

Design projects include the Classroom Modules, tape reeler, PDP color scheme, lobby redecoration, and auditorium layout. On the way is a new package for the Laboratory Modules.

In addition to the general mailing, which we are backing into with consummate grace, mailings to computer prospects, memory tester prospects, and Washington and New York area names are on the docket. The latter mailings are in connection with the opening of new district sales offices.

The mailing list appears to be about 80% keypunched at the moment. Supplementary coding has been done on about 75% of the completed tab cards. The initial 5000 names are being put on mag tape for use in the development of our own mag tape capability and for mailing list programming.

B. Lassen

We have been working on some short and long range plans which we feel sure will broaden our personnel functions.

A new application blank for higher level employees will be forthcoming very shortly. This will provide us with more complete selection material, which I feel is a must.

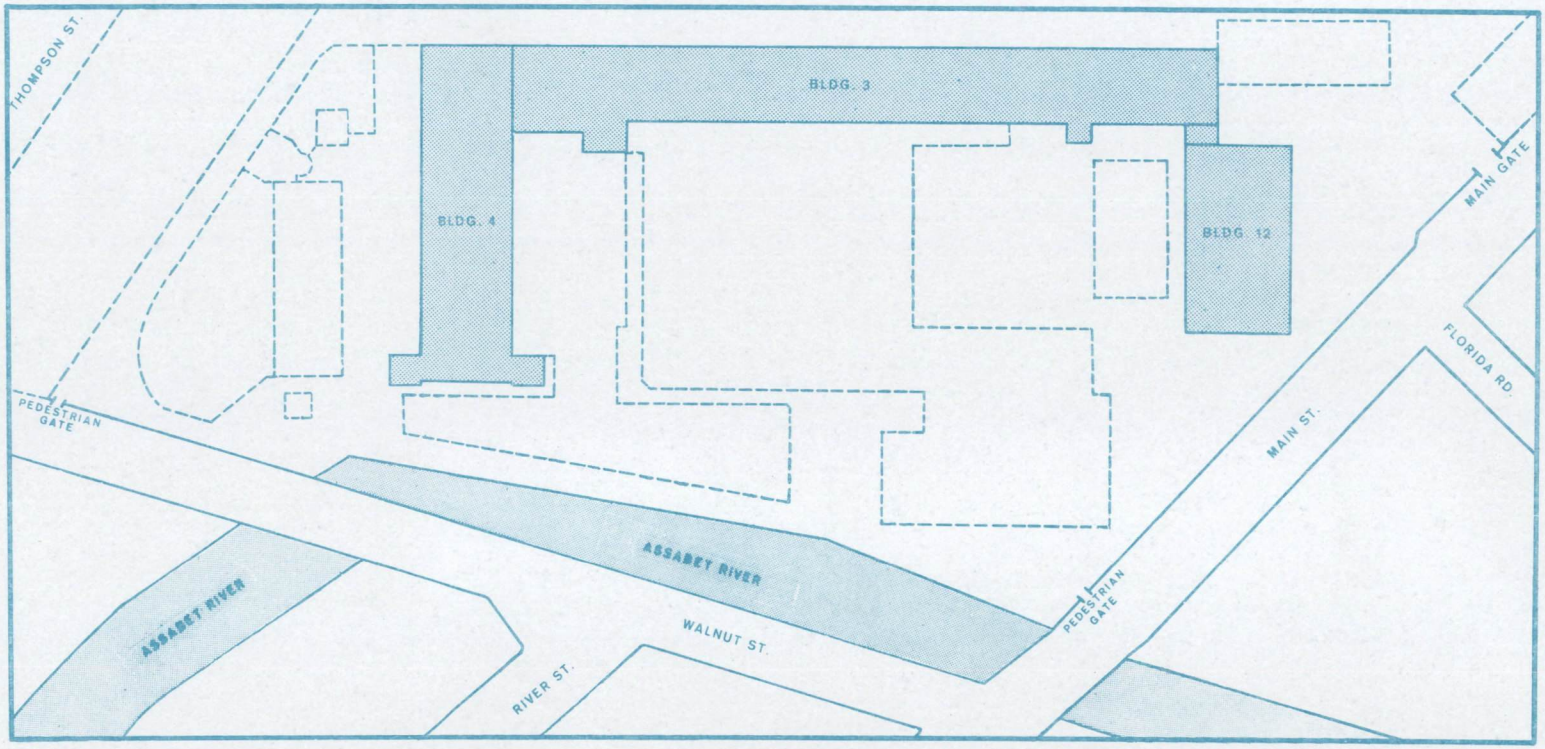
The company has just completed its annual merit rating program. Barbara Charnock and Katherine Pareago have worked hard to meet our deadline of 6/30/61. We plan to improve this program for our 1962 rating.

B. Lassen (cont'd)

We are working on a new company newspaper, and we are ready to propose the format and organization of this paper to management.

I am in the process of studying a Job & Wage Evaluation Program which will be best suited for our job structure. This is a complex long term project which will require the coordination of many ideas from all phases of management.

Barbara Charnock is continuing with her regular duties, including interviewing and testing all female applicants, personnel services and personnel secretarial work.



DIRECTORY

BUILDING 4

Third Floor
Purchasing
Engineering

Fourth Floor
Machine Shop

BUILDING 3

Fourth Floor
Computer Assembly
Systems Assembly

BUILDING 12

First Floor
Administration
Sales
Personnel
Advertising
Accounting

Second Floor
Module Production

Third Floor
Accessory Production

BIWEEKLY REPORT

COPY NUMBER 2

DATE April 14, 1961

D. Denniston

I have spent a considerable amount of time visiting and calling people in New Jersey lately, with the main interest being shown at Fort Monmouth and Bell Labs.

We are expecting an order from the Army Signal School at Fort Monmouth for a considerable amount of equipment for training, including three #2007 Buffer-Memories, twelve student sets of Digital Training Modules, and one set of Classroom Modules. They feel that a similar order will be placed again next year. Also, I have been working with two separate groups at the Ft. Monmouth Signal Labs on (1) a high speed data test system and (2) the use of digital techniques for servo systems. I feel that there are many more possible contacts to be made at the labs and have scattered copies of the logic book and other literature during my various visits.

M. Sandler

Our hiring of summer personnel for production is virtually completed. We have three excellent people returning and look forward to good help for our fiscal year inventory program.

Special units for 1517 Memory Tester, 4153, 1980, 1981 are not yet released. Release of these units to production becomes more urgent daily.

J. Fadiman

On Monday, April 10, the Memory Exerciser Model 2204B was sent out to Ampex Computer Products Company in Culver City. The last week was spent doing final debugging and minor changes on this to reduce the noise coupling.

Wiring has been completed on the Memory Exerciser Model 2205 for RCA in Camden. Most of the logic has been checked out, and there is some final debugging to be done in regard to reducing noise coupling on the output data lines. Also the output plug remains to be wired, since we just received the correct tool today. This machine should be shipped out in about one week.

Check-out continues on the Memory Plane Tester Model 1516 for Lockheed. The logic has been entirely checked out and temporary drivers have been installed. The X, Y, and Z bus systems have been checked out, and the current wave shapes look excellent through a memory plane. The Memory Plane Tester Model 1517 for I.B.M., Owego, is now being constructed much more rapidly. Most of the panels have been built, and most of the mounting panels have been wired. Interconnecting wiring is now being started on some panels, and the output plug panels and interconnecting wire schedules are being drawn up.

J. Fadiman (cont'd)

Logic design work on the Automatic Core Tester Model 2105 for General Ceramics has been held up because of lack of design engineering time. However, I am now doing that in parallel with checking out the Memory Exerciser Model 2205.

New Business: A proposal has been made to General Ceramics Corp. in Keasbey, New Jersey for a semi-automatic Core Tester Model 2107. Price with six drivers: $13,400. Delivery time: twelve weeks. Chances of sale: 95%. I have also bid on a semi-automatic Core Tester Model 2108, which would be somewhat larger and contain eight drivers. Price: $16,400.

Mr. Jack Owen, I.B.M., Owego, was here last week to discuss with me a memory exerciser which would exercise their new memory. We worked many of the details together, and he will send me a complete set of specifications. Chances of sale: 90%. Price: in the order of $20,000. Delivery time: about twelve weeks.

Mr. John W. Braicks of Philips Electric Company in Einbhoven, Holland phoned on April 10. They are ready to purchase an Automatic Memory Plane and Stack Tester Model 1516. I have sent out to them a formal quotation: the price for what they want: $50,500 with a delivery time of fourteen weeks. Chances of sale: 95%.

I.B.M. in Poughkeepsie is interested in purchasing a Programmable Pulse Generator Model 2104. We should receive the purchase order for this in a day or so. Price: approx. $11,125. Delivery time: ten weeks. In addition, there is Core Tester, Memory Tester, and Memory Exerciser business to be done at General Electric in Syracuse, A. C.Spark Plug and National Cash Register in California, Ampex Computer Products in California, Laboratory for Electronics in Boston, and other places too numerous to mention.

S. Olsen

Additions

4/3 Florence Davis, Assembly
4/3 Robert Savell, Engineer
4/5 Geraldine Baldwin, Assembly

Terminations

4/6 Edward Hoffman, Jr. - to work in gas station
4/7 Donna Prichard - Pregnancy
4/7 David Nevala, Co-op - to return to school
4/7 David Kicilinski, Co-op - to return to school

S. Olsen (cont'd)

Offers Out

Herbert Bornstien, Eng. Assistant (Summer)
Robert Kaplan, " " "
Thomas Hastings, " " "
Jon K. Clemens, " " "
Joel Winett, Engineer
William C. Stevens, Jr., Engineer
Richard Hazel, Engineer
Ralph Alter, Engineer
Arthur T. Campbell, Engineer
Theodore Russo, Engineer
Richard Otte, Engineer
James E. Sheahan, Engineer

Starting

5/1 Leon S. Barsamian, Electronic Tech.
7/30 John MacKeen, Engineer

June - Stanley Butnam, Eng. Assistant (Summer)
" - Richard Bank, Production (Summer)
" - Bruce Bombay, Drafting (Summer)
" - Judy De Grappo, Assembly (Summer)
" - Carolyn Cunningham, Assembly (Summer)
" - Linda Trez, Production (Summer)
" - Deborah Lloyd, Purchasing Dept. (Summer)
" - Carl Patterson, Shipping & Receiving (Summer)

L. Prentice

Mr. FitzGerald has recently placed the following orders with outside vendors.

1. 6 three-hold gang punch and die sets
2. 4 sets of machined parts for yoke and focus coil, display assembly
3. 10 sets of machine parts for rotating and toting, display assembly mechanism

I have not been able to find satisfactory solutions to the following:

1. Engraving of front island control panel

L. Prentice (cont'd)

2. Enclosure shields for the CRT's
3. Solder and fan arrangements and testing for selection of best blade. Vendors have promised solutions to all these problems, but to date the material is not on hand.

We have nearly completed the design work for a new cabinet based on sketches from Van Dyke Associates. The prototype cabinet should be ready for inspection before May 1, 1961.

We have recently received #304CW Curtis Abrasive Finishing Machine. This should relieve the pressing problem of better production on PIU handles. Work is presently under way to get it into operating condition to get enough handles ahead so that we can change the motors over from operation of 550 volts to 220 volts at a later date. Transformers have been rented for the interim period.

A. Blumenthal

The troubles which have plagued PDP-1B at Bolt, Beranek & Newman in recent weeks have finally all been isolated and brought under control. The majority were of an intermittent or temperature sensitive nature, making several attempts necessary at trouble shooting each one.

Troubles found on IBM Soroban Typewriter:

1. Plungers in code solenoids sticking in energized position.

2. Power unit accelerator arm sticking, failing to initiate print cycle.

3. Loose typewriter foot, allowing decoder to shift around.

4. Intermittent shorted tab controls.

5. Contact discontinuity (bounce).

Trouble #1 is caused by goo collecting inside the solenoids from the shaft lubricant. Soroban is cognizant of this problem and has promised to supply us with replacement solenoids of a type using nylon bushings and therefore not requiring lubricant, as soon as they become available.

Trouble #2 occurred with 3 separate power units and is also caused by goo accumulating. Now that this is known to be a sensitive point, its reoccurrence can probably be prevented by cleaning the parts involved during each routine lubrication.

A. Blumenthal (cont'd)

It may be possible to prevent contact bounce (#5) from further trouble by making a change in the control logic so that bounce can be tolerated rather than depend on masking it with a RC filter.

Punch troubles:

6. Clutch failure (2 cases).

7. Erratic advancing of tape.

8. Contact failure.

9. Oil on tape.

A new type of clutch is being supplied by Talley which, hopefully, will end occurrence of trouble #6.

The incidence of #7 has been reduced considerably by closer adjustment of the hold-down plates and by installing shims to reduce the end play in the gear trains. It still occurs occasionally, however, as a result of heavy folds in fan fold tape. The speed of the machine will be lowered from 60 to 45 CPS to allow more time for advancing in an effort to reduce this still further. This merely requires readjustment of delays in the buffer. Noise on the -30V line caused by solenoid switching was also found to cause some of this trouble. A capacitor to ground cured this part of it.

There are indications that failure of the advance contacts to close occasionally (#8) causes overpunching of characters. This is not surprising considering the environment of oil, chads and lint in which they must operate. A solenoid driver and delay will be added to the buffer to replace the contacts, if it can be done without excessive slowdown of the solenoid drop-out due to the more severe damping requirements imposed by a transistor driver.

The oil problem hasn't been solved yet (#9). It causes trouble in reading because it increases the transparency of the tape. An obvious help would be to use the darkest possible tape. It may also be wise to design the buffer logic to switch the motor on only when punching is actually being done so that the oil is not working up through the head while the tape is sitting stationary.

Control computer troubles:

10. Ringing on "run" line.

A. Blumenthal (cont'd)

11. Sticking AC 16 flip-flop.

12. Delay unit feeding out spurious pulses.

13. Weak +1⟹ AC pulse.

14. Bad solder joint in dis logic.

15. Bad sense amplifier - bit 7.

16. AC cord & connector - reader adjustment.

17. Noise pickup.

Nos. 10 and 11 caused "morning sickness" troubles, i.e., for about 10 or 20 minutes after the machine was turned on each morning. The ringing caused a noise spike to enter the timing chain when the run FF was set during reading of the tapes. This added an extra one to the program counter amongst other odd effects. A clamp diode corrected the trouble. The delay unit involved in #12 was in the low speed chain and fed pulses randomly into the timing chain.

No. 13 has been a source of chronic low margins and intermittent errors. Juggling the logic that forms this pulse so that the time pulses feed the transistor closest to ground where series gating is used improved the pulses immensely and gives a 9.5V margin on the accumulator.

The bad solder joint in the dis logic (#14) caused occasional failure to clear AC when AC = -0.

The AC cord and connector were not adequate to handle the current for the machine and became severely overheated. They were replaced with a cord having #10 conductors and a heavy twist-lock connector. The following day it was necessary to readjust the gain on all the reader amplifiers, probably because the increased AC input brightened the reader bulb.

Noise radiation (#17) from the accounting machines and typewriters in the office next to the computer room was found to be upsetting the 10 register and FLAG #3. Noise filters were installed in these machines by their respective factory service organizations. The problem has been solved except for FLAG #3, which is still set from noise unless the light pen gain is set very low. With the light pen system being of the high gain that it is, some means of improving its shielding will have to be sought.

An arrangement has been reached with IBM whereby their serviceman will be allowed to remove the Soroban assemblies from the typewriters when necessary to service the IBM part of

A. Blumenthal (cont'd)

the machine. A drawing will be prepared for them showing the location of all the screws to be removed in doing so.

J. Smith

All panels for the 1517 Memory Tester have been completed and delivered. Logic 1C, 1D and 1E will be completed late Friday. All other logic remains to be released. Switches have been completed and wired to the output plug panels.

I received the models for the 52 and 62 Current Drivers Friday, the 14th. Fabrication of chassis and construction of boards progressed at a very rapid rate. Three units of each model will be available for the 1516 Monday.

The Current Calibrator 71 was released to production Wednesday, the 12th. A lot of ten is being fabricated.

Experiments were conducted last week on the possibility of utilizing a vapor degreaser to clean our units after the insertion of transistors. The current method is quite tedious and time consuming. Pre-results indicate a time saving of 50% or more. A barrel degreaser of the type we would need is relatively inexpensive ($250.00). There are a few more areas to investigate before a method can be presented for evaluation.

B. Hughes

The Current Drivers and the 766 Power Supply are now being built in production.

Q-6-100 diodes have very high leakage (about 50% of them fail the factory spec) and are fragile (the glass structure looks as if the machine which makes them is not in correct adjustment). They often break in two when removed from a circuit, so in the current drivers I have changed to a D003. The stored charge in the Q-6-100 is 2.5 picocoulombs. In the D003 it is 5 picocoulombs. This does not appear to affect driver operation.

The 5000 D003 diodes from Clerite failed to pass factory specs (5 pcb. stored charge), so we sent them back and they replaced them.

The maximum energy available in electrolytics is now 86 watt seconds, so we are increasing our filter capacitors in Power Supplies 721, 741, 730 and 766. We used to use 20,000 MFD at 20 volts. We will now use 35,000 MFD at 25 volts.

B. Hughes (cont'd)

The 2N1427 Philco Transistor failed to pass our internal frequency test (it always used to pass), and we have encountered some difficulty returning these units to the vendor. Sprague units pass our internal specs.

R. Doane

Test Equipment Committee Proceedings (1st two meetings)

1. The following is a list of tasks that will be expected of Test Equipment Headquarters, on the basis of which the need for another man is projected:

a. Calibrate each oscilloscope every six weeks (30 'scopes)
b. Calibrate each meter every six weeks (55 - 60 meters)
c. Check each DEC module for usability periodically (280 laboratory modules, 230 system modules)
d. Maintain tape recorders
e. Maintain audio system
f. Set up transistor and diode tests
g. Clean 'scope filters

2. Carbon film resistors in Tektronix 'scopes in sweep and calibrator circuits will be replaced by metal film resistors to avoid fast drift and calibrator errors up to 5%.

3. The following are recent requisitions for test equipment:

a. 4 type 543 30 Megacycle Tektronix oscilloscopes
b. 4 type CA dual trace Tektronix plug-ins
c. 1 type L fast rise, high gain plug-in
d. 1 type M four-trace plug-in
e. 1 type 131 Tektronix amplifier and current probe
f. 1 pair of probes for our type Z plug-in
g. 1 type 581 100 Megacycle Tektronix oscilloscope
h. 1 type 81 plug-in for 100 Mc 'scope
i. 2 type 82 dual-trace plug-in for 100 Mc 'scope
j. 1 Simpson AC wattmeter, multi-range

4. The following are items under consideration for purchase in the near future:

a. An AC voltmeter with high sensitivity for supplanting the 543 with L plug-in

R. Doane (cont'd)

presently used for power supply ripple measurement.

b. A resistance bridge with at least ±0.05% accuracy over a minimum range of 1Ω to 5 megΩ.

c. G-R Orthonull bridge for getting L and C measurements on very low Q components to within ±1%. Our present bridge is similar in many respects to this one, but does not have Orthonull. Your comments on this one are especially solicited.

d. Another hot and cold oven to supplement the one we have.

e. Some device for insuring the accuracy of our crystal oscillator calibrating setup, including possibly another Tektronix Time Mark Generator.

f. Whatever equipment will prove necessary to make a meter calibrating test station.

5. Meter and oscilloscope calibration labels have been laid out and will soon be printed.

6. We asked Ed Harwood to see that the 'scope we have at BBN is soon returned for calibration.

1. The type 71 Current Voltage Calibrator is in production. We still don't have a source for the 1Ω 0.1%. 25 ppm/°C current measuring resistors needed.

2. The latest geometry for a 50 Mc flip-flop is under construction. Main difficulty to date has been too much total transition time: the best circuit so far had up to 20NS. The latest effort is more radical, uses principle of our 1130 Parity circuit.

3. Three new modules are in process.

a. 5310 adjustable tapped delay line with P.A., ready to be released
b. 1109 12 inverter package, model being evaluated
c. 6117 diode unit possibly usable by NSA, waiting for etched board layout

J. Atwood

There appears to be a growing tendency to use the IBM equipment for applications other than direct mail and sales prospect listing. While we hate to see this sort of situation developing, there is apparently no sportsmanlike way to stop it. So we're putting the pressure on IBM to provide us with an additional console-type keypunch and a small manual keypunch somewhat ahead of the usual top priority, national emergency delivery time of four or five or six months. If these units could be installed immediately and could be utilized full time for the

J. Atwood (cont'd)

mailing list, we might be able to complete the additions and corrections currently awaiting processing sometime around Independence Day (or Labor Day).

In the meantime we are awaiting with a certain degree of anticipation the arrival of the 403 printer, which will enable us to do such miscellaneous odd jobs as addressing the labels for all our mailings from the IBM cards we are so busily producing. The successful linking of the card reader and the computer gives us a certain degree of freedom in this respect, since a program has been devised which utilizes the reader to produce labels from the cards, and there might be some opportunity from time to time to run labels on the midnight-to-eight shift.

On the show front, the 10-foot booth built for the ISA Exhibition in New York last September has gone to Dallas for the SWIRECO show. Our participation in this 6th Region IRE event was backed up by a mailing which we hope will promote traffic at the booth and also add some badly needed names in an area where our mailing list is relatively skimpy. The 20-footer used at NEREM is being adapted for the Western Joint Computer Conference, and we hope to be able to use it later on at WESCON. So far there has been no word from the WESCON management on acceptances for this year's show, but we hope to hear momentarily.

The latest media survey shows that DATAMATION is still the top vehicle for our advertising and publicity. It leads in total inquiries (2028 through December 1960), total response to a single item (443) and in percentage of respondents demonstrating a continuing interest in our products (10.9 per cent). Other good books: ELECTRONIC PRODUCTS, MILITARY SYSTEMS DESIGN, ELECTRONIC DESIGN, AUTOMATIC CONTROL, INSTRUMENT & APPARATUS NEWS, ELECTRONIC EQUIPMENT ENGINEERING, ELECTRONICS, ELECTRICAL DESIGN NEWS, INSTRUMENTS & CONTROL SYSTEMS, and WESTERN ELECTRONIC NEWS.

BIWEEKLY REPORT

COPY NUMBER 2

DATE March 31, 1961

L. Prentice

One of our primary problems during this period is that we have only one machinist, who is very limited in his ability. The jobs that require machine time will have to be done by outside vendors. This requires more lead time than formerly so that all parts that are required for production items, particularly in PDP, ample notice must be given of changes or revisions to compensate for this lead time. The plastic protective shield for the face of the display unit mentioned in the last report is one such item. This item was released from drafting approximately one month ago. So far we have contacted three vendors; one would not do the job at all, one had a price of $50.00 per unit, and one attempted to make this and found that he did not have the proper facilities and know-how. We are waiting to hear from a fourth vendor who is now attempting to make this unit. So far we have found no one able to produce this unit in an abrasive resistant acrylac plastic and so we are trying to get them made in a plexiglas formerly used. We have, however, had some success in vending punch and die work. We are getting good deliveries and good workmanship.

I would like to urge all engineers to make use of first model or prototype layouts rather than putting this work in the drafting room. We have recently had considerable success with the 766 Power Supply and all of the units that are packaged similar to the 52 and 62 Current Drivers by making up blank chassis and blank panels and letting the engineer select his own layout before any drafting was completed on these units. I believe in most instances where the physical dimensions are known of the completed package, this is much more successful to lay out directly from a schematic and place the components rather than turn it over to the drafting room and considerable time is saved thereby.

The first six units of new cabinet design manufactured by Colonial Engineering, Cambridge, Massachusetts are due to arrive March 31, 1961. This has only minor changes from the Premier cabinets that we have been using in the past. There will be some detailed changes to the methods of attaching door latches, mounting power supplies in the rear, etc. These are minor and should not consume much time. A new method of abrasive finishing of the plug-in unit handles has been under investigation since last November. If a mutually satisfactory price can be arrived at, this machine will be purchased from W. H. Field in the near future.

Recent additions to our machine shop have been a small die filer, Kalamazoo band saw used for stock cut-off, and the DoAll band saw for die and related machine work.

Mr. Kenneth Fitzgerald is attempting several projects, one of which is a paper tape reader. He is going to work with Al Blumenthal on the repair and maintenance of in-out equipment until an electro-mechanical technician can be obtained. He will work closely with Al Blumenthal, Ed Harwood, Steve Lambert, and others to become familiar with all our in-out equipment from a maintenance point of view toward establishing schedules, possibly manuals to go with our equipment.

BIWEEKLY REPORT

COPY NUMBER

DATE March 31, 1961

E. Harwood

PDP-1

The computer has been used quite a bit in the past two weeks, mainly by Itek, and during this past week we have had one day of operation by a gentleman from the University of Iowa. Spaced in between these two users were Jack Brown and Gordon Bell using the machine to check out the magtape and card-reader, respectively. During this period, we had one trouble. We burned out one of the solenoid drivers in a typewriter control. This is the second time that particular solenoid driver has burned out, and we suspect that one of the coils in the typewriter may be bad.

PDP-1-C

As of this date, the construction stage of PDP-1-C is on schedule. All mounting panels have been delivered and wired into the machine. At the present time, we are incorporating the changes necessary for the high speed multiply-divide and also the special features related to the in-out system. The tables for the console, the display, plus the two special tables that have been ordered, are now being constructed, and we should start getting some of these in about a week or so. As soon as we get the console tables and the island control, we will be able to start checking out the machine. We hope this will come about in approximately two weeks. The only piece of gear still missing is the reader, which hasn't arrived from Digitronics. It is due in next week.

Orders to build three more PDP-1-C models will be issued next Monday. We hope to have all four machines currently in production completed the end of this year.

B. Stephenson

The new quadruple flip-flop units and the associated gate packages are creating a lot of interest. Almost every application has some place where they can be used. A request came recently from Raytheon in Waltham for a multiplier circuit which they wanted for evaluation purposes. They wanted a very slow speed circuit to perform serial multiplication of 6 bits by 6 bits and accumulate up to 20 bits. With the new units, we were able to send them a circuit which would do this for only $2,000.

Some very rough drafts have been completed for new application notes discussing decimal, alphabetic, and error correcting codes, Pseudo random word generators, the switched tail ring counter, and hybrid analog digital techniques. Also, thanks to Don White, we have the rough draft for information on the new Model 2303 Burst Generator.

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J. Smith

Our "Jumping Joe Chart" I feel has outlived its purpose but not before fulfilling its goal. This chart was part of an exposure campaign to reduce wrong parts placement in the assembly of our units. Campaigns of this type have proven successful in many companies and did very well for us with a reduction of 30% of wrong parts placed.

The 2204A was delivered on schedule. The 2204B has been completed and check-out started Monday, the 20th. There was a delay on starting the wiring of logic panels for the 2205A, pending the release of drawings. The drawings were released the 23rd and 24th and construction is progressing rapidly. The panels should be completely wired and checked out this morning. All wiring panels, units and power supplies have been delivered to the 1516. The current drivers remain to be released to production. Check-out of sections not involving current drivers has been started. Wiring of the switches for the 1517 has been completed and are currently being cabled for connection to the output plug panels, which will begin Monday morning.

George Gerelds reported that Remington Rand was having problems with the eyelet connections on our laboratory modules front panels. Temporary action to correct this has been started in that all front panel wires are being soldered to the eyelet. A number of solutions to this problem have been suggested and are currently being investigated. Any ideas on this problem would be appreciated.

M. Sandler

Now that orders are coming in at a good rate, we have stepped up production. This month we are in excess of 3200 units produced and will be shooting for 4000 during April.

Transistor troubles still give us difficulty in planning production flow. The most recent casualty is the 1427, the replacement for the 2N393.

George Gerelds has been helping Russ Doane in an investigation to determine the source of our pulse transformer troubles and it is hoped that they will soon have an answer.

We are looking forward to the increased load of work built up by good sales of systems, computers and modules. Meeting that load will require coordination of all our efforts. We must all remember that early design means early delivery.

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J. Fadiman

On March 10, 1961 the Memory Exerciser Model 2204A was delivered to Ampex Computer Products Company at Culver City. I also spent some time working on the Automatic Core Testers and Automatic Memory Plane Testers at Ampex.

Much of the basic design work has been done on the Automatic Core Tester Model 2105 for General Ceramics. The next step is to draw the block diagram for this. The Memory Exerciser Model 2204B will be shipped to Ampex Computer Products next week. It has been completely checked out, and only one or two minor problems remain.

All mounting panels and front panels have been wired and delivered for the Memory Exerciser 2205 for RCA in Camden. Interwiring is now being done and the machine should be ready for checkout about April 10, 1961.

The Memory Plane Tester Model 1516 for Lockheed is now in checkout. The logic is almost completely checked out and as soon as the transistor drivers are available, the entire system will be checked out. The Memory Plane Tester Model 1517 for IBM, Owego, is in the process of construction. The panels for the Read-Write Switches, Sense Switches, etc., are in wiring now, and all the front panels are in construction. However, there is still some logic work to be done before the logic panels can be released to production. The Memory Tester Model 1518 for IBM, Kingston, is in the first phases of design, although some of the mounting panels for the Read-Write Switches for which we know the correct wiring, have already been released to production.

Ampex Computer Products Company is interested in an extremely versatile Memory Exerciser which would test out all of the memory systems which they are now producing. The chances of selling them such a system are very good.

General Ceramics in Keasbey, New Jersey is interested in two Semi-Automatic Core Testers and quotes will be sent out to them on these immediately. They are also interested in an Automatic Plane Tester such as the 1514B. Chances are very high of selling a minimum of $30,000 worth of additional systems test equipment to General Ceramics.

IBM, Owego, is interested in a Memory Exerciser for their new memory system. I will get together with Mr. Jack Owen of IBM very shortly to discuss the details of this. Chances of sale here are very good.

There is a considerable amount of business to be done at A C Spark Plug and National Cash Register out in California. This all hinges on the availability of our transistorized current drivers, Models 52 and 62.

BIWEEKLY REPORT

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G. Gerelds

For some time now we have been having trouble with our pulse transformers passing specs. that are set up by the Engineering Department, particularly the transformers with the white and blue cores. Up until about a month or so ago, we have done our own tumbling. Now we have the vendor do this on the blue core. One batch of blue cores we received was tumbled far too much, as I could only get 20 out of 100 to pass specs.

These transformers are tested on our L.C. Meter, which gets its power from a General Radio Autotransformer in order to keep the voltage correct.

On February 1, I started running some tests to see if our potting compound and baking were ejecting the transformers. I had 100 transformers wound with 15 to 3 turns #T2020 transformer and just potted, not baked, but air dried for 24 hours. Our spec. on the T2020 is 130 to 190 and 4.6 to 7.2. There were 14 transformers that were on the low side of the 130 specs. (with 27 rejects also).

On February 2, I took 20 of these transformers that were 150 in specs. and baked them in the oven at 300° for one hour. After cooling off, I retested them and found that 18 of the 20 had fallen as much as 18 uh. However, they were still within the specs. by 2 uh. I then baked the remaining 39 and found 5 more down below specs. So with 27 rejects to start with and the 14 + 5, total of 46 rejects, I called in Russ Doane, and after investigation Russ believed the white cores were out of tolerance. We tried to return these cores to G.C., but they said they would send us new ones. We received these new cores on March 24.

I again had 100 transformers T2020 wound and potted but not baked, and of this 100 I found only 30 to pass the 130 specs. Most of them were around 110-120. I then took the complete lot of 100 and baked them and after baking 7 of the 30 did not pass the 130 specs., nor did any of the 70, but on the 29th of March, I retested the 70 transformers that were out of specs. and found 37 of the 70 now pass specs.

Now going back to March 24, Russ wanted to have 100 transformers wound (not potted) and reading taken so he can run a curve and find out if the cores are in tolerance. I took 100 cores from the same batch that had T2021 transformers. This transformer is a 8-4 turns with specs. 30 to 50 and 7.8 to 12.0. All of these transformers passed specs. On March 25, I had these transformers potted but not baked. Thirteen of the 100 failed specs. on 30 to 50 spec. (low). I then had these transformers baked. The ones that passed before were still O.K., and 11 of the 13 now pass specs. However, most of them were down at the low end of the specs. after baking.

G. Gerelds (cont'd)

On March 16 and 17, I was down to Remington Rand in Blue Bell, Pa. to repair some test equipment units that had loose front panel wires. I only found 2 or 3 that you could call loose, but the corrosion from dampness had turned the wire green, making a high resistance connection or no connection. I soldered each one of these eyelets to the wire.

We are now doing this to all units that are coming from Assembly until we have a better way or a lug.

R. Hughes

Current Drivers

The Model 766 Power Supply has been released to production. The Model 52 is about to be released (final model being made). The Model 62 looks good and will probably be released as soon as the model is built. Heat runs are being made on these units to determine stability.

R. Doane

I have been spending as much time as possible experimenting with circuits whose maximum useful frequency of operation should be 40 or 50 mc. I have a Pulse Amplifier whose output pulsewidth is about 4-5 NS, though I would expect the pulsewidth for 50 mc operation to be more narrow than this. The several geometries which have been tried so far for a flip-flop all have serious limitations. Several things are evident from work to date, however:

1. Bifilar, or at least very tightly coupled pulse transformers, are necessary to achieve reasonably low signal attenuation.

2. A particular circuit geometry cannot be fairly evaluated unless a favorable physical geometry is provided, which means that often a new printed wiring layout is necessary to try out a new idea.

3. Transistor speed ratings in terms of F_t can lead to overoptimism, since a transistor spends a large fraction of its switching time at low voltage or low current, both of which drastically reduce gain bandwidth product. Since there is no tractable analytical method for finding the total switching time for a transistor whose characteristics vary wildly during the transient, only experience allows reasonable predictions to be made.

BIWEEKLY REPORT

R. Doane (cont'd)

The Model 71 Current Calibrator has also been designed during this period, as a companion for the 62 and 52 current drivers. It will be released to production soon.

A new test equipment package, the 5310, provides a tapped delay line with pulse amplifier in the 10 mc line.

Our pulse transformer tolerance troubles are not over. Every manufacturer I have talked to (Allen Bradley, Ferroxcube, General Ceramics and even Arnold) has the same story: tolerance of ±20% or more in production is state-of-the-art for reasonable yields. Mr. James Kiser, president of Vari-L, Inc., whose business is heavily dependent on his ability to provide reproducible characteristics while employing such cores, says he solves the problem for himself by carrying a large stock of cores, all carefully tested and catalogued. Unfortunately we cannot use just any arbitrary inductance which turns up and therefore cannot use this system. Two possible solutions:

1. Test and physically grind cores to uniform inductance (we don't care much about core shape).

2. Pay for the throwing away of cores that miss a special DEC tight specification.

D. White

We are rapidly developing a very flexible group of packages in the unbuffered flip-flop series (4213-4216). Previously, the series has been somewhat limited in usefulness. The most important limitation was that, although it was easy to go from the standard 4000 series to the unbuffered flip-flop, reading out of the unbuffered series into the standard line was difficult. The problem was that of delay, since the outputs of the unbuffered series change during pulse time. Three new gate packages (Capacitor-Diode-Inverter 4125, 4127 and 4129) have been developed to solve this problem. The first lot of 4127 is now in test, and the other two will be released shortly.

In the memory tester department, a frequency response curve of the 1550 model was taken. The amplifier has a bend-pass of from 5 kc to 20 mc. John Fadiman reports slicer problems, so work is now in progress to speed up the slicer while maintaining our present slicer accuracy. More on this later.

Brookhaven National Lab is building a system using our modules. They are reading the coordinates of photographs of tracks in a nuclear bubble chamber into an IBM 7090 computer. Our equipment, together with a TMI memory, is the link between the flying spot scanner and the computer. More on this system will be in the next biweekly, since I'm going down there Monday.

K. Olsen

I made a whirlwind trip of our customers and potential customers in California. In spite of how small California may look on the map, it is indeed a big place and I was only able to see the most important people.

The Navy in San Diego was very happy with the special unit we made for them. They thought we were exceedingly co-operative in making modifications after we received the order. Perhaps we were a little naive in this and should have charged some nominal amount for the modification, but it surely did make friends for us. I was able to pass on a little of our philosophy reliability which I think they appreciated, but they did show some concern that it might make the equipment more expensive.

There are several people at Jet Propulsion Laboratory who are interested in our equipment. One group had just ordered about $15,000 worth the day that I was there. These people were avid users of CCC equipment but wanted to have a variable frequency clock and so were forced to go into our type equipment. However, they do feel that CCC equipment with dynamic logic is easier to implement when you go from equations to hardware. I mentioned that they were the first people who ever mentioned that dynamic logic was easier to use and that they should carefully look into the subject. Their immediate interest is in pattern generators and random number generators. The principal one is the shift register with a parity circuit which feeds the first stage of the shift register. This is such a commonly used device that I think we should include it as one of the examples in our Logic Book. We might even make up preprinted drawings that show people how to hook this thing up.

I visited another group that was hooking up our equipment and was shocked to see what they were doing. They believed that it was morally wrong to use a grounded net and, therefore, returned everything to a single ground point. I felt like lecturing the man but didn't want to embarrass him before the people working for him, so will have to write a nice letter to him. Fortunately, they were using low speed circuits. They had groups of three mounting panels mounted in slides which made a very compact and neat arrangement.

Ted Johnson and I visited MS&A, Incorporated, which was formerly Marc Shiowitz & Associates. This is a consulting programming organization who are interested in working with us when we sell a computer so that they will have a good chance of getting the programming job. They are a relatively broad organization and even do circuit design but, so far, have done very little hardware work.

USNOTS in Pasadena is a rather discouraging organization. They claim that other people's computers are better than ours and, therefore, we should lower our prices if we want to have any advantage. They may be bluffing, but I am tired of spending any more years working with them; and so I propose that we discontinue trying to sell computers to them. However,

K. Olsen (cont'd)

they do use Building Blocks and they are interested in the display scope, and I think we should use our normal aggressiveness in trying to sell to them. They feel that the services that the large companies have offered to them are so wonderful that I don't think we could make them happy even if we sold them a computer. They mentioned one interesting point, however, and that is that the Remington Rand 490 has two extra channels for intercommunication between two machines. Some people have tied three 490's together and used them as a single system.

We had lunch with Mr. Tomash, president of Telemeter Magnetics, and learned a number of interesting things. They are well along on their 1.5 microsecond memory for the Signal Corp in New Jersey and for RCA. He feels that someday it will cost less than the price people are presently paying for memories. Royal Howes, whom we talked with later, is somewhat less optimistic than the president. They have about one hundred girls stringing these memories now and have some semi-automatic devices which help. It is a complicated thing to make because they put three wires through in one direction. They have two diodes for each word, one for writing the drive one turn, and then one for reading which drives two turns. The cores are 17 by 30 mils, which is exceedingly small. I think these were enormous germanium diodes. The core switch is in a 0.9 microsecond cycle.

They are buying their second Rese tester because it is the only one available that goes at high speed. We had better get our current drivers out to them or we will lose the whole job to Rese. They have a number of high speed testers now which use DEC logic and electro-pulse sources, but the electro-pulse sources are off the air most of the time.

I suggested that Ted get a 541 scope and a rack of equipment so that he will have an opportunity to learn our equipment better, and he will have spares to help customers who might need it and also be able to do minor repairs in the office. I am afraid he will grow a little cold himself without the opportunity to play with the equipment a little bit.

Telemeter Magnetics was combined with Ampex a short time ago and they have made an interesting organization change. The digital tape transport section will now come under Tomash in the telemeter group. It will physically move down to Los Angeles in the summer. They realized they have not done a good job in this area and Telemeter is quite conscious of their weaknesses because they have been customers of Ampex's Digital Section. I would guess that TMI has a good possibility of straightening out many of the problems of Ampex.

I got a little bit of tan in California when my Hertz car broke down and I had to walk two miles to town.

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J. Atwood

Direct mail activity is at an all-time high. Inquiries received during March alone require the mailing of 1513 packages of literature to individual respondents. In addition, we are processing six concurrent mailings: (1) a general mailing to persons on our regular list as rapidly as the names are keypunched and reproduced on labels, (2) a follow-up mailing of new literature to PDP prospects on the list, (3) a "mop-up" mailing to persons who have not yet indicated whether they wish to remain on our list, (4) a mailing to attendees at the Magnetism Conference who are not on our regular list, (5) a mailing to new members of Association for Computing Machinery who are not already on our list, and (6) a mailing to some 3100 persons on the Schoonmaker list and to IRE Region 6 addressees on our regular list calling attention to our exhibit at the Southwest IRE Conference in Dallas this month.

Publicity on new products, new literature and new systems is also building in volume and frequency. The BBN effort, which was intended principally to lay the groundwork for forthcoming publicity of more immediate news value, has been paying direct dividends. Even though the affair clashed timewise with the IRE, which limited our ability to exploit it properly and prevented most technical publication editorial people from attending, it gained us front-page coverage in the "Sunday Herald" and would have put us on WBZ-TV news if the film had not been ruined in processing. Additional publicity, such as the write-up in "EDP Weekly", can be expected in the next few weeks as the various monthly and bimonthly publications go to press.

The IRE Show was easily the most successful and productive trade show we have attended. Traffic at the booth was exceptional, with many people coming around for the specific purpose of seeing our equipment and obtaining our literature. By limiting our literature offering to three key items, by displaying the literature in well stocked bins, and by centering the rack at the front of the booth, we were able to dispose of a record 11,000 pieces. IRE reply cards, including requests for the Logic Handbook turned in when we were out of copies, have reached a total of 860 to date. This total represents 577 show reply cards and 283 reply cards from Short Form Catalogs and Logic Handbooks distributed at the Show.

J. Cudmore

At the IRE Show two people from two separate companies asked me if we had a DEC to 7090 and 7090 to DEC conversion module. At that time no one seemed to know what the 7090's logic levels are. Perhaps this should be investigated.

A 1204 dual complementing 5 mc flip-flop model has been built and appears to work very well. The 1203 flip-flop has been redesigned to eliminate the tendency to produce overly large "P" pulses of ever increasing width. Testers for these two units have been designed and are being built.

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B. Towle

REPORT ON CUSTOMER CORRESPONDENCE:

Company	Interest
University of Wisconsin Mathematics Research Center United States Army	PDP-3
Philco Corporation Computer Division	4215 Counter
V. A. Hospital Radioisotope Service	D. to A. Converter
Bendix Systems Division Data Process & Systems	D. to A. Converter
General Electric Co. Defense Electronics Division	Logic Booklet and 10 MC Bulletin
Edgerton, Germeshausen & Grier Reactor Test Dept.	500 KC Series and Logic booklet
National Research Council Radio and Elec. Eng. Div.	Schematics on units purchased
National Aeronautics & Space Admin. George C.Marshall Space Flight Ctr.	Logic booklet
Danish Embassy	4000 Series Bulletin
Ramo-Wooldridge	Bulletins C-4000 and E-150 Info 4680
Naval Research Laboratory Application Research	PDP-1
Army Ballistic Agency U.S.Army Ordinance Missile	PDP-1

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B. Towle (cont'd)

Company	Interest
The Martin Company	DEC technical bulletins
Sylvania Electric Company	Schematics
General Electric Co.	General info
Oak Ridge National Lab Neutron Physics Div.	PDP-1
NASA/GSFC	General info
Armour Research Foundation	Digital to Analog Converter
Autometric Corporation	Logic book
I.T. & T. Laboratory	Complete catalog
Air Force Missile Center Holloman Air Force Base	Tracing paper
Curtiss-Wright Corp. Electronics Division	Logic book
Societe Anonyme des Automobiles Peugeot	Logic Kit
Radio Corporation of America Electronic Data Processing Div.	General Info
Headquarters Pacific Air Forces	Bidding on computer system
U.S. Air Forces in Europe Dir. of Statistical Services	Bidding on computer system
University of Washington Mathematics Research Center	PDP-3

B. Towle (cont'd)

Company	Interest
Sylvania Electric Products Electronic Systems	Logic booklet
Adage, Incorporated	Logic booklet
Harvard University	Programmable Pulse Generator
Philips Laboratories Philips Company, Inc.	Complete catalog
RCA Ter. Fac. (E&T)	Low frequency oscillator
Sperry Gyroscope	Diodes
Federal Aviation Agency	DEC products
Automatic Electric Labs Research Department	General
Hewlett-Packard Company	DC Amplifier
Countermeasures Research Electronics Division	General
Sandia Corporation	Quotation
Minneapolis-Honeywell Datamatic Division	Logic booklet
General Electric Company Court Street Plant	Digital to Analog Converter
Electronic Assistance Corp. Systems Engineering Div.	DEC products
Automatic Data Processing Dept. U.S.Army Electronic Proving Ground	General

B. Towle (cont'd)

Company	Interest
Ramo-Wooldridge, Inc.	Complete catalog
Systematic of Missouri, Inc.	Building Blocks, PDP, Test Equipment
General Electric Company Hanford Atomic Products Operation	Schematic notebook and catalog
Lab. of Electronics, Inc.	Four copies of complete catalog
Data Processing Center	DEC equipment
Kearfott Division General Precision, Inc.	DEC modules
Technological University Delft-Holland	DEC products
Brookhaven National Laboratory Associated Universities, Inc.	A schematic, logical drawing of each unit and short description of 4215
Western Electric Company	Schematics of the 4000 Series
The Carborundum Company Research and Development Div.	PDP-1
Naval Research Laboratory Sound Division	PDP-1
Boeing Airplane Company	Data handling problem
M.B.L.E. Bruxelles, Belgium	Pulse Generators
McDonnell Aircraft Corp. Engineering Library	7 copies general catalog

B. Towle (cont'd)

Company	Interest
The Cooper Union School of Engineering	3000 and 4000 series and bulletins A-400, F-10 and F-15
Curtiss-Wright Corporation Electronics Division Advanced Design Department	PDP
Computer Technique, Inc.	Complete catalog
ITT Intelex Systems Division	DEC packaged circuits
The Johns Hopkins University Applied Physics Laboratory	Circuit schematics
Information Storage Systems, Inc.	Catalog and Data Sheets
Sun Oil Company Research & Development Div.	PDP-1 and PDP-3
Department of the Navy U.S.Naval Training Device Ctr.	Inquiry form
Internation Electronic Eng., Inc. Santiago, Chile	Complete catalogs
A. C. Nielsen Co. Engineering Department	Catalog and price information
Radio Corporation of America Defense Electronic Products	Catalog
U.S. Department of Commerce Data-Processing Systems Div.	Magnetic core memories
Export-Markt Vogel-Verlag	Our line of business

B. Towle (cont'd)

Company	Interest
Miller Shuerholz & Gipe	DEC products
Federal Aviation Agency Bur. of Research & Development	Logic book
Monroe Calculating Machine Co.	3000 Series - 4000 Series DEC Building Blocks and Digital Systems
AIEE - IRE Student Branch Manhattan College	Technical publications
Radio Corporation of America	Information
Bell Telephone Labs - Dept. 2352	Modules
Bell Telephone Labs - Dept. 2353	Modules
Texas Instruments, Inc.	Type 2104
Natl Aeronautics & Space Admin. Geo. C. Marshall Space Flight Center	DEC Modules
Convair-Astronautics	PDP
Birds Eye Division General Foods Corporation	DEC products
Department of Psychology University of California	PDP-1
U.S.Naval Research Laboratory Rocket Astronomy Section	DECAL Programming System
M.B.L.E. Bruxelles, Belgium	Two axis-X-Y recorder

B. Towle (cont'd)

Company	Interest
Director National Security Agency	PDP-1 and catalog
General Electric Company Heavy Military Electronics Dept.	Bulletins F-2104 F-10, F-15, E-150
Liberty Corrugated Container Corp.	Brochures and application for logic elements
Corning Glass Works Electronic Components Dept.	Logic book
A. C. Spark Plug Electronics Div. of General Motors	Logic book
General Bronze Company Electronics Division	Schematic drawings as requested by John Wild
Siemens & Halske Austria	Logic book
American Missile Products	Catalog and pricing on plug-in circuits
General Electric Company	DEC products
European Organization for Nuclear Research Geneva, Switzerland	Various bulletins
I.B.M. Federal Systems Division	Transistor current drivers
National Company	Schematic drawings
Linde Company Engineering Laboratory	PDP

B. Towle (cont'd)

Company	Interest
Humble Oil and Refining Company Methods Development & Programming Department	PDP
Douglas Aircraft Co., Inc. Data Engineering	PDP
Radio Corporation of America Department AED	PDP
Corning Glass Works Electronic Components	PDP
Aero Commander, Inc. R & D Division	PDP
U.S. Dept. of Agriculture Agriculture Eng. Research Div.	PDP
M.I.T. Lincoln Lab.	PDP
Remington Rand Univac	PDP
U.S. Naval Weapons Laboratory	PDP
Michigan State University Computer Laboratory	PDP
BMEWS Control & Switching Radio Corporation of America	Logic book
Dept. of Health, Education & Welfare - Food & Drug Admin. Bur. of Program Planning & Appraisal	PDP

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B. Towle (cont'd)

Company	Interest
Production Systems, Inc.	PDP
A. C. Nielsen Co. Dept. of Engineering	Bulletin on "worst case" assumption in connection with modules
AMP, Inc.	Logic book

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Addenda

S. Olsen

New Employees

2/20 Edson de Castro - Applications Engineer
2/28 John Koudela - Engineer
3/1 Charlotte Reynolds - Assembly
3/6 Marcia May - Assembly
3/6 Paul Haskell - Drafting
3/8 Rebecca Dodge - Secretary, Engineering
3/13 Theodore Kauppi - Production
3/14 Ruth Alving - Secretary, Engineering
3/20 Emil Tero - Wireman
3/20 Elaine Batchelder - Assembly, Clerical
3/20 Priscilla Clanton - Bookkeeping Clerk
3/28 David R. Merrick - Wireman
3/30 Peter Bonner - Sales

Terminations

2/23 Valton Greene
2/24 Ronald Schofield
2/28 Walter Weeton
3/3 Cindy Rendell - Co-op
3/3 Arthur Vartanian - Military Service
3/20 Emil Tero

Offers Out

Joel Winett, Engineer

BIWEEKLY REPORT

COPY NUMBER 2

DATE February 17, 1961

E. Harwood

PDP-1B Operation

The past biweekly period has not been a particularly good one for PDP-1B operation. The people at BBN have been complaining of troubles, and we have been doing our darndest to fix them. Most of the problems have been noise troubles on read ins to the flip-flops. Due to the sensitivity of flip-flops, noise has been setting or clearing the flip-flop. This noise is because we have tried to run long wires to the emitters of transistors, and noise on these lines have been triggering the flip-flops themselves. We have tried to eliminate this problem by putting capacitors at the emitters of the read in gates to eliminate some of the noise. It seems to have worked, but we will try to find a better solution to the problem as a permanent answer to it. We have just finished a big change over process of all inverter packages in the PDP-1B. We removed every inverter package from the computer and brought them back to the factory for testing and found that many of the packages had slow transistors in them. Also, quite a few had high leakage current. All the packages were tested, bad transistors replaced, and the repaired packages are now all back in the computer. We hope this will tend to eliminate some of the troubles that may have come up due to aging of the transistors. In spite of all these troubles on the computer, the people at BBN are still using the machine around the clock and getting a great deal of useful time. Bill Fletcher has been a great help in picking out these troubles and has managed to program around them in a lot of cases.

PDP-1 Operation

Until today we had been getting very good operation out of the PDP-1 here at the factory. Today we came up with some mysterious troubles like the computer stopping in the middle of a program. We have been trying to track down this trouble, but it seems that every time we get on the trail, the computer starts operating very nicely. We will keep on this problem until we find out just why the computer is stopping. The computer is being used on an average of three days per week by people other than DEC personnel. It is used one or two days a week by Itek people and Dick Bennett uses it one or two days per week. This leaves us very little free time for doing troubleshooting and maintenance work on the machine, of which we have a great deal to do. We hope Dick Bennett will not need so much time in the future and that we will be able to shut down for periods of time and tie on the things like the card reader and magnetic tape machine. Plus all of this, we have to supply some time to Al Blumenthal to do some troubleshooting and familiarization with the machine.

PDP-1C for Itek

The PDP-1C system has been coming along very nicely. Most of the mounting panels are wired and all of the equipment for the machine has been ordered such as the reader, punch, and special things like the display. There is still one piece of logic missing for this machine and that is the high speed multiply and divide logic. The cabinets have been delivered to

E. Harwood (cont'd)

us, and the memory system has been installed. We have also done some wiring to the junction panel, so if things go along as planned, and we hope they will, the machine should get shipped on its scheduled date which is June 1, 1961. Bob Reed has been handling a lot of the paper work of this machine and has been doing a very good job.

M. Sandler

Production of units is holding at good level. Testing is at overload at present, as we are heat checking and retesting all flip-flops. Saturday work for this group will be necessary until we recover.

System and computer panel wiring is a busy sub-group in Assembly.

D. Denniston

During the last few weeks I have had the opportunity to visit several educational institutions. There is quite a bit of interest in the use of our Digital Test Equipment for training applications. The technician-training institute, I believe, will be more interested in a classroom demonstrator than in the individual type of lab set-up. This feeling was expressed by Mr. Anagost of DeVry Institute of Chicago, and he feels that all similar institutions could not afford to purchase the quantity of Test Equipment necessary for lab use, due to the size of their classes, but that the expenditure for a demonstrator would be justified.

As an interesting sidelight, all the people I have spoken with are interested in the capabilities of the Buffer-Memory System, Model 2006. However, there were many that expressed the feeling that this system is too large - in word length and memory size - and that the sales value of a smaller, less expensive system, perhaps with a small delay line memory, would be much greater to us where the average college or university is concerned.

A. Blumenthal

Ways of shortening the PDP-1 cycle time are being sought. The limitations imposed by the memory operating time are under attack first. A successful step already effected has been the clamping of the inhibit lines by paralleling them with 220 ohms. This virtually eliminated the ringing on the sense lines following the inhibit turn-off, permitting an earlier read cycle. As a result the time pulse 10 to time pulse 0 delay has been reduced by 100 nanoseconds. The limitation on this delay is now in the computer logic and with some rehashing it can probably be reduced by another 100 nanoseconds.

The read and write current rise times can be reduced by paralleling their current limiting

A. Blumenthal (cont'd)

resistors with a series RC. This will permit an earlier strobe and shorter read and write pulses. A means of speeding up the inhibit rise time will also be sought.

Recent troubles on PDP-1B have revealed the existence of noise on the test address and test word lines as a result of indicator light switching transients. It has been cured by heavily by-passing these lines to ground. A means of eliminating the noise at its source will be sought, however.

L. Prentice

Two new dies have been added to our equipment, a meter hole punch and a 3 hole punch for Blue Ribbon 32 pin connectors.

Design revisions to the 765 and 766 Power Supplies have been completed. Drawing changes to the 765 will be set aside, but drafting must be completed immediately so that the 766 supply can be made available.

Only minor changes are contemplated in design of the PDP-1 Display Unit; major changes being a better yoke and focus coil. Final model of supports for above units is made up, ready for installation. Other attempts toward improvement will be limited to: 1. use of a casting for turning and tilting mechanism to reduce time and cost. 2. use of a highly abrasive resistant plastic for protective shield over tube face.

B. Towle

Customer	Request
National Bureau of Standards	PDP-3
Radio-Television Training School, Inc.	Building Block Logic Kit
Army Ballistic Agency	PDP-1 and PDP-3
Executive Computer Utilization	General Information
Dir. of National Security Admin.	Phone call by Ben Gurley
Harvard University	A-700 Catalog
ITT Kellogg	Logic booklet
Food Mach. and Chemical Corp.	Memory and time device
University of Western Ontario	PDP-3
Minneapolis-Honeywell Reg. Co.	Building Block Logic Kit
Northern Radio Co.	General info
Advanced Technology Lab.	PDP

B. Towle (cont'd)

Customer	Request
Naval Ordinance Lab.	36-bit machine
Radio Corporation of America	Technical bulletins
Curtiss-Wright Electronics	PDP-1
Tech/Ops	PDP-3
A.B. Henrik Lindstahl's Bokhandel	Descriptive literature
Mullard Equipment Ltd.	1000 Series
Science Materials Center, Inc.	Logic Kit
General Precision, Inc.	Logic Kit and PDP-3
Pacific Gas and Electric Co.	PDP-1
Queensborough Community College	Logic Kit
Shell Development Co.	PDP-3
Convair	General purpose analyzers
Giddings and Lewis Machine Tool Co.	Digital Logic Modules
Yale University Computing Center	PDP-1 and PDP-3
Phillips Laboratories	Technical bulletins on products
Dynamics Research Corp.	Literature on PDP-1
Lockheed Aircraft	Logic book and general catalog
General Electric Co.	Logic Booklet
A C Spark Plug	A-700B, A-400A and E-150
Harvey Mudd College	Logic Kit
General Electric Co.	Logic Booklet
Delta Airlines	Sent letter on PDP-1
Pan American Airways	Sent letter on PDP-1
National Bureau of Standards	Sent letter on PDP-1
General Electric Co.	Logic Booklet
Sun Oil Company	Specific questions on PDP-1
Bio-Rad Laboratories	Sent letter on PDP-1
Dunlap and Associates, Inc.	Sent letter on PDP-1
Mitre Corporation	PDP-1
Ohio University	Logic Kit
Mr. Robert E. Sawyer, Jr.	Logic Kit
Computer Sciences Corp.	Sent letter on PDP-1
Leeds & Northrup Company	1000 Series Building Blocks

B. Towle (cont'd)

Customer	Request
Dept. of National Defense	Additions to 500 KC Building Blocks
Oak Ridge National Lab.	PDP-3
Tech/Ops	2nd letter on computer
Goodyear Aircraft Corp.	Logic Booklet
The Bendix Corp.	Logic Booklet
Shell Development Co.	2nd letter on PDP-1
University of Illinois	Info on computers
The Mitre Library	7 Logic Books
National Security Agency	Info on PDP-1
Texas Instruments, Inc.	Core plane memories
E. I. Du Pont De Nemours & Co.	Info on PDP-1
Remington Rand	Schematics
Bell Telephone Laboratories	Schematics
I.B.M. Corporation	Schematics

J. Fadiman

Systems Under Construction

Work is proceeding rapidly on the Memory Exerciser 2204A for TMI. Delivery is scheduled for March 6; price: $23,500. Inter-panel wiring is being done now and should be completed on Tuesday. All plug-in units have been delivered.

At the same time we are working on the Memory Exerciser 2204B for TMI. Delivery is scheduled for April 3; price: $19,500. All front panels have been constructed and most have been pre-wired. A manual and description of these machines is being written now.

Work has also been started on the Memory Exerciser 2205 for RCA. Delivery is scheduled for April 10; price: $27,500. Most front panels have already been completed for this, and the remaining two have been drawn and will be manufactured next week. Block diagrams have been completed, and all wiring diagrams except part of one have also been completed.

Block diagrams, wiring diagrams, and front panel designs have been completed for the Memory Tester 1516 for Lockheed. Several mounting panels have already been wired. Delivery is scheduled for April 10; price: $48,650.

We have just received a purchase order for a Memory Tester 1517 for IBM, Owego. Delivery is scheduled for May 8; price: $59,100. Much of the basic design has been done,

J. Fadiman (cont'd)

but there are still several problems to solve before actual construction can begin.

Future System Orders

We are still awaiting a purchase or rental order from Sylvania, Muncy, for the Memory Tester 1514 which is the machine that is now out at Lockheed. Delivery time has now been pushed up to June 1, and we will receive an order before March 15. Total price: $40,000.

We will definitely receive an order for a special Automatic Core Tester for 2105 for General Ceramics within about two weeks. Delivery time: May 22 to June 1. Price: $20,000.

On January 30 I visited Mr. Bruce Felton at IBM, Kingston. They are interested in purchasing a Memory Tester in the near future and would want this machine sometime around June 15. Chances of making this sale are about 80%.

On February 10 I visited Mr. Ross Holtz at General Electric in Syracuse. He is interested in buying a Memory Tester, Model 1514. Chances of making this sale are about 85%. Price: $40,000 to $50,000.

On February 8 and 9 Mr. John Braicks of Phillips in Holland and Mr. Harry Schmidt of Ferroxcube were here to see me about purchasing a Memory Tester Model 1514 for Phillips in Einhoven. They are very interested, but no definite commitments were made.

J. Atwood

IBM-ising continues to be a major concern. Over half of our qualified mailing list has now been coded and keypunched for the 403 printer we hope to receive some day. Until this happy time, Administration, Inc., on Congress Street is printing the pin-feed pressure sensitive mailing labels we will be using for bulk mailings henceforth. We have installed an automatic dispenser which enables us to affix these labels to the envelopes at a very respectable operating speed. Fortunately we are able to produce selective prospect lists from our new tab cards on the present 402 printer, thanks to some rather nifty patchcording by Bob and Fred.

Also we are in the process of adapting our departmental procedures to IBM accounting. Special coding provisions will now enable us to get a monthly run-off showing the internal labor charges and external supplier billings on any given project. With a bit of resorting, these costs can be accumulated for our major areas of responsibility: advertising and sales promotion, public relations, technical publications, industrial design, reproduction

J. Atwood (cont'd)

services, and miscellaneous services.

As our cost accounting procedures become more sophisticated, we will also be able to apply to each project an appropriate charge for administration and overhead and for supplies and materials from stock. We will also have a breakdown by activity -- space advertising, trade shows, direct mail, etc. It will then be possible to calculate much more accurately than our present records permit the amount we are investing in any particular operation, activity or project and to relate much of this information directly to various product lines.

The decision to return to direct sales in all but a few market areas puts the emphasis on quality instead of quantity in the production of sales leads through advertising. It means that there are considerably fewer people to follow up these leads and, consequently, that the leads must be qualified as carefully as possible in order to get maximum return on our field sales effort. As a result, we will be putting even more dependence on direct mail and trade shows, which can help us pinpoint promising prospects and markets.

J. Cudmore

Flip-Flop Temperature Tests

The following flip-flops have been tested at 55° C.

Test Equipment

201 - operation satisfactory
3201,3203 - required increase in pos. bias on 2N412 buffer transistors

System Building Blocks

1201 - operation satisfactory
1209 - " "
1213 - " "
4201,4209 - required increase in pos. bias on 2N412 buffer transistor
4213 - operation satisfactory
4214 - " "
4215 - " "
4216 - " "

The flip-flops which operated most poorly were the 4201, 4209, 3201, 3203. These units all use 2N412 transistors in the buffer stage. The 5 mc equipment operates very well. In the future all system flip-flops will be tested at 55°C before being released to finished goods. The test equipment will not be tested at elevated temperatures due to the problems of patching these units together.

S. Olsen

NEW EMPLOYEES

1/30	David J. Nevala, Drafting
	Frederick H. Gould, Technician
	John E. Simeone, Technician
	David Kicilinski, Technician
2/3	Frances Morris, Clerical, Advertising Dept.
2/6	Allan Blumenthal, Engineer
2/7	Daniel Wardimon, Engineer
2/7	Margaret Rand, Sales Secretary
2/13	Richard F. Mills, Comptroller
2/13	Ione Murray, Clerical, Material Control
2/13	John Dyer, Design Draftsman
2/15	Jean Mattson, Assembly

STARTING

2/20	Edson de Castro
4/1	Robert Savell
April	John Koudela, Jr.
June	Stanley Butnam

H. Anderson

PDP-1 Activity

The general level of sales interest and activity for the PDP-1 computer seems to be snowballing rapidly at the moment. Firm orders for the PDP-1 seem to be closer than ever before, and our decision to concentrate on PDP-1 may have come at a very appropriate moment. Along these lines, we are undergoing a significant standardization of program for the optional features of PDP-1. This is intended to allow convenient inclusion or omission of the options in the catalog. The catalog will be revised within the next several months in time for the Western Joint Computer Conference in Los Angeles the first week in May.

We are seriously considering the possibility of hooking a typewriter in Los Angeles to the PDP-1 in Maynard via a data phone hookup for the Western Joint Computer Conference. We are not sure of the technical problems involved and whether it could be done in time, but it would make a very exciting demonstration. The PDP-1 will be exhibited at the American Research & Development Corporation Annual Stockholders Meeting on 1 March 1961 at the John Hancock Building in Boston.

H. Anderson (cont'd)

We are presently studying the pricing of PDP-1 and very likely will increase the price to be effective several months from now. Also, we hope to have a rental plan come out of this pricing study. The results of all of this are not as yet known, of course.

G. Gerelds

On February 8, 9, and 10, I attended a Workshop Seminar on the Managerial Aspects of the Chief Quality Control Manager's Job, at the Hotel Astor, New York City, conducted by the American Management Association. There were only 17 of us, including the two discussion leaders. The chairman was Mr. J. L. Bernik, the quality manager of The Martin Company, Baltimore 3, Maryland, and Mr. R. W. Primrose, supervisor of quality control, Colgate Palmolive Company, Jersey City, New Jersey. We also had people there from Anaconda Aluminum, Kawecki Chemical Co., Metal & Thermit Corp., Garlock, Inc., Allen Mfg. Co., Motorola, Inc., Textile Machine Work, A. B. Dick Co., Singer Mfg. Co., Kaman Aircraft Corp., U. S. Rubber Co., Baldwin-Lima-Hamilton Corp., Electric Specialty Corp., Keasbey & Mattison Corp. All of these men were chief quality control managers of their companies.

The outline we followed was as such:

1. What is quality?
   (a) Satisfied customer
   Satisfactory performance
   Uniformity of the product
   At minimum cost
   Adherence and conformance of a product to a standard product characteristic
   Ability to perform satisfactorily for its intended use at economical cost

2. What is quality control?

   (a) Where should it be applied
   Raw materials
   In process inspection
   Design
   Personnel (training program), etc.
   (b) By whom should it be applied (everyone)
   (c) What should Q.C. organization's functions be outside of Q.C. - to handle customer complaints, help production as much as possible

3. Scope of quality control
   (a) Limits of authority
   Depend on company you are working for

G. Gerelds (cont'd)

(b) Areas of responsibilities
As many as possible

4. Quality control organization
(a) Relative position in companies
Should report to V.P. or President of company
(b) To whom should reports be made
Report to anyone as long as the quality is up to standard
(c) Size of organization
Depend on the product of the company and area it covers but the standard figure is one quality man for every five production workers
(d) Policies, procedures
Establish systems so as to assure desired quality level of raw materials, finished goods and vendor survey

5. Quality control objectives
(a) Dissemination of Q.C. attitude by education
House organization within the dept. (Q.C.)
Seminars
Outside consultants
Dept. meetings
Manuals
Bulletins, adv. slogans
Make the man pay for errors
(b) Educate those concerned to build in quality (inc. mfg.)
Quality is never an accident
It is always the result of intelligent effort
There must be a will to produce a superior thing
Why is there never enough time to do it right but enough time to do it over
(c) An appreciation of customer reaction of your product
First sales
Subsequent sales
Feedback information

6. Functions of quality control in relationship with suppliers
(a) Q.C. should be willing to discuss problems and recommend solutions to supplier's problems.
Also be understanding that suppliers have problems too.
Q.C. should spell out your required quality level to the supplier, and
After this expect the agreed upon quality levels

G. Gerelds (cont'd)

The agreed upon quality levels can be done by the Purchasing Dept., or on prints to outside vendors
Use of statistical quality control

(b) Sampling inspection
Sampling should be done on all incoming material
Figures show that 100% inspection turns out to be only about 85%
They also have what they call per control whereas they sample first 5 pieces off of a machine and if all 5 are good then they only sample test every 10% thru the rest of the run

(c) Control charts and data significance
Control charts to prevent defects
Trend for quality tool eng. and production
Uniform quality
Cost reduction
Customer required information

(d) Quality control engineering
What should be its function (defect prevention)
Special studies and analysis of component testing
Super testing the product

7. Cost reduction

(a) By substitution of cheaper raw materials. How and when should be up to the design or eng. section. Reduction of Q.C. crew. By more experienced help and no duplication on inspection.
Get from sales customer requirements
Clarified specs reduction sometimes can be from rework and scrap
Increased rates sometimes happens when sales or any other dept. tell a customer we will wrap or package it to suit him. Outside of our normal procedure.

Although many of the people there had reliability and production problems, there were two of them that I talked to quite extensively. There was a Mr. A. J. Hitzelberger, Director of Production Eng. and Test Laboratory, of Motorola, Inc., Franklin Park, Illinois, of which he has under him the Quality Control Dept.

They make home-car radio stereo, Hi-Fi, and T.V. that has a printed card such as ours.

One of his problems was cold solder joints when he was doing dip-soldering such as we are (showing up in the field). Also, he found that when the board was being dip-soldered

G. Gerelds (cont'd)

that it warped out of shape and in so doing, breaking some of the copper lines that did not show up til they were out in the field. Now he no longer dip-solders but they have a soldering wave machine that the board passes over twice for three seconds each time. He also said there had to be very little or no cleaning of excess solder from the board.

The other man I talked to was a Mr. Claude E. Contant of the Kawecki Chemical Co., Bayertown, Pennsylvania. This company had their reliability problems, also. They make tantuluna capacitors for Sprague, Mallory, Sangamo and other companies. These capacitors, after in use for awhile, develop moisture inside and he claims that they look just like a noise pulse in an electronic circuit from the leakage. However, they say they have cured it.

BIWEEKLY REPORT

COPY NUMBER 2

DATE February 17, 1961
Addenda

T. Johnson

NEL is very pleased with the Digital Data Processor system and this should help in making in-roads to this large user of building blocks.

JPL is also a large user. We have made a good start with them, although they did have a lot of problems arising from misunderstandings on how to use the units. Some of this confusion really came from some of the different techniques we use with the 500 KC quadruple units, and it is clear that we must make these distinctions more evident to the prospective user.

We received a sizable order from Applied Physics Labs. in Washington for our underwater tracking system, and there are several good potential areas at Boeing.

General Motors, Santa Barbara, also placed an order which will go into a system similar to that being done by the Sonar people at A.P.L.

Despite the general slowness of business, as indicated by the continuing complaints of electronic salesmen in the area, the first of the year has seen a sudden burst of interest and activity as far as digital products are concerned.

It is my observation that digital work is often out of phase with other electronic businesses, possibly because it is used as a fill-in project area where engineers can buy building blocks and work on some job that has probably had to take a back seat.

Computer sales potential looks good in the Los Angeles area. Several could fall in line in the near future.

BIWEEKLY REPORT

COPY NUMBER 2

DATE January 31, 1961

L. Butterworth

Push Button Pulse Generators

There will be available shortly a mercury contact, push button pulser, employing a circuit mounted on the switch.

The circuit uses a -15V transient through an RC discharging into a standard DEC transformer. Output is 3.1 volts at 80 nanoseconds. There will also be a 400 nanosecond pulser.

J. Fadiman

Work has been continuing on the Memory Exercisers 2204 for TMI. All front panels except one have been made and painted. Silk screening will be done at the beginning of next week. All block schematic diagrams, including the timing, have been completed, and all wiring diagrams except the timing have been completed. The timing will be completed Monday. Wiring has been completed on about one-half of the mounting panels.

I spent a day at RCA in Camden discussing the Memory Exerciser 2205. This will be identical to the 220r except that it will be for 56 bits instead of 28 bits and will contain a mechanical error counter. Price: $27,500. We should receive that purchase order almost immediately. I also discussed another Memory Exerciser on a Serial Type Memory for which I still have to make the proposal.

The basic design work has been completed for the Memory Tester 1516 for Lockheed, including decisions on the new Read-Write Switches.

On Monday I will visit IBM in Kingston to discuss a Memory Tester.

B. Stephenson

According to Ted, who has been in contact with NEL, our Digital Processor is working quite satisfactorily and is now in a submarine out in the ocean somewhere.

We have been working with the Smithsonian Observatory of Harvard on a sort of star watching system. Our part of the system is a flying spot scanner which will sweep across a screen and stop when it discovers a star. It will then record the position and intensity of this star. This system was recently written up in an issue of Electronic Design but, unfortunately, DEC wasn't mentioned.

Two other interesting systems we have bid on are for Minneapolis-Honeywell in Monrovia, California and Davidson and Hemminger in Easton, Pennsylvania. Minneapolis-Honeywell

B. Stephenson (cont'd)

wants to precisely measure the length of time which a camera shutter is open. This camera is in an airplane and they want to calculate how far the airplane travels when the shutter is open. We will measure the time and record it in a shift register memory until they are able to send the information to a printer. For Davidson & Hemminger, we are working on part of a color measurement system that is supposed to give a quantitative method of color comparison.

There have been a lot of inquiries about the new Quadruple Flip-flop units, and one of the biggest problems of the moment seems to be getting enough information to these people to enable them to use these units. I think we are all looking forward to the day when this literature is completed, and we can just mail it to people instead of having to go through each problem individually.

J. Smith

The U.S.M.C. Test Equipment front panel eyeleting machine is now in operation. The installation of the machine is being acclaimed as a major contribution to the prevention of muscle bound legs by the girls who operated the old foot power machines. I am real satisfied with the performance of the machine. It has gone beyond my expectations. Panel construction has increased an unbelievable 60%. A major contribution to this increase is the wide acceptance of the machine as a fatigue reducing device, which results in a favorable increase in employee operator attitude, which is the greatest single factor determining production efficiency.

Panel fabrication for the two 2204 Memory Exercisers is moving along quite rapidly. All the panels have been fabricated and painted. They are currently being held up, pending the utilization of a new type of lettering for the silk screening process. The lettering arrived this past Friday and drafting is now working on the layouts. The first of the panels will be ready for screening tomorrow and available for construction and wiring Thursday. Two of the five wiring panels, the Pattern Verifier and the Bus Driver, have been completed. The remaining three panels have not been released.

PDP-1C wiring is coming along quite well. Panels completed to date are 1D, 1E, 1F, 1H, 1J, 1K, 2D and 2E. The complete Memory System and panels 2F and 2H will be completed by the end of the week. Currently, there are engineering holds on mechanical fabrication of the console table and island control. Wiring is progressing at such a rapid rate, it is the general concensus around Production that we should have quantity "off the shelf" shipment of computers by the end of the year.

M. Sandler

Our list of overdue units is a short one this week. The 1671 Light Driver and the 6603 Pulse Amplifier are the real trouble units. 1671 is in Test and will be in stock momentarily, but 6603 still has engineering difficulty.

Next week we will begin the modification of units for the Navy and the recheck of BBN computer packages.

S. Olsen

NEW EMPLOYEES

1/11	Scott Miller, Graphic Illustrator
1/15	Shirley Johnson, Assembly
1/17	Dorothy Spaulding, Draftswoman
1/18	Peter Januskiewicz, Technician
1/23	Jacquelyn Micklay, Clerical, Advertising Dept.

TERMINATIONS

1/20	William Colburn, Technician
1/20	William McDowell, Sheet Metal
1/27	Helen Le Blanc
1/27	Norman Fitch
1/27	John Valentine
1/27	Tadeus Sztuka

STARTING

1/30	Frederick Gould
1/30	John E. Simeone
?	Allan N. Blumenthal
June	Stanley Butman

PENDING PHYSICAL

Jean Mattson
Daniel Wardimon, Engineer
John B. Dyer, Draftsman

OFFERS MADE

John Koudela, Jr., Computer Applications

R. Doane

We are working on a 50Mc line of building blocks. We have a PA and a time work generator which together produce 5, 10 or 50Mc pulse trains. We cannot quite see what shape our pulses are, since the best 'scope we have now is 100Mc in bandwidth, but we have a flip-flop complementing (erratically, at present) at 5 or 10Mc from them.

The 50Mc variable clock will be a dilly of a problem, in spite of the fact that we have one that does something (oscillates, perhaps) at 100Mc. I anticipate difficulty in shielding its multivibrator from noise, since even the 10Mc clock is sensitive to pick up.

We will soon have a 1000Mc 'scope and a generator variable up to 50Mc, with which we'll be off to the wild blue.

J. Cudmore

The memos on the high temp. operation of flip-flops, the possible replacement transistor for the 2N412 and the statistical analysis of the semiconductor replacement in test, have consumed most of my time. The first lot of 1201-A flip-flops have been delivered to my desk and will be fully analyzed. I am working with Bob Hughes on a test for transistors which will give more information on the inverter freq. response problem.

G. Bell

We are interested in PDP-1 sales, and items of this price are not purchased overnight. In this regard, we would enjoy finding out from people who have contacts in the computer field of possible potential PDP-1 customers. If you know of people who might be interested in this machine, please let us know. This list may include people who write articles in technical journals or personal acquaintances.

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER 2

DATE January 13, 1961

L. Prentice

Investigation is under way to try to improve the appearance and durability of our modular cabinet racks. After a delay over the Christmas holidays, we have had calls from two salesmen, the Falstrom Company and from Colonial Engineering in Cambridge, Massachusetts. Both of these companies are expected to submit proposals on a slightly different cabinet rack assembly than we are now using. A sizable order for top and bottom brackets for our test equipment will shortly be let. This should relieve the sheet metal shop of some of its work load. Mr. Fitzgerald has spent the past two weeks trying to bring some order into the confusion in our stock room on the third floor to plan a better arrangement for the tools that are to be loaned out and the considerable increase in the stock of hardware that will be kept on hand.

E. Harwood

PDP-1 Operation

Dick Bennett has been operating the PDP-1 for the past two weeks. In general, he has had pretty good operation, although he has complained of two troubles. One trouble has been the reader. It occasionally does not seem to read in information properly. The other trouble he complained about was that he thought he was losing a bit in memory. This trouble was traced to a 1209 flip-flop in the Memory Buffer Register. The flip-flop was removed, and we are going to investigate it. It seems that the flip-flop would get set to ONE and then on its own accord would flop back to a ZERO. This could also account for the trouble Andy had when he was running a program for the Navy visitors. He complained that the computer stopped in the middle of the program, and this flip-flop trouble would cause the computer to stop. Punch operation has been pretty good since we have been using the rolled tape. We still cannot punch a fan-fold tape properly on our punch. We have two major areas to investigate on the computer, one being the speeding up of the memory and the other being eliminating the transients caused when turning on the punch power.

PDP-1B at BBN

I have been in touch with the people at BBN almost every day, and in general, they are very happy with the computer. The only trouble they have complained about recently is that the reader occasionally does not seem to read in correctly. The trouble they were having with the punches have evidently all cleared up, and they seem quite satisfied with their operation. These people are using fan-fold tape, and they seem to be having better luck than we are having. We made a trip down there last week to install the Epsco Transicon, and the installation

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

E. Harwood (cont'd)

went quite well. So far, we haven't heard any complaints. At the same time, we installed the light pen, and it also worked very well. As of the moment, out of the original six items we had to fix for BBN before the acceptance test, we have cleared up four of the troubles. The only two remaining troubles are transients caused by turning on the punch motors and then performing the 24 hour test that they require before signing the agreement.

PDP-1C

I have sent construction orders on most of the sheet metal work for building four new computers. Work has started on most of these and will probably progress at a satisfactory rate. At the moment, we are only building the mounting panels for one computer, and I have also only ordered plug-in units for one computer. There will be some changes made in the logic of the machine, so it seemed advisable to order only one set of mounting panels at this time. We will build up two memory systems because we have two stacks available, and it seems easier to build two at the same time. Steve Lambert has been assigned to the computer room and maintenance operation on the computer. He will gradually work into this position so that he can handle all the routine maintenance and troubleshooting of this machine and at BBN. We hope this will be the start of a very efficient service organization.

G. Bell

A set of introductory programming notes for the PDP-1 is now in printed form. This is the first pass at describing in very simple terms the operation of the machine. These notes intend to complement the present PDP-1 manual and act as primer for the machine. As soon as Dick Bennett, of Data Processing, Inc., finishes the compiler for the machine, machine time will be available for use by the people within DEC and for outside people. This free time, which we conservatively estimate at $20 to $50 an hour, may be utilized for various applications. It is hoped that we can write more programs which demonstrate the use of the machine. The half-hour noon time discussions have been started to discuss the details of the machine. The sole purpose of these meetings is merely to provide DEC with expert programmers and machine designers.

M. Sandler

Holiday inertia has been overcome, and we are running again at full blast in Production.

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

M. Sandler (cont'd)

The new cost system proposal is complete. IBM Tabulating has prepared statements of Labor Distribution for both Production and Engineering. Sales Analysis Reports and Cost of Goods Sold Reports have been run, and Mailing List work is going along well.

J. Smith

Thanks to all who participated so eagerly in meeting the shipping date for the 1514D. Because of the fine cooperation and coordination among all departments, the machine was completed in one week.

The Production Stock Room is undergoing a face lifting. We are in the process of standardizing our storage bins. An inexpensive bin made of cardboard has been received, and we are finding it quite satisfactory. There are plenty of cartons available, if Engineering decides to utilize them in their stock room.

Work orders for the mechanical parts for four PDP's have been issued and are currently being fabricated. At the present time, there is an engineering "hold" on the console and table parts.

Construction of the cabinets for 2204A and 2204B will begin the first of the week. Wiring has been released and is being done in Production.

Cabinets for the 1516 have been completed and delivered to Systems Assembly.

R. Hughes

COMPONENTS

During the last several weeks we discovered in some of our systems that series strings of transistors had high pulse drops. This resulted in low input amplitudes at the inputs to flip-flops, and, therefore, resulted in a reduction of margins or outright failures. The problem turned out to be that the transistors we were using had poor high frequency response. To take care of this problem, we ordered about 4000 2N393 transistors and about 5000 2N1427 transistors. We tested all our transistors for F_t and found that of 6,194 Sprague type MA45 transistors 3,378 passed our F_t test, which requires a Beta cut-off frequency of 50 megacycles; 2,816 failed to pass this test, so we can see how a problem existed. Of the 1500 2N393's which we purchased from Philco, 42 units failed the F_t test. Now, F_t has been specified on 2N393's as being 5 at 5 megacycles. This means that F_t is 25, and we require it to be 50. For years, we

digital equipment corporation
MAYNARD, MASSACHUSETTS

DAP-971

R. Hughes (cont'd)

were undoubtedly getting transistors with F_t's of 50 and higher, but things happened on the production lines of Philco and Sprague which changed this. One thing found was that punch through voltage, which is specified at 6 volts, was more nearly like 15 on a majority of units. This implies a thicker base region in the transistor and, therefore, higher voltage at a resultant loss of speed. Another thing that happened was that Philco has apparently been culling the virgin MAT line for high frequency units. One such type is the 2N1427 (which we ordered 5000 of) which has an F_t spec. of 10 at 5 megacycles or 50 megacycles. We have not yet tested the 2N1427's for frequency response, but we have an indication from the first 100 we purchased. Four units failed our F_t test. We do not know what to do with the transistors which fail our F_t test. We cannot use them in flip-flops and inverters, but we might use them in internal flip-flops, P.A.'s etc.

Lately we have been getting into difficulty on our low speed line and found that at moderate ambient temperatures our 2N412's have sufficient current to cause low margins on our flip-flops. If the base is observed, it appears to not be getting sufficient overdrive and if the light box underneath the plug-in unit is turned off, this trouble disappears and tests show this to be leakage. We have not as yet taken all our units through an environmental test to assure that at 55°C and -20°C they operate well and with margins, but we are working on a program to do this.

We are currently negotiating with diode manufacturers to make diodes to our specifications with our color code on them, and in the future we will replace Ohmite diodes type OMC 514 and OMC 514R with DEC diode type D001 in both the 5 megacycle and 500 kc. lines. DEC diode type D002 will be a replacement for Westinghouse diode type 3101 and 3101R. DEC diode type D003 will replace the Clevite type CTP 894 and CTP 894R.

CURRENT DRIVERS

A re-appraisal of the current drivers has been necessitated due to the fact that we have poor rise time. In an early experiment I observed the rise time of the Texas Instrument type 2N1046 and found it to be 24 nanoseconds, but my lead length wires on the capacitors, which decouple the voltages, were about 1½" long and the collector and emitter wires were about 1" long. I retested the 2N1046 in the same circuit and verified the 24 nanoseconds rise time and then shortened up on my lead lengths to the absolute minimum and found that rise time was 0.1 microseconds. This condition was also

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R. Hughes (cont'd)

verified in a new layout of the Model 62 Positive Current Driver in which it was found that the better the layout the poorer the rise time, so a new geometry is being evaluated for the output stage of the current driver.

The 4112 package has been designed and works well. This package consists of 6-2 input negative OR gates.

TEST EQUIPMENT

Yewell Associates demonstrated the Hewlett Packard sampling scope last week and most everyone liked its simplicity. We need this scope for checking F_t on our new transistors, such as the 2N769 (600 MC.F_t), and for work on the high speed line (100 MC.?).

Technical Instruments is going to demonstrate the FLUKE differential voltmeter next week. This meter is a combination voltmeter and potentiometer.

J. Fadiman

MEMORY TESTERS

The word address Memory Tester 1514B was completed on schedule and sent out to Lockheed in California on January 6. We are lending them this machine until we can deliver to them a Memory Tester Model 1516 (128 x 128 x 64), which exactly fills their specifications. This will have the new current drivers and is due for delivery on March 16. We are just starting work on this machine. It is almost sure that Sylvania, Muncy, will first rent and then purchase the Model 1514. We also have a good chance of selling a Memory Tester 1517 to IBM, Owego.

MEMORY EXERCISERS

We are now building two Memory Exercisers, Model 2204, for TMI. The first one is due for delivery on March 7, and the second four weeks later. All of the block schematics, except for the timing, have been completed, and two out of the five mounting panels are now being wired. All front panels have been designed and drawn up, but have not yet been made. The fact that TMI is changing the specifications for the timing is causing us some delay.

There is a good chance of selling at least one such similar exerciser to RCA, Camden, and another group from RCA, Camden, is interested in a different type of exerciser.

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J. Fadiman (cont'd)

CORE TESTERS

The chance of selling a Core Tester 2102 to General Electric in Phoenix is excellent. Minneapolis-Honeywell in Minneapolis is also interested. Both of these will require our new Current Drivers.

S. Olsen

NEW EMPLOYEES - 1960

11/14	Edna Bombard, assembly Brunhilde MacNevin, draftswoman David Denniston - engineer, sales
11/15	Edward Hoffman, Jr., production Lillian Bobnis, assembly
11/21	Norman Fitch, co-op student (Northeastern) John Valentine, co-op student (Northeastern) William McDowell, sheet metal
11/28	Helen Brackett, assembly Dorothy Gauvin, assembly Paul McDonnell, maintenance Norman Rheault, draftsman Martha Ring, Accounting Department Eleanor Knox, assembly
12/5	Louise Connors, Accounting Department

NEW EMPLOYEES - 1961

1/3	Ken Fitzgerald, mech. eng. Priscilla Rendell, Adv. Dept. - temp. Jan. & Feb. only
1/9	Ronald Adams, technician William Colburn, technician Katherine Pareago, Accounting Department Josephine Milewski, assembly
1/11	Tadeus Sztuka, technician

TERMINATIONS - 1960

11/10	Virginia Roche, assembly
11/18	Cynthia Wilson, clerk, sales

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S. Olsen (cont'd)

TERMINATIONS - 1960

11/18 David Nevala, co-op student (Northeastern)
David Kicilinski, co-op student (Northeastern)

12/2 Charlotte Bivens, Accounting Department

12/9 Henry DeMichele, sales
Jean Mattson, assembly
Dorothy Gauvin, assembly

12/16 Allieen Liebfried, drafting

12/23 Martha Ring, Accounting Department
William MacMunn, technician

12/30 William Butler, eng.
Marcia May, assembly

TERMINATIONS - 1961

1/6 Patricia Judd, assembly

PENDING PHYSICAL

Scott Miller - graphic illustrator
Shirley Johnson - assembly

REPORTING

1/23 Jacquelyn Micklay, clerical - Adv. Dept.

OFFERS OUT

Daniel Wardiman, engineer
Allan Blumenthal, engineer
Stanley Butman, engineer (summer 1961)
Joseph Grabowski, technician
Carl Jacobsen, personnel

R. Doane

The Programmable Pulse Generator 2104 sent to the West Coast originally had a minimum pulse width from the level section of from 30 to 45NS, depending on the particular channel. Replacement of the 1681 transistors with the faster 2N769 resulted in pulse widths of about 55NS, according to John Fadiman. Wally Weeton has taken with

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R. Doane (cont'd)

him to the customer (Burroughs) two special flip-flop 6202A's and a special pulse amplifier 6603A, which used together, allow the flip-flop to be set and reset rapidly enough to produce a -3V pulse less than 15NS wide. A very simple modification to the flip-flop allowed a 20NS output even when 70NS set and clear pulses were used. The modification consists of removing 3 capacitors: the 2 capacitors from the base of each buffer to the collector of the opposite buffer, and the coupling capacitor from the internal flip-flop to the buffer for the unused output. Normal set and clear inputs (pins E and T) are used. This modification may be useful in working on the VHF building blocks.

The 10mc burst generator is about to get provisions for dynamic and static testing of inverters, so that the complete testing of types 6202, 5202, 6603, 5602, 6105 and 5101 can be done on the single tester. The short leads possible with the configuration used for this device will allow more accurate test results for all units. One or two days of technician time is all that is needed to complete the job.

At present, we test our pulse transformers for inductance only. There are 3 kinds of defects not found by this method: 1) wrong turns ratio; 2) wrong winding polarity; 3) shorts between windings. We can't tighten our inductance specs enough to be sure of detecting wrong turns ratios, and testing for wrong polarity or shorts would require a separate operation. A tester has been designed which will check all four characteristics of interest and which can be easily modified to allow the measurement of interwinding capacitance, which will probably be important for VHF equipment. It provides a display of an R-L discharge at the primary of the transformer under test as observed at the secondary. A reference transformer is driven in a slightly different fashion to provide a superimposed display of maximum and minimum tolerance. Inductance tolerance can be set at from ±10% to ±35%, and turns ratio tolerance can be set to from ±2% to ±20%. This tester will also be finished in a few days.

J. Cudmore

The 1201 flip-flop has been modified once again. The new circuit includes a pulse amplifier which precedes the complement input circuit. This P.A. serves to improve complement sensitivity and gives a larger "P" pulse. This change should eliminate 5mc counter problems once and for all.

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J. Cudmore (cont'd)

The new layout allows all transistors, which have external connections, to be placed close to plug. This new location should result in wave shape improvement and lower lead inductance on the board. The transfer characteristic of "P" pulse circuit is much better with the new design than with any previous models. In complex gating on the complement (e.g., four series inverters), the pulse inverter should always be as far from the load as possible. A great improvement in operation is realized by pulsing the grounded emitter inverter. This point has not been stressed enough. It is mentioned in our catalog of the 1000 Series, but it is not mentioned in our logic book.

J. Atwood

Top priority job at the moment is the preparation of a binder on the Navy units, which are now known as "Digital Training Blocks." Copy for the PPG 2104 folder has been completed, and this will go into production next week. Another hot item is the Logic Kit folder, our advertising and publicity on this item having produced a heavy volume of requests for further information. The Taper Pin Mounting Panel bulletin is ready for layout, and the Current Drivers 51 and 61 bulletin is awaiting a final decision on the future of these two units.

Transfer of the mailing list to IBM cards continues to be a major project for our group. Present plans call for the run-off of the corrected list to be done in stages as each 500 or so new cards have been punched. This will let us get back to at least a portion of our list with information about new products without waiting until the entire list has been processed.

The new man at the new drawing board, in case you haven't been formally introduced, is Scott Miller, a native of Rochester and a Bachelor of Industrial Design from Syracuse. Scott comes to us via Raytheon and Bruce-Babel Associates of Framingham, a consulting design organization. He will be concentrating heavily on graphic design as an appetizer, helping to give our literature and such the bold, new look (or whatever they call it these days).

Two new equipment items for the graphics end of the business are expected to lighten the load and brighten the look. A photographic typesetter, which is already in operation will let us set display type for printed material, board layouts, front panels, and many other applications without the delay, cost and uncertainty involved in going outside. A larger press, capable of handling an 11 x 17

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BIWEEKLY REPORT

J. Atwood (cont'd)

inch sheet, is due for delivery in a week or so. This press will not only let us do a better job of house printing, but will make it possible to produce four-page folders, such as the PDP application notes, without the necessity for collating and stapling each set.

B. Towle

The following requests have been received:

PROSPECT	REQUESTED
Design & Development	Current Drivers
Jet Propulsion Lab.	Schematic No. 4215
American Machine Foundry	Current memory planes and current drivers
The Bendix Corp.	Logic booklet
The Vendo Company	Catalog - Modules
National Pneumatic Co.,Inc.	Logic booklet
French Power Bureau	Logic Kit
CBS Electronics	Logic booklet
Applied Physics Lab. (Johns Hopkins University)	Schematics - 3000 & 4000 Series
Republic Aviation Corp.	Logic booklet
Laboratory for Electronics,Inc.	4000 Series
Westinghouse Corporation	PDP-1
Convair Company	PDP-1
Mechanical Engineering Dept. (Auburn University)	Prospect names
Melpar, Inc.	General info
Technical University	General info
Minneapolis-Honeywell	5000 & 6000 Series
U.S.Army Signal & Dev. Lab.	General info
Autometric Corporation	Info - analog/digital
American Totalisator Co.	PDP-1
Hokushain Electric Works,Ltd.	10mc Series - delay line memory
L.C. Friel	General info
Scully-Anthony Corp.	Info - binary
WLAC-TV,Inc.	Logic booklet

FJL

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DATE December 22, 1961

R. Lassen

We have had a brief respite in our normal interviewing schedule undoubtedly because good people are not looking for work during the Holiday Season. The few candidates we have had have not been acceptable. We are taking this opportunity to catch up on other phases of personnel work including a study of our present Merit Rating System. This interlude also gave us time to plan and make arrangements for the annual Family Day.

Employment ads will be placed in our best recruiting areas next week and I feel we will start drawing people again after the first of the year.

In the meantime, I have been contacting Placement people from the better electrical and trade schools and either setting up recruiting dates or inviting groups of young people to the plant.

Several of our M.I.T., Tufts and Northeastern prospects have come in during the past two weeks. Several of these men are interested in Applications. However, Selective Service is a major problem.

I was extremely pleased with the enthusiasm and company spirit shown by the many volunteers who gave of their own time to make our Family Day lots of fun for all. This healthy attitude on the part of our people is a very valuable asset and we must continue to do everything we can to encourage it.

We presently have the following unfilled Personnel Requisitions:

Applications Engineers	2 or 3 trainees
Systems Engineer	1
Engineering Secretary	1
Mechanical Inspector	1
Detailer (Female)	1
Apprentice Machinist	1
Test Technicians	(indefinite)
Computer Check-out Technician	1
Technician	1 (to be filled from within)
Wireman	1 (to be filled from within)
Engineering Writer	1
Technical Copywriter	1
Programmer	1

J. MacKeen

EN 2102	30%
EN 2101	70%

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J. MacKeen (cont'd)

Core Tester 2108D, with high speed logic, was checked out and shipped to Ampex, L.A. on December 13, 1961 along with the 1519 Memory Tester. Dick Whipple has gone to L.A. to install these units.

All parts for Memory Buffers 2007-4,5,6 have been ordered and actual construction should be under way shortly.

The seventh Memory Buffer will be known as a Model 2009 and includes the following items.

1. No Keyboard (keyboard functions performed on the indicator panel).
2. Five (5) fully shiftable registers.
3. Conditional shifting of the sign bit in the A, B, and MB registers.
4. Printer operation controlled by the program.
5. Load and examine modes controlled by push buttons on the indicator panel.
6. The machine will be suitable for serial or parallel operation.

M. Sandler

The past two weeks in Production Assembly Section have been marked by 28% absenteeism. Illness, and, I suppose, Christmas preparations, had as many as fifteen girls out on certain days. But the last two days show great improvement and production is booming again.

Our newer people have become noticeably more productive and our subcontractors are now delivering acceptable work. Computers in cabinets in Final Assembly and in checkout are tangible evidence of this and I am confident that module production will now begin to rise sharply.

A. Falco

EN 1016	50%
EN 1017	30%
EN 1000	15%
QC	5%

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H. Crouse

T.M.I. is having considerable difficulty with core production. Two memory stacks of the order for ten have been received. A third is scheduled for shipment this week. Beyond the first three, the delivery is "indefinite".

Ferroxcube is now prime source with an order for ten memory stacks with the following delivery schedule; first unit in December, six in January and three in February.

Part of the 1901 mounting die was delivered today. The final set should be completed in a week's time.

January 2nd Richard King will join the Purchasing Department as an expeditor. Dick was employed at Nuclear Metals in Concord and performed an inventory control and follow-up function.

The following books are now available in the library:

Mathematical Puzzles and Pastimes - by Aaron Bakst, D. Van Nostrand Company, Inc.

Manual of French Commercial Correspondence - by G. R. MacDonald, Sir Isaac Pitman & Sons, Ltd.

Semiconductor Reliability - by John E. Shwop & Harold J. Sullivan, Reinhold Publishing Corp.

Static Relays for Electronic Circuits - by Richard F. Blake, Reinhold Publishing Corp.

Handbook of Transistor Circuit Design - by Keats A. Pullen, Jr., Prentice-Hall, Inc.

R. Doane

10 Mc Modules	20%
VHF Modules	30%
5 Mc Pulse Generator	15%
Transformer Cores	15%
5 Mc Pulse Amplifier	10%
Technical Description for Catalogue	10%

Tests of our 500 Kc General Ceramics type T_1 and O_3 materials show Q of about 1 to 2 at a sinusoidal test frequency of 500 Kc. This high loss results in several design problems:

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R. Doane (cont'd)

1. In applications where pulse width is standardized by dumping a known energy in or out of a transformer inductance, the Q of the transformer core is a non-negligible factor in determining the width produced.

2. Pulse transformer damping constant depends upon transformer core Q perhaps as strongly as on the size of damping resistor used.

3. We neither specify nor check the Q of the cores we buy.

4. The useful energy in a P.A. pulse probably depends more strongly upon Q than would be apparent from a comparison of pulse width or amplitude, because the ability of a pulse to drive a circuit is proportional more nearly to the volt time area above the noise threshold (say about one volt) than to either peak amplitude or pulse width at the base of the pulse. A lossy transformer core reduces the pulse width more at the top than at the base of the pulse, when it is used as an output impedance transformer.

J. Cudmore

1689	35%
4517	15%
Technical Information Data Sheets	50%

The 1689 DEC to 7090 level converter has been released. This package contains four circuits which convert DEC gnd and -3V levels to IBM 7090 levels of gnd and +8V. Each output can drive a 90Ω load to gnd.

The 4517 mag. tape sw. is out of drafting and the tester and test data sheet have been completed.

D. Denniston

Bell Telephone Labs in Whippany, New York City, Murray Hill, and Columbus have kept me pretty close to my desk lately with their end-of-the-year orders. Everyone is quite concerned about his order, so "holding hands" has kept the N.Y.O. more than busy these past two weeks.

I did manage, however, to make a couple of trips to Ft. Monmouth to take a few modules and mounting panels to them. They seemed happy to receive the equipment we have shipped so far on their second contract. I might mention that although there has been as yet little concern about our failure to meet the delivery dates specified in the contract, I

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D. Denniston (cont'd)

don't believe that we can afford to become too lax. There was, after all, a slight amount of pressure to complete our previous contract with Ft. Monmouth and I have visions of this coming up again. They can be much less tolerant than they are at present.

I also prepared a third quotation for American Bosch Arma Corporation in Garden City, L.I. This was merely a combination of the first two. They thought a few dollars could be saved by combining the two quotes and it turned out they could. We have received numerous requests for literature from various people at Arma; at this point I am slightly encouraged. I know that they are at least interested.

Also, I spent two days at the Eastern Joint Computer conference in Washington, D.C. last week.

J. Fadiman

Memory equipment sales work	30%
Customer servicing at Philco and RCA	20%
Design work on Core Tester 2113	20%
General Administration work	30%

The first week of the Bi-Weekly period was spent at the Eastern Joint Computer Conference in Washington and at the Philco Corp. in Willow Grove, Pa. At Philco I took care of one or two problems that still remained with the Automatic Core Tester 2102G. Philco is possibly interested in another Automatic Core Tester, but this need will not materialize for several months. During the week, the Memory Plane Tester 1519 was shipped to Ampex Computer Products Co. in Los Angeles and a Semi-Automatic Core Tester 2108 was also shipped to Ampex. The Memory Exerciser 2211C has been completed and almost completely checked out. It will be shipped the beginning of this week.

We are now getting many very serious inquiries from Japan about our Memory Testing equipment in particular. It looks as if there is a definite need for this equipment now and the customers are getting ready to buy; therefore, someone will make a trip over there in the near future.

The new Automatic Core Tester 2113 has been designed, which takes the place of the 2102. This system will use the new Slicer Flip-Flop 1570 and provide much higher overall bandwidth than the Core Tester 2102. The first of these new machines is due to be shipped to Ampex at the end of January.

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A. Blumenthal

1056	10%
1031	90%

The magnetic tape system and display for the JPL machine were made operational in time for the Eastern Joint Computer Conference, December 12, 13, 14. A couple of minor bugs appeared but for the most part the machine (PDP-1C-13) performed well. It is now back in the house undergoing checkout for mag. tape, display and high speed mult. and divide.

Testing of the Geo-Tech computer (PDP-1C-9) commenced on December 15. About thirty hours of checkout time have been spent on it making most of the central machine operational except for in-out units.

The ITT machine checkout has progressed from the central machine to the optional area, with jump field now being worked on.

Testing of the JPL machine revealed a problem in the pulse amplifiers (1607) which caused low amplitude pulses to appear in circuits where the loading is heavy and the input signal on the low side of the permissible range. The trouble has been isolated to the output transistors and all of the PA's in the machines undergoing checkout will have these transistors replaced.

Formalizing of test procedures has progressed with the addition of step by step procedures for the break cycles.

Many of the plug-in units removed from computers in the field have been found to work properly upon going through the test department. Putting them into a computer for further test has also failed to reproduce the troubles. The question arises, what to do with these units. Obviously we would like to avoid discarding units that are usable. We have a number of units falling into this category from the MIT and ITEK machines. They will be returned to service and watched carefully in order to determine the risk involved in returning such units to service.

L. Prentice

1000	50%
1053	30%
1064	10%
2042	10%

Work has been completed on the 2301 Scanner and delivered to the Systems Floor. Proposals are ready to submit to Vaught Camera Company showing the major dimensions of all the

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L. Prentice (cont'd)

major components going into the precision display unit. Sketch drawings have been made for component parts for the 21-inch Color Display. Data is still not available on the Celco yoke fo for this unit. The support needed for this unit will have to be designed as soon as this data on this yoke becomes available.

Pictorial proposals have been made for Beckman Instrument Company indicating the looks and paint scheme for this unit. Similar proposal was made for 2207 Buffer Unit. Sketch print should be ready to submit to Perfection Mica very soon for the shielding for the Precision Display.

K. Fitzgerald

1000 Gen. Eng., Supervision	25%
2061 ITT Console	25%
2063) 2104) Drawing changes and Gen. Eng. 2133)	35%
1036	5%
1025	5%
1024	5%

During the past two-week period the Machine Shop has been functioning more as an engineering facility than it has for the past six months. It has been concentrating on things like the 2301 Scanner, refit on the ITT Console Production #1, overhaul and repairing of Memory Stack hardware (that was shipped to a vendor to have the stacks mounted and was damaged in shipment), making and repairing tools and equipment for Sheetmetal Shop, Module production area, and System Assembly area. Overhaul and repair on punches, dies, and drill jigs.

This week, the week before Christmas, no evening overtime was worked by the Machine Shop personnel, but during the past three-month period the weekly overtime averaged better than 40 hours per week. In other words, if we figure overtime efficiency at approximately 50% (which is about the best we can figure after a prolonged period of overtime work), it cost in the neighborhood of 2 1/4 hours for 1 hour's actual production.

The reason so much overtime was necessary was because there just didn't seem to be enough time between order date and delivery date. In many instances, this was unavoidable, but in many others a little foresight would have allowed more time. So, if it is at all possible, it would be greatly appreciated if as soon as it is realized a part is going to have to be made or reworked in the Machine Shop to get the order issued as soon as possible.

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J. Atwood

This seems to be the right time and the right place to say a heartfelt "thank you" to everyone for the many kindnesses of the past year. Hardly a week has gone by without our having to call on at least one department or individual for help "above and beyond the call of duty" in order to meet our deadlines. In every instance we have received the help we needed, and it has been given unstintingly by the people concerned. This is a remarkable record in an organization where every department is already carrying a full workload of its own.

I hope what we have been able to accomplish has repaid these kindnesses at least in part, and I trust we will become increasingly self-sufficient. We are getting the people, the equipment and the experience we need to provide a well-rounded service on a regular basis with a minimum of emergency situations. This is what we are aiming for, and this is what you have a right to expect from us.

Our two new men will be able to make a major contribution toward the achievement of that goal. Alex Stephens has had industrial advertising and management experience; Bruce Hodgman worked intensively in various news media. With the amount of written material they are ready, willing and able to turn out, we should be able to step up our flow of publicity releases, direct mail and product literature to a level which more adequately meets our promotional requirements and more properly reflects the company's achievements.

One word of caution: we may start asking a few more questions than usual next week about the things you want us to do for you. This is not because we are suddenly getting "G.I." The reason is that our department will be pioneering the new cost center system of accounting. In order to make this system operate properly, we will have to keep close track of exactly what is wanted, who has authorized the job, who will pay for it, what materials are used, and what labor is required to complete it. So please bear with us; you will probably be able to benefit from our experience when your turn comes.

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DATE December 8, 1961

D. Denniston

Since I didn't submit an article in the last Biweekly Report, I am going to try to let you know what has transpired in the New York area in the past four weeks.

Bill Cannon of F.A.A., Oklahoma City flew up here and we visited Ft. Monmouth along with Brad Towle. I'm sure that Brad pretty well summed things up in the last Biweekly. I might add, though, that I was very happy to have Brad along. He was a great help in many respects.

We have submitted a quotation to American Bosch Arma in Garden City, L.I. Although this is basically a system quote, we did turn in a bid for modules necessary to build this system. I spoke to the engineer involved and he seems interested. We have just received another Request for Quote from them that I am now constructing on paper, which is more or less a supplement to their first request. Although this is not a huge quantity order, it is large enough to give us a fairly good foothold there, should we get it.

The local rep for Control Logic phoned me soon after I requested their literature. Since he is new in the field, he was not aware that we were competitors, but I did tell him anyway. He insinuated that they did not really have any 20 or 50 mc circuitry on the shelf, but it was hooked up on breadboards. Also, he mentioned that they don't have any 20 or 50 mc literature available that he knows of. He may or may not be "reliable." Apparently there is a big push on sales and he is contacting every possible lead they have in this area.

Bell Labs in N.Y.C., Whippany, and Murray Hill have been really tieing up the lines with their end-of-the-year-delivery orders. They are pretty busy boys at Bell Labs and they are keeping both Jim Myers and me pretty busy, too.

I also visited Rockefeller Institute in New York City and spoke with Dr. Schoenfeld. He is presently using NAVCOR equipment, but it seems that some of the people at M.I.T. have convinced him to investigate DEC more thoroughly. I will certainly keep in touch with him.

H. Crouse

T.M.I. began shipment on our 4096 memory stacks some four weeks overdue; the balance of eleven should be shipped on a weekly basis.

Ferroxcube is our second major source with an order for ten and Fabri-Tek is producing one as a safety measure.

Our sub contractors are relieving the delivery pressures we have at the moment in fine style.

Stan Olsen asked how many vendors sent letters of regret for not being able to meet a delivery date before the date had arrived--in the past three years I recall only one.

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H. Crouse (cont'd)

That letter, needless to say, is cherished.

The following new books are now available in the Library.

Industrial Dynamics - By Jay W. Forrester, John Wiley & Sons, Inc.

The Elements of Style - by William Strunk, Jr. & E. B. White, The Macmillan Company

Handbook of English in Engineering Usage - by A. C. Howell, John Wiley & Sons, Inc.

A Manual of Style - The University of Chicago Press

L. Prentice

2060	25%
1000	50%
1053	12 1/2%
2042	6 1/4%
2101	6 1/4%

The use of our larger staff is beginning to show results. Several proposals have been made pictorially of the 21-inch Display of the Anelex Reader, and proposals are under way for PDP-4 and the Precision Display LRL.

Considerable time has to be spent executing change orders, some of these for the advantage of or because of outside vendoring. Some are minor in nature. Most of them are necessary to keep reduction costs at a reasonable level consistent with reasonable quality. Some are simply work simplification.

Work on the 2301 Scanner is now approximately 90% complete. All parts for this are either complete or on order with the machine shop. Major points have been cleared up as to the relationship of the camera for the Precision Display, the table, shielding necessary for the tube, general arrangement etc., so that detail design can proceed on this item. This is the toughest project of this nature to be attempted by the company to date.

J. Smith

The systems for ITT and CRC are expected to be from 3 to 4 weeks late in shipment.

With the help of our sub-contractors, we have the system for LRL on schedule. This system, and all subsequent systems, will be on schedule. Two months checkout will be available for each system.

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J. Smith (cont'd)

We have many sub-contractors doing wiring and assembly work for us. Henry Crouse will have a list in his Biweekly.

G. Bell

EN 1034 Sales PDP	25%
EN 1061 Design PDP-4	25%
EN 2035 Programming	25%
EN 2061 ITT	25%

The PDP-4 design has progressed through various stages and is presently an 18-bit parallel machine. The machine would be about 1/2 the speed and cost of PDP-1. From a marketing standpoint, perhaps only 1/10 of PDP-1's applications could be handled by a PDP-4.

A particularly interesting application, suggested by Foxboro, is a bakery control problem with 400 1-bit inputs and 400 1-bit outputs. A card reader and punch with not many calculations but rather the single manipulation of the input and outputs is the class. This, along with a problem such as controlling a fleet of elevators, is the type of computer application that is most interesting. As computers become smaller and less expensive, they will take over some special system types and then the computer becomes a module of the system.

K. Larsen

The PDP-1 for BBN, West Coast Office, was installed by Ed Harwood and myself. Very little trouble was experienced in bringing up the machine, thanks to a good check-out crew. There was no shipping damage to the computer itself, but the Epsco unit was damaged due to improving packing before shipment.

Some interest in the possibility of purchasing time on BBN's machine has been expressed by potential customers. Many people have indicated that they will be following BBN's and Beckman System's utilization of the PDP with respect to their own applications.

Regarding shipment of units to this area, it would be appreciated if those responsible for meeting delivery schedules would take the time to TWX "shipped" or "not shipped" information to us. The irritation to the customer due to late shipments is compounded by not knowing that the unit will be delayed until after the delivery date has passed. Because we are not informed, we in turn cannot keep the customer posted. Under this condition, it is hard to convince a customer that we are, in fact, a part of DEC and that it is unnecessary for him to call DEC Maynard for information.

In looking back over the period that I've been with DEC, I realize that four months have passed, and they have been quite enjoyable. I want to take this opportunity to thank

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K. Larsen (cont'd)

everyone for their patience with me and their willingness to give technical assistance at any time. I will be watching for Bob Beckman's logic handbook. I think it will become an especially important item to those who are training their personnel to maintain large systems using our modules.

L. Cleary

2125	100%

I am designing an off line tester for the IBM 40-323 Punch Unit. This unit will simulate the computer and can be switched from Computer Control to test control by a switch. The purpose of the system is to be able to trouble shoot the Punch Unit without taking up computer time.

J. Cudmore

EN 1010	40%
EN 1016	10%
EN 1026	25%
EN 2058	5%
EN 1000	10%
EN 1055	10%

I am presently working on a DEC to 7090 Converter.

The Mag. Tape R/W Sw. 4519 has been released. This switch permits the use of the same tape head for reading and writing.

The Memory System for EN 2058 was checked out this week and it had more than its usual share of wiring troubles. The main problem was cold-soldered joints.

J. MacKeen

EN 2058	50%
EN 2107	25%
EN 1000	25%

Memory Buffer 2007-2 has been installed at Fort Monmouth, N. J. Twisted pair wires were substituted for several cable wires carrying pulses. The unit was then turned on and operated perfectly after minor adjustments. The new Fabri-Tek stack performs very well. No mechanical troubles after shipping with this second unit. (not even a scratch on the side)

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J. MacKeen (cont'd)

Memory Buffer 2007-3 has been shipped and we are waiting for notification of arrival at the Signal School.

Minor modifications to allow greater flexibility of operation in Buffers 4, 5, 6 have gone into drafting. Construction has already started on some of the panels for these units. The seventh buffer will undergo considerable redesign, much of which is not definite at this point.

E. Harwood - A. Blumenthal

This Biweekly Report will summarize all pending jobs on the machines we have out in the field.

BBN - Cambridge Machine

1. Install new Reader Indicator Panel.
2. Do Typewriter mod.
3. Change Tape feed on punch to no holes.
4. Re-do power clear.
5. Balance Sense Amplifier inputs.
6. Reduce cycle time to 5 microseconds.
7. Change time pulses on shift gates.
8. Do check status instruction.
9. New power cycling panel.
10. Add diodes where needed.
11. Terminate all pulse lines.
12. New AC and IO shift pulse change.
13. Make the +10 on 3D-8 fixed on memory.
14. Do in-out halt mod.
15. Add -1 to PC mod.
16. Do preliminary work to make ready for the addition of the drum.

ITEK MACHINE

1. Reduce cycle time to 5 microseconds.
2. Do reader mod.
3. Do Typewriter mod.
4. Change Tally punch to a Teletype punch.
5. Terminate special pulse lines.
6. Replace 1684's with the new version.
7. Do single instruction mod.
8. Check power clear to IO panels.
9. Check status mod.

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E. Harwood - A. Blumenthal (cont'd)

10. Check reader switching relay.

MIT MACHINE

1. Change time pulses on shift gates and reduce cycle time to 5 microseconds.
2. Remove redundant lines to memory flip-flops.
3. Replace indicator panel.
4. Install marginal check for reader.
5. Check socket 1K23 - seems to be broken.
6. Install punch tape folder.

CRC MACHINE

1. Do marginal check for reader.
2. Modify punch AC control.
3. Replace or repair reader.
4. Replace MB5 light.
5. Replace IR3 light.
6. Install punch tape folder.

ITT Prototype

We will not list the changes on this machine because it will be coming back to the factory and we will do all the changes at that time.

BBN California Machine

We have no changes to be made on this particular machine. The only thing we have to do is send them their display and the light pen.

R. Lassen

Since the Biweekly Report of November 22nd, the following people have been hired.

Test Technicians (trainees)	4	
Sheet Metal Trainee	1	
Female Assemblers	6	(3 pending physicals)
Sales Secretary	1	
Mechanical Draftsman	1	(pending physical)
Computer Check-out Technician	1	(pending physical)
Janitor	1	(pending physical)
Chrome coater	1	(pending physical)

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R. Lassen (cont'd)

We have been interviewing Engineering Writer applicants for several months and have finally located a man with good qualifications.

Interviewing, especially the first 3 days of each week, continues to be heavy. We have had fair results in some areas; however, we have had very little success locating good, experienced technicians.

I believe our best source of trained technicians will eventually be from our testing group and not from the outside. We are constantly looking for young men who have at least one year of electrical school or its military service equivalent. Locating eager young people with growth potential is a slow process. However, our additions to this group have been reasonably steady.

Female Assembly response is only fair. However, Barbara Charnock has been able to find an average of 2 or 3 acceptable girls each week.

We have stopped evening interviewing for the Mother's Shift. However, Barbara has approximately 12 girls who may be called upon at a later date, if necessary.

Plans are now under way for our annual Family Day on December 17th. People are starting to pitch in and we plan to have a day to remember.

I talked with 10 people at Northeastern on December 6; primarily looking for Applications Engineering Trainees. One or two have possibilities; however, Uncle Sam appears to have first choice.

R. Doane

10 Megacycle Special Circuits	35%
Transistor specification and F_t testing	12%
High Fidelity Transmission of current pulses	35%
Test Equipment Committee	10%
Engineering Stock room	2%
Miscellaneous	6%

A trip to Sprague in New Hampshire afforded an opportunity to see the physical arrangement of their production F_t testers. From this, my trip to Lincoln Lab to see and hear, and technical articles from Fairchild and Tektronix, I think I have learned what needs to be known about F_t testing at high frequencies.

I have achieved current pulse compensation down to less than 1% overshoot with less than 50 nanosecond rise time under many conditions simply by trimming the coaxial cable series

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R. Doane (cont'd)

termination at the end farthest from the drivers. For 50Ω cable, typical terminations are around 80Ω. Four such cables in parallel are needed to perform well with 1 ampere pulses, since the voltage drop in the high termination resistance otherwise allows the drivers to saturate. Operating the drivers with more voltage would reduce the number of cables required. Putting more than one positive driver on a single paralleled set of cables increases rise times above 50 μsec because of the high output capacitance of the positive drivers.

Preliminary tests using variable series termination of cables from guillotine (where cores are tested) to current calibrator and from current calibrator to oscilloscope show good results, but further work is needed to compensate for a few percent of low-frequency overshoot observed.

M. Sandler

The reputation of our product has become that excellent that the demand for the goods we have engineered and sold has far exceeded our present in-plant capacity to produce within a "keep the customer happy" time. We are continuously seeking to increase our capacity by employing greater numbers of people and we are at present seeking to augment our capacity by subcontracting to a far greater extent than we had ever planned.

Much of our metal fabrication work is being done by a number of vendor shops, a good deal of panel wiring is being subcontracted, and we have recently added completed etched and drilled boards and component assembly to the list of operations being purchased outside.

It is hoped that all this subcontract activity will help in filling our orders, but we must all be aware of the need for rigid specification in our purchase orders, close cooperation and surveillance of our vendors and careful inspection of incoming materials, to insure there is no insidious sapping of the quality of our final product.

The Mothers' Shift shows good progress. Personnel obtained excellent people for this shift and Bob Maroney is learning how to manage this lonesome job. Given a little more time for the girls to learn their jobs, we will be able to add to that group.

J. Fadiman

Checkout Memory Exerciser 2207	30%
Checkout Memory Exerciser 2211B	30%
Checkout Memory Tester 1519	15%
General Administration work	15%
Memory Tester & Core Tester Sales	10%

The Memory Exerciser 2207 was shipped to RCA in Needham on November 29 and this was installed at RCA during the next two days. One wiring change had to be made in the mothed

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J. Fadiman (cont'd)

of checking data and there is still one wiring change to be made in the method of sending out the address, in order to agree with the initial specifications.

The Memory Exerciser 2211B was sent out to Ampex Computer Products Co. on December 7. Much of my time during this past week has been spent checking out this system.

The Memory Tester 1519 has been completed for Ampex Computer Products Co. Final checkout has been almost completed and Mr. Ken Strong of Ampex was here this week to check out the RCA Word Address Stack on this Tester. There still exists certain problems with the rise time of the current pulses.

Wiring is continuing on the Memory Tester 2211C for Ampex and this machine should be ready for checkout in about one week.

Today we start wiring the Memory Tester 1516 for Ampex International. Most of the mounting panels are ready and all front panels are ready to be wired.

Final block diagrams have been completed for the PEPR project and packaging will start next week. All circuit modules have also been ordered. Last week the Automatic Core Tester 2102H was shipped out to Electronic Memories, Inc.

D. Adams

Semiconductor Testing

These semiconductors have been received and tested since the last report.

Semiconductors	Mfr.	Units Tested	Percent Rejects
D-001-1	Clevite	63,750	1.7%
D-003-1	Clevite	3,100	12.1%
D-662-1	Clevite	10,072	0.1%
1N 750A	Transitron	100	0.0%
1N 1220	Westinghouse	262	2.67%
1N 1227	Westinghouse	500	2.4%
1N 1341	Westinghouse	275	0.0%
1N 2976B	Motorola	110	0.0%
1N 3156	Motorola	40	0.0%
1N 3208	Motorola	1000	1.7%
1/4 M8.2Z5	Motorola	110	7.3%

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D. Adams (cont'd)

Semiconductors	Mfr.	Units Tested	Percent Rejects
MA-80	Sprague	4442	0.34%
MD-93	Sprague	1712	2.8%
2N 224	Philco	1000	0.9%
2N 398A	Motorola	32	0.0%
2N 457A	Tex. Inst.	5	0.0%
2N 711A	Tex. Inst.	1500	0.27%
2N 769	Philco	50	0.0%
2N 813	Raytheon	20	25%
2N 1304	Tex. Inst.	1000	1.5%
2N 1305	Gen. Elect.	1000	0.9%
2N 1496	Philco	17	23.4%
2N 1499A	Sprague	65	0.0%

D. Dubay

Test Equipment Service

Since I missed the last biweekly issue, this report will cover the last four weeks.

The following instruments have been calibrated since November 10th.

Oscilloscopes

Type 543A	Ser. No. 3162
Type 543	Ser. No. 1946
Type 543A	Ser. No. 3152
Type 543	Ser. No. 148
Type 543A	Ser. No. 3366
Type 543	Ser. No. 1763
Type 543	Ser. No. 1543
Type 543	Ser. No. 599
Type 543A	Ser. No. 3362
Type 543	Ser. No. 1182
Type 545A	Ser. No. 29267
Type 543A	Ser. No. 3383
Type 543	Ser. No. 526
Type 543A	Ser. No. 3384
Type 543A	Ser. No. 3390
Type 515A	Ser. No. 3117

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D. Dubay (cont'd)

Oscilloscopes (cont'd)

Type 543A	Ser. No. 3159
Type 543	Ser. No. 1167
Type 543	Ser. No. 526
Type 543	Ser. No. 1232
Type 543A	Ser. No. 3324
Type 541	Ser. No. 6111
Type 541	Ser. No. 7066
Type 543	Ser. No. 1947
Type 543	Ser. No. 368
Type 581	Ser. No. 110

Preamplifiers

Type CA	Ser. No. 17316
Type CA	Ser. No. 1898
Type CA	Ser. No. 17317
Type CA	Ser. No. 24601
Type CA	Ser. No. 33722
Type CA	Ser. No. 5238
Type CA	Ser. No. 32560
Type CA	Ser. No. 20723
Type CA	Ser. No. 1899
Type CA	Ser. No. 33721
Type CA	Ser. No. 20724
Type CA	Ser. No. 29315
Type CA	Ser. No. 34087
Type CA	Ser. No. 34085
Type CA	Ser. No. 34086
Type CA	Ser. No. 144
Type CA	Ser. No. 20725
Type CA	Ser. No. 31896
Type CA	Ser. No. 5237
Type CA	Ser. No. 29300
Type 80	Ser. No. 12908

Misc. Equipment

L. C. Meter Ser. No. 023
Type 575 Curve Tracer Ser. No. 1431
Type 575 Curve Tracer Ser. No. 3643

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D. Dubay (cont'd)

The following instruments were received since November 10th.

1 Type M preamplifier
1 Type 80 preamplifier
1 Electro Scientific Industries capacitance bridge

R. Mills

Accounting System:

This has been a busy period for our section since we have been implementing the first phase of our cost center reporting system. With your help, we have assigned all employees to cost centers and before these are locked up for actual charging of payroll they will be checked with you. Rubber stamps have been ordered for our processing of purchase requisitions in order that cost centers and expense element coding can be handled next week. Along with this, we are contemplating a small change in the handling of time cards in that they will now be split down by cost centers and every Monday morning they will come to the cost center manager for approval, including notes on absences and extraordinary items, before they are sent to the Accounting Department for final check and processing. We are planning to issue the first cost center reports in January, for December, even though a few days will be missing in December, but it will give us a chance to establish a format of reports and to try it out on you. An instruction manual is now being written for expense element coding under the new cost center approach and will be ready by the end of next week. The establishment of the job order systems for every cost center is well defined at this time and we plan to initiate this system in the first department in January.

PDP-1 Order for DEC:

Yesterday we formally entered the order for accounting, sales and engineering's PDP-1, which will be shared jointly by these three sections. We will be using this to develop accounting procedures with an ultimate goal of preparing some soft wear to go with our units for the accounting field. The machine has some standard things on it but will be used primarily for checking all of our "In-Out" devices for evaluation and prototype work. The delivery date is February 28, 1962 to which we look forward with considerable enthusiasm.

PDP Programming Class:

Our programming class is proceeding on schedule and on January 3rd, we are starting to program our payroll application. We have a schedule laid out which shows a completion date for this job of January 27, 1962. We are quite enthused about this since it will have many benefits from a machine utilization standpoint both for the IBM and the PDP.

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R. Mills (cont'd)

PDP Order Entry:

We recently instituted the break-down for cost purposes of a PDP order into several cost sections with a separate EN number being assigned to each significant cost area within the PDP-1 system. We are starting this system with the ITT #3 unit, which when completed, will give us some very badly needed cost information. It should be re-emphasized that particular attention should be payed to the fact that there will be many EN numbers per system from now on, so that our reporting is correct and meaningful.

K. Fitzgerald

1000 Supervision	10%
1000 Vendors	15%
1024 Tape Reader	50%
1000 Gen. Eng.	25%

During the past two-week period we have contracted with Donnelly Manufacturing Company of Waltham to build three more ITT Console Ends. They promised delivery within three weeks of receipt of order. These people are building 50 of our regular computer cabinets for us now and from what we have seen so far they look very good. The dimensional stability and workmanship on the first 10 units shipped to us was excellent, although there were a couple of small areas that needed re-welding. (This problem has been cleaned up.)

Production #1 ITT Console is on the Production #1 Machine at this time, and the few remaining mechanical problems to be cleaned up on this machine can be done at a later date with little or no interference with the checkout program.

The major portion of the Machine Shop time is now being spent on experimental and development work on the paper tape reader, 2301 Scanner, and handling the last minute emergency jobs for Systems, Computers, Production, etc. that always seem to crop up just before a delivery date. In other words, most of the Machine Shop production type work has been put out to outside vendors who should be able to give us better delivery than our own shop. We will have to continue with this until such time as we get more people in the Shop or we get caught up enough so that we have some lead time on this work.

In order to alleviate some of the assembly problems in the Display tube housing, the pillow blocks for the tilting mechanism have been re-designed as a casting and we will phase out the present pillow blocks that we have in stock now and switch over to the casting as soon as they are available, which should be within two weeks.

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S. Olsen

In the past months, our Engineering Department turned out a remarkable number of new modules. However, Technical Information Sheets have not been keeping up with the new modules. Sales Personnel have had the embarrassing situation where customers call to discuss a unit which no one in the Sales Department has even been aware of. Not only are we missing potential sales on these new modules, but, worse, our steady customers feel information is being withheld from them. We have had some unhappy situations where customers feeling there is no other way to get technical information on what we have available demand that they receive copies of our complete schematic book. The result is that not only are we creating customer bad will, but we may be losing customers as well.

As preliminary to obtaining complete information on our modules, Elsa Newman completed a status list showing modules classified according to sales status. This list, also gives the prices of all modules that are for sale and indicates how additional information can be obtained on each of the units.

In general, information on standard modules i.e., flip-flops, gates, pulse amplifiers, pulse generators, clocks and delays (except some of the new 4000 Series units) is included in our full catalogue. Mimeographed information sheets have been made up on most other standard logic modules and these sheets can be obtained on request from Marilyn Cunningham.
A limited amount of information on digital-to-analog converter modules is available in the digital-to-analog converter application note. For more detailed information on these and on the special input-output units - amplifiers, drivers, etc. - information is best obtained from the engineer or Elsa's list. Information on laboratory type training modules is available in a special "Digital Training Modules" catalogue which is available from Advertising. No information is presently available on classroom modules. However, electrical characteristics of these modules are the same as the training or laboratory module equivalents.

For accessory items, very little information is available. Of principle interest to customers are line drawings and dimensions which can be obtained from the Drafting Department. Electrical characteristics of power supplies is another big area which is not presently covered adequately for sales purposes. Our "applications product bulletin file" contains a circuit schematic and test data sheet for each module. Additional information is obtainable from the engineer given on the "DEC Status List."

The Logic Handbook is still the principle source of applications' information but is sadly in need of revising. A logic handbook supplement which covers the use of the new 4000 Series and also gives applications for serial arithmetic and binary coded decimal arithmetic is available in a "preliminary version" printed form from the Sales Department.
(See Marilyn Cunningham). An elementary version of the logic book designed for people not familiar with digital circuitry was written by Bob Beckman. This was mimeographed but the copies have been going so fast that only about two are left at present. The latest addition

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S. Olsen (cont'd)

to the application notes is a digital-analog converter bulletin. This contains a considerable amount of much-needed information on the methods and the modules used in conversions.

Barbera Stephenson is presently working on an application note covering binary coded decimal codes and binary coded decimal logic. This will be available in mimeographed form within the next week or two.

NEW SALES CATALOGUE:

I propose that we put out one book similar to the RCA Tube Manual which will begin with logic type information, contain a product bulletin on every module which is for sale, and have a final section of application notes. The target date for all information is January 1st. This project will, of course, entail a considerable amount of work on the part of many people, especially the Engineering Department.

A revised Technical Information Data Sheet has been prepared and is ready for use by Engineering. (At this point, I am back to the highest priority item and my opening paragraph.) It is absolutely necessary that these forms be given the attention they obviously require. The sheets will also be the basis for the information in the new catalogue.

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K. H. Olsen

ENGINEERING PROTOTYPE DEVELOPMENT LABORATORY

It is very important that the first model of any product be of the highest quality and be as cleverly and as wisely worked out in all its mechanical and electrical details as possible. In order to facilitate this, we are going to assemble a model shop on the Engineering floor which will be located where the present Testing Room Headquarters are and where some of our most skilled people will be available to produce the first of each product and possibly the production quantities of some items which may be too difficult to be made in production. This laboratory will contain a sheet metal shear, a brake and a foot press with a complete set of dies. In addition, there will be a small lathe, a drill press and a grinder and all necessary hand tools. The personnel in this laboratory will also have the responsibility of maintaining the engineering stock room and will keep an inventory and samples of all mechanical fasteners and other devices.

QUALITY CONTROL DEPARTMENT

DEC has not gotten to the size where we feel we must consolidate all quality control functions under one department. This department will report directly to the President and therefore will be free of the direct pressures of the Engineering Department and the Production Department.

In some cases, the personnel now doing quality control tasks will be transferred to the Quality Control Department, but, in other cases, they will remain as they presently are. The Quality Control Department will, however, be responsible to be sure that all the functions are correctly performed.

Quality control is a very delicate and difficult function to perform. Often there are opposing pressures from the Engineering Department, the Production Department and the customer. It is unfair to ask one person to set all the quality control standards and so we will set up a Quality Control Committee to do this. This committee will consist of the President, Sales Manager, Production Manager, Chief Engineer, Head of the Computer Department, and, Head of Special Systems Department. All interested parties will be invited to attend the meetings. The Test Equipment Committee will continue to supervise the test equipment and continue their present responsibilities.

The responsibilities of the Quality Control Department are as follows:

1. Supervise, maintain and calibrate all test and measuring equipment, including the mechanical measuring devices.

2. Check all incoming goods including electronic components, mechanical parts and

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K. H. Olsen (cont'd)

assemblies components, mechanical parts and assemblies components built by outside vendors.

3. Specify and supervise electrical checks on all DEC products, including building blocks, systems and special parts.

4. Specify and supervise mechanical and physical inspection of all products.

5. Specify manufacturing techniques where the quality of the product is effected.

6. Test and specify components for use in DEC products, and to maintain a published list of recommended parts for DEC products.

7. Supervise all incoming transistor and diode tests.

8. Carry on life tests on critical components.

9. Carry on life tests on DEC products.

10. Study and analyze failure reports on DEC products and propose action when it should be taken.

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T. Johnson

The two magnetics shows in Los Angeles and Phoenix, Arizona (November 6-8 and November 13-16) took up most of our time during these two weeks. The response at L.A. was very poor. The show at Phoenix gave us a chance to concentrate on G.E. and we did see a better cross-section of memory people there, but, in general, these shows were regarded as disappointing, particularly with respect to the papers presented and the traffic in the booths. My personal opinion is that the problems in the core business are production problems and few people attend the shows with an interest to learn something new. The papers on new techniques and developments in thin-film work, etc. were regarded as disappointing. All in all, I think the magnetics shows, if they follow this trend, are of questionable value to us. Expected registration at L.A. was 600. Actual was 265. Expected at Phoenix was about 1500. Actual was 701.

While at Phoenix, I journeyed to Ft. Huachuca (Wyatt Earp country). They have some 4000 modules in the ADP Digital Data Reduction and Transmission group and are quite pleased with their performance. They had initial problems in understanding our symbology and in understanding the rules of positive and negative pulses, gating configurations, and interconnecting standard and quadruple units. We should make sure that logic books and full catalogs are shot out with the first nibble by an interested prospect.

My recent trip to Monterey Naval Postgraduate School was both interesting and fruitful. They were using CDC160 cards for bread-boarding small systems. I arranged a loan of equipment which should be the clincher in convincing them of the merits of DEC logic. A possible interest also exists for a PDP-1.

The memory test business continues to be active here. The first PDP-1 arrives for BBN this week.

We are making good use of the mailing list printouts to concentrate on areas and dig out good potential leads. I continue to urge communication from any and all on ideas or leads and useful information. The Biweekly has been good on this, but sales histories would be a big help.

E. Towle

Sales Trip to Fort Monmouth, New Jersey

On November 13, I had the opportunity to visit our Branch Office in New Jersey and also take part in a discussion of DEC Training Devices now in operation at the Army Signal School in Fort Monmouth, New Jersey. Dave Denniston met me at the Newark Airport and we drove to the Clifton office of DEC where Millie Omifracke was kind

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E. Towle (cont'd)

enough to show me around the office. Later that day, we met Bill Cannon of F.A.A. - Oklahoma City, at the Idlewild Airport. Incidentally, Mr. Cannon was instrumental in the order from F.A.A. for a Buffer Memory System and a good supply of Laboratory Modules.

Tuesday, November 14, Dave Denniston, Bob Beckman, Bill Cannon and myself drove to Fort Monmouth where we met Len Deutsch, of U.S.N.D.T.C., at Port Washington, N.Y. After a tour of the Signal School, we saw DEC equipment in operation during which Bill Cannon took several pictures and discussed the Buffer with Jim Porter of the Signal School. Fort Monmouth is very pleased with the equipment and because of their keen interest in educational training devices, have done much to promote DEC equipment at other military and government installations.

Dave Denniston and myself paid a visit to Mr. Palumbo who has recently been appointed as the new Contract Administrator at Fort Monmouth. I've been mentioning the importance of delivery in the last few Biweekly Reports and our discussion with Mr. Palumbo was indeed a very necessary one. We were able to receive a few days extension on the already overdue third Buffer System, but somehow I got the opinion that a continued delivery delay in future contracts would not promote our sales chances. Incidentally, we are fast approaching the delivery dates on the second contract which could give us a chance to redeem ourselves delivery-wise.

All in all, I enjoyed the opportunity to visit Fort Monmouth for the discussion on Training Devices and the chance to see their application of DEC equipment.

L. Prentice

1053	25%
2060	10%
1000	65%

Mr. Ron Cajolet joined this office Tuesday, November 14, 1961. He was able to start work almost immediately on the 21-inch Color Display. Plans for this are now nearly complete with the exception of the layout of the Operator's Control Panel. Most of the parts have been ordered and fabrication should be able to be started this coming week. A considerable percentage of my time this week has been spent discussing the problems of fabrication of our standard cabinets and Mag Tape cabinets and Special Console for ITT with outside vendors who are bidding, or about to bid, on these units. A die for 1901 top and bottom sections has been placed with Burgess Bros. in Norwood. It is

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L. Prentice (cont'd)

anticipated that this die will be ready for our use in approximately 5 to 6 weeks. Once this is done, whether we keep this job in the house or place it with vendors, should considerably expedite the time necessary to build 1901 panels.

Scott Miller is well along on the design and procurement of cabinetry for the Anelex Reader. These cabinets should be here the last of this week or possibly by next Monday.

A new Mechanical Change Order Form has been drawn up and is now in effect. Will all people be sure that they have the latest drawing. The notification will be sent with the change to production as soon as the Change Order is initiated. However, this does not automatically recall all the prints that have been issued before that date. Everyone should exercise the utmost caution that the prints they have on hand are the latest, if the decision has been made by production to build the unit to the latest prints. This depends somewhat on the stock on hand or the importance of the change.

J. MacKeen

EN 2057	25%
EN 2058	50%
EN 1019	25%

The second Memory Buffer was shipped on November 15th. A crash program was initiated to get the third buffer finished after Fort Monmouth notified DEC they wanted shipment on the 24th of November - or else. The unit has been wired and is now in the systems area undergoing checkout.

I would like to thank George Gerelds and his crew who wired the machine, and Fred Gould who supervised the construction and is also helping in checkout.

H. Crouse

Burgess Bros. are building a new 1901 mounting panel die which will ease our (can't get 'em fast enough) production problems.

Jack Smith and I visited Electro-Circuits in Lowell yesterday. They will be doing some of our printed circuit work. Most of the people are former Electro-Lab employees and are very capable.

Donnelly Manufacturing received the contract for producing three ITT display fronts. Not only was the bid most attractive, but they appeared to be the most capable of

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H. Crouse (cont'd)

meeting our delivery schedule, December 15, 1961.

The Engineering Model Laboratory in Ashland is doing a good job for us on wiring front panels, meeting deliveries and a good grade of work.

The following is a list of new books available in the library.

New Books - November 13, 1961

Standard Refrigeration and Air Conditioning - Questions and Answers, by Steve Elonka & Quaid W. Minick, McGraw-Hill Book Co.

Semiconductors and Transistors, by Alexander Schure, John F. Rider Publisher, Inc.
Successful Technical Writing, by Tyler G. Hicks, McGraw-Hill Book Co.
Engineering Manufacturing Methods, by Gilbert S. Schaller, McGraw-Hill Book Co.
Handbook of Automation, Computation and Control, by Eugene M. Grabbe, Simon Ramo, Dean E. Wooldridge, Vol. II, John Wiley & Sons, Inc.

Introduction to Operations Research, by Churchman, Ackoff, Arnoff, John Wiley & Sons
Adventures in Computers - Vol. I, by Franz L. Alt Academic Press, New York and London
Computer Control Systems Technology, by Cornelius T. Leondes, McGraw-Hill Book Co.
The Van Nostrand Chemist's Dictionary, by Honig, Jacobs, Lewin, Minrath & Murphy, D. Van Nostrand Co., Inc.

Paint Manual, U.S. Government Printing Office
Statistical Abstract of The United States 1961, by Edwin D. Goldfield, U.S. Government Printing Office

United States Government Organization Manual - 1961-1962, U.S. Government Printing Office

Barbera Stephenson

I spent three days out at NEREM and the booth sure was busy. We had the usual number of Ad agencies, investment brokers, and students, but we also had a good number of new customers and even more old customers who came in to discuss new applications. I came back with a long list of people I promised to send things to and two of these have already called to discuss their requirements in more detail. Most of these people are interested in analog-to-digital conversion devices because they see the modules listed in the short form catalog but no other information on them. It seems to be sort of like giving them one salted peanut. A lot of people inquired as to when we would have some higher speed circuitry. A lot of the teachers and students who were at the show were interested

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Barbera Stephenson (cont'd)

in an elementary version of our logic handbook, which Bob Beckman has been writing. By the way, Elsa Newman has been working on this also and getting it ready to go to press. I think there will be a lot of inquiries when it is available.

A really impressive number of DEC people came out to the show. Three C's even stopped by to say they thought our whole company had come out and they were all going over to fill up their booth and keep the customers out. Sneaky trick.

By the way, one of the papers given (No. 14.5) was on the world's largest circular aperture antenna which is being constructed at Arecibo, Puerto Rico. This 1000 foot diameter spherical reflector is sponsored by the Advanced Research Projects Agency and is being designed and built by Air Force Cambridge Research Laboratory and Cornell University. This is using a good number of DEC Modules in the data processing portion and it seems like a good thing for us to get some publicity on.

I had an interesting time looking at all our competitors' booths. Three C's was there with a picture of their new computer and also an artist's conception of their new computer to be. Packard Bell was there with their little suitcase, PB-250. Computer Equipment Corporation had some really impressive looking literature, both on their modules and on systems. It looks terrific until you start reading it in detail. Their circuits operate at 250 kilocylces and the driving ability of the flip-flops, AND gates, OR gates, and oscillators is about 2 units load. They sell at about the same price as our 1 megacycle quadruple flip-flops, capacitor diode gates and multiple input diode gates.

Control Logic is a new company, just started five or six months ago by Sam Bass. Their Advertising Agent stopped by to let us know that they already had 200 KC, 500 KC, 2 MC, 5 MC, 10 MC, 20 MC, and 50 MC lines and were presently working on a 100 MC line. They're pretty speedy workers.

J. Smith

It is very important that all departments be aware of the critical point of development facing our organization. Projects that have been in the development stage for many months are now being released to production. Unique problems are arising on these first run systems that have to be met with cooperation and understanding. These problems must be found and corrected as soon as possible, so that they can be eliminated in future systems.

I am quite sure that for every error made in design there are equal errors made in construction. These errors must be brought to the attention of the responsible person - not

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J. Smith (cont'd)

with the idea of "nailing" the person but with the feeling that the errors must be corrected for the good of the company. We must all then pitch in to see that the error is corrected in a minimum amount of time to enable the meeting of all schedules.

We must all be very aware of the "Big Picture," the "Big Picture" being the integration of all projects into our schedule. We all feel that our own individual projects are by far the most important, but the "Big Picture" may dictate otherwise. Projects that will further the goals of our organization must be given the most time and attention. The sequence of these projects are determined by upper management and must be accepted.

The work we are having done outside is beginning to show a marked effect on our schedule. Sub-assemblies for three basic computers have been wired outside and delivered. We are currently wiring these sub-assemblies together. Our current arrangement with this vendor is the delivery of sub-assemblies for a basic computer every ten days. Six sheet metal vendors are helping us with our work load of sheet metal parts. Arrangements have been made to have modules constructed by an outside vendor. We will continue to utilize these vendors until our own capabilities can be built up to accommodate our work load.

All of our production methods are currently under investigation to see if they can be improved. A requisition has been placed for a methods engineer to work with us on some of our methods.

Bob Maroney has been assigned to Special Systems for a few weeks to make parts lists for each of their systems. We are in great need of these parts lists.

D. Wardimon

1607 Pulse Amplifier	100%

J. Fadiman

Work on Memory equipment in California	40%
Sales work for new Memory Systems in California	45%
Design and checkout of Memory Exercisers	5%
General Administration work	10%

Last week was spent in California cleaning up several details of our Memory Systems out there. Several minor difficulties on the Memory Tester 1516B were taken care of so that the machine is now working properly. I also spent some time at Lockheed Electronics discussing the possibility of their purchasing an Automatic Core Tester. Joe Katz is

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J. Fadiman (cont'd)

interested in this. There are several new off-shoots of Ampex Computer Products whom I also visited in Los Angeles; namely, Electronic Memories, Inc., who have already purchased a Core Tester and will probably purchase a Memory Tester, and International Computer, Inc., headed by the former Chief Engineer of TMI. One day was spent at Phoenix, Arizona, where I talked with the people from General Electric who were interested in an Automatic Core Tester and a Memory Plane Tester.

Other future sales on the West Coast involve a large and sophisticated Magnetic Tape Handler Tester for testing the TM2 tape system for Ampex Computer Products.

During the past two weeks we have received an order from the Burroughs Corporation in Philadelphia for a Memory Tester 1516; price $57,000; delivery date February 19, 1962.

Another order which we should expect soon is an Automatic Memory Plane and Stack Tester for Mr. Ross Holtz of General Electric in Syracuse.

Work in Progress: The Memory Exerciser 2207 for RCA in Needham is due to be shipped out on Tuesday, November 28. All wiring has been completed and it is now undergoing checkout. The Memory Exerciser 2211B for Ampex Computer Products is due to be shipped out on December 1. All wiring will have been completed by Monday, November 27, and checkout will take place next week. The Memory Tester 1519 for Ampex Computer Products Company will be completely checked out by November 29. At that time an engineer from Ampex is coming down to check it out with a special jig feature for their RCA Memory Stack. The Automatic Core Tester 2102H for Electronic Memories, Inc. is now undergoing final checkout. It will be shipped out on November 29. The Semi-Automatic Core Tester 2108D was completed two weeks ago in time for the NEREM show. It will be shipped out to Ampex Computer Products Company next week, as soon as the proper termination boxes are completed. The Memory Exerciser 2211C for Ampex Computer Products is now in the process of being wired. We expect to have all wiring completed by December 8 and we will ship on December 15.

Preliminary design work is being done on the Automatic Core Tester 2113 for Ampex Computer Products Company. This is a redesign of 2102. New front panel designs have been completed and the circuit design work will be started next week. This will be shipped out on January 22. The front panels are being screened and mounting panel wiring will be soon started for the Memory Tester 1516D for Ampex International Operations in Hong Kong. This machine will be shipped out in the middle of January. The Optical Scanner 2301 for the University of Illinois is now undergoing final checkout by Don White. The second Memory Buffer 2007 was delivered to Fort Monmouth last week and the third one is now in the process of final checkout. This third Buffer was

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J. Fadiman (cont'd)

wired by Production. We have already received orders for Buffer Memories 4, 5, 6 and 7. Block schematics drawings have been completed on the PEPR project known as SC2310 for MIT. They are now going over these logic drawings to see if everything is in order.

R. Lassen

Since the Biweekly Report of November 10, the following personnel have been hired:

Female Assembly	4
Co-op Student	1
Test Technician	1
Secretary	1
Copy Writer	1
Electronic Technicians	2 (pending physical exams)

Employment inquiries are starting to come in as a result of our Open House. We have some good prospects under consideration, especially at engineering level. This, of course, is largely due to the pending RCA relocation. We have been "tracking down" those people who appeared to be worth further consideration and have already set up several appointments. I feel that the Open House has given us some new life and that we will enjoy the results of it for some time.

Out of 11 men with whom I interviewed at Tufts, only three are worth further follow up. There were no outstanding people in this group.

We are still looking for Engineering Writers, male and female Assemblers, Mechanical Draftsman, Purchasing Expeditor, Applications Engineers, Technicians, System Engineer and other general help. Our openings are steadily being filled. However, locating qualified Applications Engineers and Engineering Writers is a difficult problem.

Very shortly we will form a new mother's shift to supplement our present female assembly force. We have been, and will continue, interviewing women during the early evening who are interested in working from 6:00 p.m. to 10:00 p.m. Approximately 12 women have already been selected pending physical examinations. Some of the basic policies regarding hours, rest periods, pay rates and company benefits have been established while the problems of supervision and training are being worked out by Maynard Sandler.

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A. Blumenthal

1031 100%

PDP-1C-13 (JPL) performed satisfactorily at the NEREM show. A couple of bugs did show up on the punch and typewriter but were corrected without much difficulty. This machine is now back in the house for installation of optional equipment and latest changes. We should be able to resume test by next Tuesday.

A meeting with Digitronics representatives has brought to light some facts which we hope will alleviate our problems on the tape readers. A major cause seems to be poor quality control at Digitronics which has allowed some units to leave the plant with wrong type brakes, motors, and solenoids. Digitronics has agreed to supply all the necessary materials to correct these, including the replacement of existing brakes with a greatly improved type.

PDP-1C-7 was shipped to Bolt, Beranek and Newman in California on Monday, November 20.

J. Atwood

The Open House went nicely. There were lots of interviews, a good showing of the right town officials and a fair turnout for a Saturday event. The comments around town were excellent. The people who came were much impressed and felt nicely handled; the people who couldn't make it are looking forward to the next one - preferably in the evening. The local papers did us proud, as did the Framingham and Marlboro radio stations.

Our employment advertising is pulling in a lot of candidates. The radio spots on the Mother's Shift turned up enough good applicants in one week for us to get started, and the current Sunday Globe ad is drawing a heavy response. Our local ads this week will be based on a new plan devised to tap particular areas for particular types of people. It will be fun to see how scientific we can get.

The Conference on Magnetism in Phoenix was definitely better than Los Angeles, according to Ted, and we had a good show at the Armory - in spite of their mismanagement. Not too many people appreciated the wait for Reg-I-Dent cards.

Eastern Joint is the next show on the docket. That's December 12 through 14 at the Sheraton Park in Washington. It is followed on the 15th by a special showing of computers for top officials of the various government agencies in which we will participate.

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J. Atwood (cont'd)

It looks now as though we will definitely have the new DECAL Manual ready for this event. It is progressing well.

Bob Buyer of the National Company's technical writing staff will be doing a manual on Don White's scanner for the University of Illinois. Everyone who has talked with Bob is impressed with his evident ability, and we will be anxious to see how he does with this job. Not that we would dream of trying to lure him away from National!

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K. H. Olsen

DEC'S BEST SELLERS

There are not very many technical books that have sold as many copies as the DEC logic book. Of course, our pride should be limited somewhat by the fact that we give them away free, and sometimes, even force them on people. However, the compliments we have received on this book have been very numerous and they appear to be sincere. Our critics have been small in number, but vocal. They all work at DEC so when they criticize, I ask them to try to do better.

A few people have taken up this challenge and we are well under way toward a new logic book. The schedule is to produce this new volume before the IRE show in New York in March, 1962. Although this appears to be a long way off, when it comes to the production of a book, it is not really very much time. Our immediate need is for suggestions from all our staff members as to what they would like to have in the new book. These might be simple criticisms, re-works on chapters or additions to what is already there, but, we would like to have them on paper. We will appoint Elsa Newman as editor of this new book and address all suggestions to her.

We have commissioned Cyburtek, Inc. to write the instruction manual for the PDP Computer. This is a long, tedious job and quite expensive, but, they appear to be doing a good job. We expect them to be completed by the early part of December and then we will publish it. This, of course, will only have a very limited edition because it is one of the things you would rather not let the competition get hold of.

We then plan to commission Cyburtek to write the manual for PDP-4. Because it is a much simpler machine, it will not take as long to write. It will be written before PDP-4 is built, and so the technical writer will also have the opportunity to pick out inconsistencies in design and possibly even contribute to the design.

DIGITAL CLUB

General Radio in West Concord has an electronics club for local high school boys. They meet one night a week and some of their engineers teach electronics and, in general, generate interest in the field. High school boys from Lincoln Sudbury Regional High School approached me with the idea of having a Digital Club that engineers from our company would sponsor one evening per week at DEC. They are keenly interested and have sampled opinion in the high school and there is already a large number who would be very much interested in a club such as this. I think that we could do a lot of good with a club like this, but, we do have the problem that most of our engineers live so far away from work that coming back an evening a week to help in a club like this is somewhat difficult. However, if someone is interested and it is possible for them to spend the time, please let me know and we can consider forming one.

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S. C. Olsen

The past two weeks have been spent mostly catching up on some overdue calls in Florida and the Midwest.

The Florida calls were Milgo, NASA Cape Canaveral, Radiation, Inc. and Honeywell, St. Pete.

The Midwest included Minneapolis-Honeywell, McDonnell Aircraft and Central Institute for the Deaf.

We are anxiously awaiting word of the award on the 477L NUDET Program. PDP-1 is the best contender and there are about twelve machines involved.

We have been working closely with Foxboro Company lately and building up a relationship that could be mutually advantageous for years to come.

J. Fadiman

Proposals and Sales work on Memory Testers and Core Testers	40%
Redesign of Core Tester (EN 2103)	10%
General administration, scheduling, planning	35%
Memory Exerciser Design (EN 2073 - EN 2075)	10%
New circuit designs for Memory Testers	5%

Work in Progress

We have built another semi-automatic Core Tester, model 2108, which will be shown at the NEREM show November 13. This will then be shipped out to Ampex Computer Products about November 20; price: $9,500. The next system to be shipped out will be the Automatic Core Tester, model 2102H, for Electronic Memories, Inc. This will be shipped about November 15; price: $21,000. Wiring is being completed on this and it should be ready for check-out on Monday. Next system to be shipped out will be the Memory Exerciser 2207, for RCA in Needham. This will be shipped on November 20 and check-out is expected to start on Monday, November 13; price: $37,000. Following that, the Memory Plane Tester 1519 will be shipped out to Ampex Computer Products about November 22. The logic has been completely wired and the output plug panel is now being wired up in the machine. Check-out is expected to start next week; price of this machine is about $52,000.

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J. Fadiman (cont'd)

Following that, the Memory Exerciser 2211B will be sent out to Ampex Computer Products about November 27. All panels have been wired and all mounting panels wired. Inter-panel wiring in the machine is more than half completed. The price of this machine is $21,700. In addition, there is another Memory Exerciser 2211C which will be sent out to Ampex Computer Products in mid December. Price is the same as the 2211B.

The first Memory Buffer 2207 was installed by Jack MacKeen at the Signal Corps last week and they seem very happy with it. The second Memory Buffer will be sent down next week and the third at the beginning of December. We already have orders for three more from the Signal Corps and the possibility of future orders after that.

Drawings are being prepared for the PEPR project, which is scheduled for delivery at the end of January. Eight of the twelve finished drawings have been delivered to MIT today and the remainder will be delivered next week.

Another Memory Tester 1516 is also under construction for delivery to Ampex International Operations on January 12; price of this machine is about $52,000.

Future orders:

I am going down to Burroughs today in Philadelphia to discuss the purchase of a Memory Tester 1516. They already have the money budgeted, and this looks like a sure sale. The price will probably be in the order of $44,000. In addition, the Burroughs people at Electrodata in Los Angeles are interested in buying a Memory Tester, but the chances of this sale are not very good. General Electric, in two places, are also interested. Mr. Ross Holtz in Syracuse has renewed interest, and the chance of a sale here is about 80%. General Electric in Phoenix is also interested in our Memory Tester as well as in our Core Tester. I will spend Monday out there with them. I think our chances of selling some test equipment to them are very high. There are other proposals for Memory Testers which have gone out to the Mullard Radio Valve Co. in England, Electric Memories, Inc. in California, and Siemens Halske in Munchen, Germany. There is a good chance that at least one of these European machines will come through. We have also made a proposal to High Voltage Engineering Co. for a Digital Processor, which is a special systems on which Barbera Stephenson has done the design. They will very likely buy this machine at a price of $14,800.

New design developments are going forward on the Automatic Core Tester which we are redesigning in order to realize a wider machine bandwidth. Our present machine is not adequate for testing the very fast cores. The first of these new machines, known as the CT 2113 is due for delivery to Ampex Computer Products at the end of January; price $21,000. Lockheed Electronics is also interested in such a machine.

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J. Fadiman (cont'd)

We are making further improvements in our wiring techniques on the Memory Testers as a result of what I learned at Philips.

G. Gerelds

Testers and test data sheets are coming out of Engineering at a fine rate of speed these days. However, there is some confusion in final test about the marking of testers, as each engineer marks his tester in a different manner than the other fellow. Sometimes the markings may mean the same thing but just worded differently.

I would like to see some kind of a standard set-up for this, and I would work along with same to get this standard.

We recently hired five new test technicians. Four of these men have gone through the wiring area and built their own burst generator they are going to be using in test, and they are now doing final test. One man will be finishing his burst generator shortly and go on to test. That will give us eleven reg. test stations, one 10 mc station, and one station for current drivers and current calibrators.

The Test Department is losing Dick Mangsen November 10 to a job that is forty miles closer to home (but not to one of our competitors).

L. Cleary

1031 100%

I am finishing a test program method for physically determining the start and stop time of the paper tape readers. This program will allow the proper times to be typed out on the On Line typewriter.

D. Denniston

I mentioned in the last issue of the Bi-Weekly that we were expecting a visit from John Koudela. He arrived, and in the two days he was here we managed to visit Curtiss-Wright in East Paterson, American Bosch Arma in Garden City, L.I., and Information Storage Systems in Pompton Lakes.

We visited American Bosch Arma Corporation expecting to attend a bidder's conference that would lead to a computer proposal. However, this turned out to be a special systems application. However, the system itself is of the type that we would not be interested in

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D. Denniston (cont'd)

bidding on, in that there were rather rigid specifications. John and I remained after the completion of the conference to inquire about the possibility of presenting them with a module quotation. They seemed quite interested.

Information Storage Systems has their leasing company all lined up to purchase the PDP-1 for them, and they seem convinced that our computer will serve well in demonstrating their tape system.

I dropped in at the U.S. Military Academy, Dept. of Electricity, at West Point as a result of a little bit of information I received from one of my "spies" at Ft. Monmouth. In general, they were quite interested in our training modules. However, their course includes instruction in computer programming, logic and logic circuits, in that order. They feel they should select modules that will illustrate logic and circuits. I tried to convince them that it would be confusing for a student to face a logic element with its circuit on the front panel. While I was at West Point, I learned that NAVCOR has a training line that uses the philosophy that West Point is looking for. This was my first encounter with NAVCOR's training modules, and although I saw only flyers, I was not too impressed. The Signal School has a few of these for teaching basic circuits.

I have visited Ft. Monmouth several times in the past two weeks to help straighten out a few problems they had with their first Buffer-Memory System, and to get their reaction in general. Although everyone there is satisfied, people in the Signal Supply Agency would like to see the 3rd Buffer-Memory System shipped by November 24. It has been insinuated to me should we fail to meet this date for shipment, it is quite probable that DEC will be entered on USASSA's "Black List."

We know for sure that two of the potential customers we've been in touch with lately, Clifton High School and International Electric Corporation in Paramus, are direct results of our announcements sent out from Maynard. A Mr. Klinger from C.H.S. stopped in to see us. He seems interested in our training line. He asked me if I might stop in to present a few of his advanced classes with a demonstration. I intend to oblige him in the very near future.

I visited with Mr. Robert L. Lewis of International Electric Corporation. It seems he is doing a preliminary investigation concerning a computer system that they intend to use as a message processor. Although this project is classified in nature, I believe the use will be as a message encoder-decoder with code tables supplied to memory every twelve hours. Although they are in their early stages of investigation, it is not expected that such a system would be available before 1963. The total order would be for 8 or more complete systems.

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D. Denniston (cont'd)

In addition to the visits I have mentioned, I also stopped in at Daystrom in Archbald, Pa. to assist them with some logic.

J. MacKeen

MB 2007-1	25%
MB 2007-2	65%
MB 2007-3	10%

This report covers several weeks. The first memory buffer has been installed at Fort Monmouth, and aside from several slight problems, has been working fine. Dave Denniston reports the personnel at the Signal School seem quite happy with the equipment.

The second buffer will be shipped as soon as the sheet metal work is complete and painted. This unit will have the first of the Fabri-Tek memory stacks in it. The Fabri-Tek construction appears excellent, and the unit performs satisfactorily in the buffer.

Production has begun assembly and wiring of the third buffer. It is hoped the unit will be ready for checkout in two weeks.

Subsequent buffer memory systems will be modified slightly to allow greater flexibility of operation. We have orders for at least four more buffer systems.

H. Crouse

We are subcontracting on all fronts for Production; cables, front panel wiring, fabrication of consoles and table tops.

Consideration is being given to Bob Savell's Displays and Power Supplies.

Memory stack delivery schedules are as follows:

Ampex - 4096 - 12 on order - first 11/17 - one each week thereafter

RCA - 4090 - 2 on order - first 11/10 - second 11/17

The performance of all our suppliers is generally good when the increase in volume and decrease of lead time is taken into consideration.

I have a request to make of those who use the Purchasing Department's services - please express your needs in writing.

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H. Crouse (cont'd)

The following books have been added to the library's bulging shelves:

Industrial Traffic Management, by Van Metre, McGraw-Hill Book Co.
Statics and Strength of Materials, by Milton G. Bassin & Stanley M. Brodsky, McGraw-Hill Book Co.
Top Management Handbook, by H. B. Maynard, McGraw-Hill Book Co.
Transistors and Active Circuits, by John G. Linvill, James F. Gibbons, McGraw-Hill Book Co.
Printed Circuits, by Morris Moses, Greensback Library Book
Practical Electrical Wiring, by H. P. Richter, McGraw-Hill Book Co.
Building Construction Handbook, by Frederick S. Merritt, McGraw-Hill Book Co.
Mechanical Engineers' Handbook, by Theodore Baumeister, McGraw-Hill Book Co.
Modern Computing Methods, by The Philosophical Library, New York 2nd Edition

R. Lassen

Since the biweekly report of October 27, the following personnel have been hired:

3 Female Assemblers
1 Janitor
2 Test Technician Trainees
1 Sheet Metal Trainee
1 Wireman (trainee)
1 Silk Screening Trainee
1 Mechanical Design Draftsman
1 Cost Accountant
1 Circuit Design Electrical Engineer
1 Mechanical Engineer (trainee)

Some of these new people have already reported for work, while the others have yet to pass their physical exams; however, I do not anticipate any problems.

Several of the young men with whom I met at MIT recently have been out to discuss employment opportunities in more detail. Two of these men are interested in Sales Applications and are worthy of further consideration. Two others are interested (and have some experience) in computer programming. The fifth man is interested in Systems Design and is an extremely bright person with outstanding scholastic achievements. We will invite these men out again so that we can review them more carefully before their graduation dates. I am expecting several other men out when their schedules will permit.

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R. Lassen (cont'd)

We have been extensively interviewing Technicians, Secretaries, Advertising people, Engineering Writers, male and female Assemblers, Mechanical Draftsmen and general help, but with one or two exceptions have not been encouraged by the quality of these people.

Barbara Charnock now has two prospects for Sales Secretary. However, she feels that the calibre of female assembly applicants has dropped off measurably in the past two weeks.

Plans are now being made for an "Open House" on Saturday, November 18, from 9:00 A.M. to 5:00 P.M., for the purpose of creating outside interest with respect to employment opportunities at DEC.

Recruiting schedules have been established for both local engineering colleges and technical schools. We have made arrangements to visit these schools between now and the spring and have hopes of attracting some good people.

We are reviewing our present recruiting sources and find that the local newspapers, particularly the Worcester Telegram, have produced fair results at the hourly employee level. The employment agencies have produced some candidates for administrative and engineering levels. However, recently "referred leads" from our own employees have been extremely successful.

Recently several people have terminated their employment and the Personnel Department has not received proper notification. We urge you to notify the Personnel Department in writing as soon as one of your employees notifies you of his intent to leave DEC. This will help us to carry out the necessary administration and to arrange for an exit interview, which is extremely important with respect to furthering employee relations.

R. Hughes

EN 1010	45%
EN 1011	30%
EN 1063	20%
EN 1039	5%

Fairchild Semiconductor reports that ultrasonic cleaning machines destroy transistors by harmonic motion.

We are going to build a sample and hold circuit (called range gate integrator - sampler 1569) for the University of Cornell, Radio Physics Lab, Arecibo, Puerto Rico. This unit will be tough to test; i.e. transistor leakage is specified to be 2 nanoamperes.

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R. Hughes (cont'd)

Three new specs. have been written for transistors. They are MD93, MD94 and MD95. These will replace the MD27, which has given us much trouble.

An experiment is being made to find out how good our D001 diodes are. We are aging them for 100 hours at 100°C.

A history of defective transistors found in test is being made in an attempt to improve quality.

Barbara Charnock

The Twinbrook Personnel Association for women Personnel Directors held their October 19th meeting at the Colonial Inn in Concord.

Mr. Curtiss Bacon, Management Consultant, spoke to the group on "Various Personnel Aspects."

At the conclusion of his speech, the thing that pleased me most was to learn that situations which create personnel problems in other companies have been pretty well resolved here at DEC. The particular problems highlighted were -

1. Let the employee know when he/she is doing a good job and that their efforts are appreciated.

2. Promote within the organization whenever possible rather than hiring outsiders.

3. Allow employees some time off for personal business rather than docking them and causing them to report sick in order to receive their full pay for the day. (I agree with this policy up to a point. However, if we were to adopt this policy for our hourly people, I feel that the number of days allowed for sickness should be cut down so that the total allowance for sick days and personal business would not exceed the 12 days allowed now, as our policy already is more liberal than that of many companies.)

4. Have an employee suggestion box. (This practice is one that I do not agree with at all inasmuch as it is more apt to become a grievance tool than anything else.)

5. Each department head should hold a meeting once a month to hear about suggestions for improvements and any grievances that might have arisen within the department. (I feel that adopting a policy such as this could prove to be quite beneficial to management in that any grievances that could lead to a Union threat could be brought out in the open and squelched immediately.)

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Barbara Chamock (cont'd)

6. Always let employees know when there is to be expansion within the organization to enable present employees to transfer to the new area, whether it be in the home office or in a newly established office out of state.

7. Give employees an idea of what jobs they may be able to qualify for, as they gain experience, coupled with their present qualifications.

8. Have a periodic merit rating system, the results of which would be discussed with the employee to enable him to know exactly where he stands.

9. Assure employees of job security. (This, I agree with also, in respect to the stability of the company, but while it is important to let an employee know that he is doing a good job, let him know that his advancement is dependent upon his doing even a better job. To have 100% security would lend itself to some indifference and carelessness.

I was further impressed by the fact that while these other companies were referred to as the X, Y, or Z company, their ages were made known. In all cases, they had been established longer than DEC; this fact, too, was impressive in that it indicated how well advanced our personnel policies and practices are.

W. Farr

Punch Control	50%
Reader Transients	50%

A. Falco

EN 1010	20%
EN 1018	60%
QC	10%
EN 1000	10%

D. Wardimon

Pulse Amp. 1607	70%
Power Supply 773	25%
Binary to Octal Tester	5%

The new Power Supply 773 will replace P.S. 767 and P.S. 771. The output is regulated by a zener diode. Unit ratings are: 0 to 150 ma at 12 volts.

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R. Doane

Engineering Stock Room	5%
F_t Tester and Bridge Power Supply	35%
Components	20%
Test Equipment Committee	10%
VHF	5%
10 mc Modules	25%

Recently, while building a device for making pulses from 10-50 mc sinusoids for use in VHF work (if I ever get time for it), I became aware that our stock room in Engineering is terribly inefficient. Because there are few principles to help one to know where things are, one sometimes has a dozen places to look. Bob Sanders will be spending 1/2 to 3/4 hour each morning until things are in good shape, and thereafter a few minutes each morning to replenish supplies where needed. We have a long list of changes to be made already, and further suggestions are welcome.

A visit to Lincoln Lab that I made recently has resulted in a memo describing their methods for measuring F_t, the (equivalent) frequency at which common-emitter current gain is unity in a transistor. I have designed a new F_t tester for our own use, both in Production testing and for engineering evaluation. Due to long lead time on the low-level RF volt meter employed, this tester will not be operating until about the first of the year.

The constant-power generator for our resistance bridge will be ready in a few days. We are waiting for two high-voltage filter capacitors at present.

We have ordered our first batch of transistors for the 10 mc line under the revised specifications.

Two weeks ago a memo summarizing some detailed performance data on 10 mc equipment was sent to everybody I thought would need it. If anybody else wants a copy, holler.

D. Dubay

Test Equipment Service

The following instruments have been calibrated within the last two weeks.

Oscilloscopes

Type 545	Ser. No. 29266
Type 543A	Ser. No. 3152
Type 543A	Ser. No. 3304

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D. Dubay (cont'd)

Oscilloscopes (cont'd)

Type 543	Ser. No. 1947
Type 543	Ser. No. 822
Type 543A	Ser. No. 3317
Type 543	Ser. No. 1116
Type 543	Ser. No. 1479
Type 543	Ser. No. 597
Type 543	Ser. No. 1478
Type 543	Ser. No. 524
Type 543	Ser. No. 1171
Type 543	Ser. No. 1643

Preamplifiers

Type CA	Ser. No. 29309
Type CA	Ser. No. 17306
Type CA	Ser. No. 17315
Type CA	Ser. No. 146
Type CA	Ser. No. 17312
Type CA	Ser. No. 32557
Type CA	Ser. No. 24599
Type CA	Ser. No. 29307
Type CA	Ser. No. 17317
Type CA	Ser. No. 200
Type CA	Ser. No. 14231
Type CA	Ser. No. 14232
Type CA	Ser. No. 18433
Type Z	Ser. No. 1184

On October 31st, we received the following instruments from Tektronix.

1	Type D preamplifier
1	Type G preamplifier
3	Type CA preamplifiers
2	Type 543A oscilloscopes
1	Type 551 oscilloscope
1	Type L preamplifier
1	Type M preamplifier

D. Dubay (cont'd)

Type D is a high gain dc differential preamplifier for use with 530, 540, 550, and 580 series oscilloscopes. Calibrated deflection factor is from 1mv/cm to 50v/cm. Frequency response is dc to 350kc at 1mv/cm sensitivity....increasing to dc to 2mc at 50mv/cm and lower sensitivities. Rejection ratio is 10,000 to 1.

Type G is a wide-band dc differential preamplifier for use with the oscilloscopes mentioned for Type D. Deflection factor is 0.05 v/cm to 20v/cm. Frequency response with Type 543A oscilloscope is dc to 20mc. Rise time is 18 n sec. Common-mode rejection is 100 to 1 at full gain.

Type M has four input channels and is similar in characteristics to Type CA. Vertical deflection factor is from 0.02 v/cm to 10 v/cm.

Type 551 is a dc to 25mc dual beam oscilloscope. This instrument has two dc coupled main amplifiers, with rise times of 14 n sec each. Two separate preamplifiers may be used with this instrument providing a high degree of signal handling versatility.

For the past few days I have been building an ultra low leakage power supply to be used in conjunction with the Type 230-R resistance bridge. This power supply, designed by Russ Doane, will enable us to make highly accurate resistance measurements and will eliminate the necessity of connecting batteries to the bridge. If all goes well, it should be ready for use within a very few days.

D. Adams

Semiconductor Testing

These groups of semiconductors have been received and tested during the last two weeks.

Semiconductors	Mfr.	Units Tested	Percent Rejects
D-003-1	Clevite	5188	1.1%
D-662-1	Clevite	7645	0.22%
IN 67A	Transitron	2000	0.3%
IN 270	Transitron	2000	1.0%
IN 758A	Transitron	50	0.0%
1.5 M 100Z5	Motorola	11	0.0%
MA-80	Gen. Inst.	1000	0.8%
MD-27	Sprague	1127	8.8%

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D. Adams (cont'd)

Semiconductors	Mfr.	Units Tested	Percent Rejects
2N 1204	Philco	1400	1.6%
2N 1305	Tex. Inst.	10000	5.5%
2N 1754	Philco	14463	0.17%
2N 2099	Sprague	1000	3.5%

J. Cudmore

PDP Check-out Equipment and Memory System for PDP-1C-8	40%
Mag. Tape Sw.	20%
4218 Tester Test Data Sheet	20%
Mitre Service Call	10%
EN 1000	10%

The technician in charge of Memory System check-out is writing up a test procedure for this system. He is now thoroughly familiar with this system and the check-out procedure.

The Mag. Tape Sw. is going to be tried out in prototype form on one of Jack Brown's tape systems.

The 4218 Quadruple F.F. has a tester and a test data sheet.

The Mitre service call was very interesting. The customer's problem was due to his horribly long leads, which were bundled together very tightly, producing huge cross-talk signals. On my second trip I was able to convince him that his system would have to be re-wired and that this will solve all his difficulties. Education of our customers in proper wiring techniques is a subject which deserves a lot of attention.

K. Fitzgerald

EN 1000	30%
EN 2076	70%

The majority of my time for the past two weeks has been spent on getting the ITT Prototype Control Console completed at Colonial Engineering. For some reason or other, the last three weeks of work by Colonial on the console has lagged terribly so that at the very end we were two weeks late in receiving it.

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K. Fitzgerald (cont'd)

On Friday, November 3, Loren and I both went to Colonial right after dinner and stayed with the job getting the last details cleaned up, and brought it back here to the plant at about 6 o'clock. Since that time, we have had two men from the Machine Shop working on it almost constantly getting it ready first of all to be photographed by the ITT public relations and Sales people. As soon as they finished photographing it, we immediately started to mount the in-out equipment, checked the mechanical details against the drawings, and went over it from top to bottom to determine if any changes were necessary before the final design was O.K.'d.

L. Prentice

EN 2076	5%
EN 1053	50%
EN 2060	20%
EN 1000	25%

The layout has been made of the 2301 Scanner and some of the detailing has started. It is hoped that this can be completed within the next few days and parts released to the Machine Shop for production.

The ITT console was received from Colonial Engineering November 3. This was joined together with the other cabinets and set up in the Auditorium for photos for the market people from ITT. Several small revisions, most of them of a minor nature, are necessary to completely get this ready for ITT Production #1. Quotations on these consoles are expected from Colonial Engineering tomorrow, November 10.

Marked up prints for an Analex Reader Console have been released to production. Details are now in the Drafting Room for the other parts needed to finish this unit. These are scheduled for delivery November 17.

Design is well under way on a table-top reader spooler unit for LRL. This is similar in concept to the unit now in use in our Computer Room on the first floor.

A job offer has been made to a Mechanical Engineer, and if he accepts and passes his physical, should report here approximately in one week. No trouble is anticipated in getting ample work for this additional personnel.

A new LeBond 13 x 30 inch Lathe with accessories and tooling has been ordered from Hebert Machine Company. This unit should greatly extend the accuracy and facilities of our Machine Shop. There is approximately a ten-week delivery on this equipment. This means that it will not become available until after the first of January. The speed range is somewhat higher than we have and has a pre-select feature which allows the operator to

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L. Prentice (cont'd)

anticipate the next speed needed from the Lathe, select it, and on disengagement and re-engagement of the clutch the new speed is attained. This should shorten the time for most operations requiring different size or multiple cuts.

J. Smith

We are currently working on the first production construction of Magnetic tape equipment, Tape Unit 50, Tape Unit Control 51 and Tape Control 52. Many problems have been encountered, as was expected. At the present time, we feel most of these problems have been resolved. We have received very good cooperation from the Mag. Tape people in helping us to transform the systems from the design stage to actual production construction. Construction is going very slowly, seeing this is our first experience with the system.

This past week Production has been given the responsibility of constructing our first Special System, the 2007. We expect to have this system complete and ready for checkout in two weeks.

Bob Hughes has pointed out to me an article in "Fan-Out," a publication distributed by Fairchild. The title of the article is "Ultra-Sonic Cleaning Will Harm Transistors." We are currently cleaning our modules by ultra-sonics, which has reduced our cleaning time 75%. I am investigating the problem.

A Dyna-Sert machine has been ordered from United Shoe Machinery Corp. Dyna-Sert is the automatic insertion of components into printed circuit boards.

E. Towle

A recent request by Charles Adams Associates of Bedford for the use of a PDP at a computer show located at the Hotel Somerset in Boston brought about the installation of a Data Phone. A crash program for obtaining plug-in units began and additional pressure was brought to bear on the telephone company. Edson De Castro worked evenings in checking out the system and around midnight of the day prior to the show, final checkout was completed. The Data Phone installation seemed to be a complete success, although the advertising furnished by Adams Associates left something to be desired. We have decided to keep one of the data phones here at the plant in case of a need for another installation in the near future.

Frank Boynton, of the Signal Corps School at Fort Monmouth, visited the plant on November 8 for the purpose of inspecting the second Buffer Memory, which is about ready for shipment. Incidentally, Mr. Boynton has informed Dave Denniston and myself of a change in the Contract Administrator at Fort Monmouth. The new Contract Administrator,

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E. Towle (cont'd)

Mr. Palumbo, has notified Boynton of the late delivery on the Buffer Systems and his intention to take action if the order is not completed by November 24. It would indeed be a blow to our company to receive a black mark from such a potentially large customer. At the present time, it appears as though the third Buffer System will not be ready by the 24th, and I am planning on submitting a letter to Mr. Palumbo indicating the additional delay.

R. Mills

EN Number Assignment

Effective the first of this week, the assignment of EN numbers in the 2000 series has been transferred to the Accounting Department and is being handled by myself directly at the moment with an eventual transfer to Fred Mariani after some alterations in the operation of the system. The primary change is to allow us to know our costs in a more detailed way so that the cost of the individual components of the machine will be known. This will call for much closer attention to the use of EN numbers. We plan to have a short meeting to discuss this point next Tuesday morning.

IBM Payroll Operation

As a follow-up, I thought you would be interested in knowing that our new payroll application has saved us approximately a day and one-half in the preparation of each weekly payroll.

New Accounting and Cost Control System

The past several weeks have been spent making final passes at the basic forms involved to account for labor, material and overhead. We made some real progress on the labor job ticket, revising it to include information necessary for our new system. Our new system of breaking down the individual components of a system or computer is being instituted this week using our present EN numbers. This will make it easy for us to change over to the new cost center job numbers when the time comes, since the detailed breakdown of the units will have been made. In order to give us some extra hands, we are having a man come out from Lybrand, Ross Brothers and Montgomery's Management Services Division within a few weeks. We have hired a new Cost Accountant by the name of Ed Simeone, who is coming to us from Brand-Rex. Ed has had a great deal of experience in this field, is intelligent and comes highly recommended. I think he will be a good man for us.

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Lora Dunn

We are happy to report that NASA has apparently decided to give DEC their order rather than sending out bids as originally planned. They obviously plan to place the order as soon as they receive a quotation on cost and delivery.

Diamond Ordnance has checked with us on a system that will be essentially a 10 MC counter plus some associated circuitry. Later they might want to do something similar with 20 MC flip-flops.

IBM is at the cost estimating stage of a system that would involve an analog-to-digital conversion, then successive multiplication by a series of coefficients and then digital-to-analog conversion. If they decide to go ahead with this, it would be in the neighborhood of $20,000 worth of modules plus some special core memory units.

If telephone calls are any criteria of interest in DEC's equipment, I would say we have the APL business "in the bag," as a day very rarely goes by without at least one call from them.

Mr. Beckman has just about recovered from the "waiting game" he played at Martin Co. in Denver. Seems it took him a day and a half to get in, and coffee there is taboo. That I would love to have seen! Anyway, seems there may be great potential in Martin Co., so it was worth the wait and "no coffee."

A visit was also made to FAA in Oklahoma City by Mr. Beckman. They are DEC enthusiasts but will be slightly slowed down on ordering some of the training modules they want, as they have funding problems. The primary subject discussed was the Memory Buffer system and how they will use it in their computer build-up for their course.

While in Denver, he also took a stroll through the Denver Research Center at the University of Denver. They are quite pleased with our equipment. He saw the equipment, which was just about completed, and which has a nice installation of our modules.

Last, but certainly not least, my hat is off to Mr. & Mrs. Beckman and their son. Their superlative courage is remarkable. A pat on the back for Mr. Beckman who is doing an excellent job which would be impossible for most of us, including myself.

J. Atwood

NEREM is on top of us, and that's not just a figure of speech. Somehow or other, we are managing to complete a computer ahead of schedule, build an SMCT 2108, construct a new booth, get literature printed - all in time for Tuesday's opening. Happy as we were to get an extra booth, the acquisition pretty much cancelled out our previous plans for the

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Jack Atwood (cont'd)

show.

Ted reports from Los Angeles that the Conference on Non-Linear Magnetics drew a real blank this year. If any people were in town for the show, they apparently decided to go watch the brush fires instead. Here's hoping the Conference on Magnetism in Phoenix next week is a little more rewarding. After that, it's on to EJCC.

Next year's show calendar is fairly well set, and requests have gone out for information on all shows in which we are interested. Also advance reservations have been made for show personnel through December 1962 in all cases where we have had sufficient information on the show dates and locations. First show of the year is the AIEE Electrical Engineering Exposition at the Coliseum January 29 through February 2. We'll be staying at the Park-Sheraton.

We have taken our annual beating at the hands of the IRE Show Committee - one booth again next year. The only answer to this one seems to be that some people aren't enjoying our success as much as we are. However, we have made a deal with Jolly Jack Spargo for a booth which has a space behind it identical in size to the booth itself. It's big enough to hold the computer, and we should have some fun promoting our "back room" operation.

Bill Barton of ANCO Technical Writing Service contends he is making real progress now on the DECAL Manual. We are awaiting with some anxiety his first draft text. This isn't an easy one, and we're not altogether sure of his or our ability to spell it out properly. The AMCT 2102 Manual text has been printed, so this one needs only the schematics and a few new close-up photos of the controls to be complete.

The AD/DA Conversion Application Note has been pasted up ready for camera, but we are now having to make final changes on the final changes that had been made in the final version of the text. If we get this one on its way, we hope to clean up the new 4000 Series catalog.

Our new design man, Jim Lozouski, is turning out a good quantity of the kind of layouts and drawings we have long been hoping for. He promises to be a real comfort in my declining years. Frank Howland has added another facet to his many-sided talents by attending the Technifax Workshop on overhead projection slide techniques. (Frank repaid the host company's courtesy by giving informal instruction on industrial art to his team-mates at the Institute.)

The immediate crusher is, of course, the open house on the 18th. We're going to have to do a heap of preparing and promoting to put this one over right in the short time available.

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Jack Atwood (cont'd)

However, we hope it will pay off in terms of badly needed recruits. If they like what they see, we may land some of the assemblers and technicians we are going to need to meet the orders that are coming in.

1031 A. Blumenthal 100%

This biweekly period saw many service calls due to tape reader malfunction. The difficulty for the most part is in the ability of the reader to stop the tape within a single character's distance. Adjustment is extremely critical in this respect and no easy solution is at hand. The manufacturers are developing a new brake which may solve the problem. I think some improvement could be brought about by getting a better time relationship between the clutch and brake action. This would necessitate redesign of their driving circuits.

PDP-1C-13 (JPL) has been checked out (the basic machine, that is) in the record breaking time of one week. This was achieved mainly through the efforts of the technicians who worked on the machine 24 hours a day in 2 twelve-hour shifts. It will be displayed and operated at the NEREM show next week.

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H. E. Anderson

PDP-1 Quotations:

Our old system of quotations for PDP-1 left DEC in a very vulnerable position with respect to delivery; i.e., if all customers to whom quotations had been issued accepted our offers on the same day and they all had been told delivery was 6 months, the problem is obvious.

To remedy this situation, a statement similar to the following should be included in quotes: "Normal PDP-1 delivery is 6 months, and a firm shipping date will be established at the time a firm order is placed. The prices quoted above will remain in effect for 30 days (or 60 days if the customer needs the extra time) from the date of this quotation."

The practical aspect of this is as follows:

We are presently making two PDP-1's per month. Only one customer can be assigned to each machine. Letters of intent or firm orders can be assigned delivery dates. Firm orders take precedence over letters of intent. All letters of intent which have been acknowledged by DEC will be reviewed on the 1st of each month.

If firm orders have been received during the month, they will normally move ahead of letters of intent in our delivery sequence. A letter of intent must become a firm order no later than 4 months prior to the delivery date. Letters of intent can be cancelled at no penalty to the customer up until that time.

PDP-4:

Gordon Bell and I have been actively working on the specifications for a new machine called the PDP-4. This is a company confidential project at the moment. No information is to be given outside of the company about it. We are probably going to build a prototype for one customer with whom we have been working closely. Depending on how that comes out, we may or may not make a standard product out of it. The target price is $30,000. Let me know any comments you have on the specifications below.

PROGRAMMED DATA PROCESSOR - 4

Technical Specification

The DEC Programmed Data Processor - 4 is a stored program digital system designed for use as a component with other electronic equipment such as keyboards, printers, analog converters, typewriters, punches, etc. The stored program concept, which is also used in modern general purpose computers, brings the flexibility and

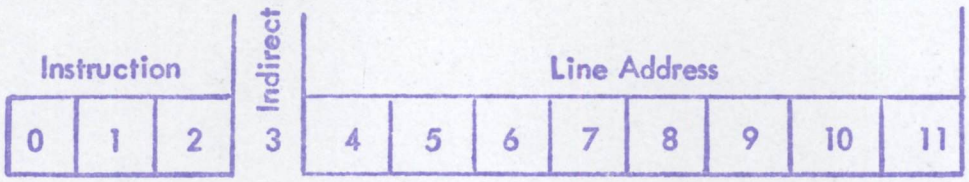
H. E. Anderson (cont'd)

economy of a standard product to applications which have required special purpose computer systems in the past.

System Description

The PDP-4 is a parallel computer with 12 bit words. It performs seven types of instructions and can have either 1024 or 4096 lines (words) of memory, all of which are conveniently addressed by the program. Indirect addressing, convenient double length arithmetic, and efficient subroutine calling instructions are among its outstanding features.

The 12 bit word layout is as follows:



The addressing system features pages which each have 256 lines. A 1024 line memory system has 4 pages, and a 4096 line memory system has 16 pages. If the indirect bit of an instruction is 0, the address bits refer to a line address on the page where the instruction is located. If the indirect bit of an instruction is a 1, the contents of the line specified will be the page and line of the desired operand. Thus, by indirect addressing, the entire memory can be addressed conveniently.

The instruction list is as follows:

ad Y Add Operation Code 1

The new C(AC) are the sum of C(Y) and the original C(AC). The C(Y) are unchanged. The addition is performed with 2's complement arithmetic. If the sum exceeds the capacity of the Accumulator, the carry link flip-flop will be set.

sc Y Store and Clear Operation Code 2

The C(AC) replaces the C(Y) in the memory. The C(AC) is cleared by this instruction. The original C(Y) are lost. The Carry Link is unaffected by this instruction.

jp Y Jump Operation Code 3

H. E. Anderson (cont'd)

The Program Counter is reset to address Y. The next instruction that will be executed will be taken from Memory Register Y. The original content of the Program Counter is lost. If this instruction is used with indirect addressing, it can have the effect of turning to another page of memory.

js Y Jump to Subroutine Operation Code 4

The original Program Counter contents are stored in Memory Register Y, and the Program Counter is reset to the address Y + 1. The C(AC) is unaffected by this instruction and is normally used for holding the argument to be operated on by the subroutine. To exit from the subroutine, a jump indirect to Y is executed. (jp*Y).

an Y AND Operation Code 5

The bits of C(Y) operate on the corresponding bits of the Accumulator to form the logical AND. The result is left in the Accumulator. The C(Y) are unaffected by this instruction.

Logical AND Table

AC Bit	Y Bit	Result
0	0	0
0	1	0
1	0	0
1	1	1

is Y Index and Skip Operation Code 6

The C(Y) are replaced by C(Y)+1. The C(AC) are unaffected by this instruction. If, after the addition, C(Y)+1 has overflowed, the Program Counter is advanced one extra position and thus the next instruction in the sequence is skipped.

op Y Operate Operation Code 7

This is an augmented instruction in which the address Y specifies the details of the operations to be performed as follows:

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H. E. Anderson (cont'd)

IN-OUT OPERATION - Addresses will be 400 or higher
Clear Accumulator - Add 200 to the address

NOT IN-OUT OPERATION - Addresses will be less than 400
Clear Accumulator - Add 200 to the address

Accumulator Group

Mutually Exclusive
(Complement Accumulator - Add 140 to the address
(Rotate AC & Carry Link Left - Add 100 to the address
(Rotate AC & Carry Link Right - Add 40 to the address

Skip Group

The C(PC) will be indexed by 1 if the test conditions specified by the address are met.

Address 1	Skip if Carry Link is 0
Address 2	Skip if Carry Link is 1
Address 3	Skip if AC_0 is 0
Address 4	Skip if AC_0 is 1

Standard Input Equipment

The PDP-4 has a 5-hole paper tape reader as standard input equipment. Loading the application program into the machine is done via this media. Convenient facilities for adding optional input output devices are included as standard equipment.

Optional Input Equipment

A Teletypewriter with paper tape punch can be added as an input-output device. This can be either local or remote.

Operator Controls

Operating Push Buttons

Start	The computer will start. The first instruction comes from the memory location indicated in the Address Switch.
Stop	The computer will come to a halt at the completion of the current memory cycle.

H. E. Anderson (cont'd)

Continue	The computer will resume operation starting at the state indicated by the lights.
Examine	The contents of the memory register indicated by the Address Switch will be displayed in the Accumulator and the Memory Buffer lights.
Deposit	The word selected by the Test Word Switches will be put in the memory location indicated by the Address Switch.
Examine Next	The contents of the next address of memory after the address specified by the Program Counter will be displayed in the Accumulator and the Memory Buffer lights and the C(PC) will be indexed by 1.
Deposit Next	The contents of the Test Word Switches will be put in the memory location specified by the Program Counter. The C(PC) will be indexed by 1.

Operating Toggle Switches

Power	Turns all power to the computer on and off.
Single Step	When the Single Step Switch is on, the computer will halt at the completion of each memory cycle. This switch is particularly useful in maintenance. Repeated operation of the Continue Push Button will step the program one cycle at a time. The state of the machine can be examined at each step.

In Out

In Out is a connection with the machine which handles communication with external devices such as tape readers, punches, printers, analog-digital converters, etc. Most any device may be connected at these terminals and 2^8 different functions may be selected. The information is transmitted directly through the AC.

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H. E. Anderson (cont'd)

Program/Data Transfer Interrupt

This connection allows the program to be interrupted and the program sequence resumed according to the address specified by external signals.

An external signal may cause a selected memory register to be read or written.

Communication is through the Memory Buffer.

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D. Denniston

Both Bell Labs, in Whippany, and Bell Labs, in Columbus, still continue to take up an appreciable amount of my time. Between passing out wiring lay-out sheets and keeping them posted on the status of their orders, I think we are keeping them fairly satisfied.

Stan and I attended a U.S. Naval Training Device Center bidder's conference in Port Washington, L.I., N.Y. Although the conference confirmed the Request for Quotation for a Classroom Demonstrator, Device 6B4, insofar as the rather severe physical dimensions and arrangement of a classroom demonstration device, we at least had the opportunity of talking with Len Deutsch and Lt. Gannon and keeping the door slightly ajar there. I must agree that this is not the type of item we should bid on because it could not be easily constructed with standard modules, and also I believe that the basic design specifications are somewhat out of line with our philosophy of training.

I understand that although a proposal for the device outlined in their request for quote will not be submitted, an unsolicited proposal will accompany a "no bid" letter for a similar device that could be constructed with our standard line. Even though this will not fit exactly with the idea of the strong-minded, empire-building individuals we met at the bidder's conference, I think it will, at least, start them thinking. After the closing date for the proposals, I will again venture out to Port Washington for an informal "chat".

At last the Buffer-Memory has been delivered to the Ft. Monmouth Signal School. I spoke with Bill Cannon of F.A.A., and he is coming here from Oklahoma City to accompany me to Ft. Monmouth on the 14th of November to witness this gorgeous monster in operation.

We are expecting John Koudela to arrive here tomorrow and with a few prospective PDP customers lined up, these next few days should prove fairly interesting.

Beside quite a few trips mentioned to Bell Labs, Whippany, and the U.S. Naval Training Device Center, I have also stopped off at Columbia University in Dobbs Ferry, N.Y., and Lockheed Electronics in Metuchen, N.J.

R. Mills

Accounting and Cost System

Progress continues, as we are now assigning every employee to a home cost center (department). The current fiscal year's figures are being broken down into the new form in order to develop overhead rates for cost center managers.

A meeting was held on October 26th to explain the operation of the system as it affected cost centers, and requisitioning for expense, inventory and capital equipment purchases. Several good ideas were obtained, and we made plans for employee educational meetings.

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R. Mills (cont'd)

Programming Class

John Koudela is conducting a class in programming, which is giving us a much needed orientation to the PDP-1. We hope to use the PDP-1 for our accounting applications at a later date.

H. Crouse

On October 17, 1961, Bob Hughes and I toured Clevite's facilities in Waltham. Clevite is our major source of glass germanium and silicon diodes (2 million approximately per year).

On Tuesday and Wednesday of this week, I attended the National Association of Purchasing Agents Conference in Boston. It could best be called an "idea" conference, with people like Dr. Howard Lewis of Harvard presiding. Very informative and interesting.

Fabri-Tek and T.M.I. both have shipped a 16 x 16 x 32 memory stack; T.M.I. approximately eight weeks late, Fabri-Tek several days ahead of schedule.

Potter Instrument is performing like none of our suppliers - shipping on schedule.

E. Harwood

We finally shipped the PDP-1 to CRC, and the installation went fine. We sent along more soft wear than any other machine including paper tape, books, programs, etc. This machine is still lacking the display, which we hope to send in a week or so.

BBN, California Machine

All of the computer has been checked out with the exception of the Sequence Break System. This system has been installed but not fully checked out yet. Currently, the mag. tape that is connected to the machine, is being checked out by Jack Brown and his crew. We still have one other cabinet to connect onto the machine. This cabinet will contain the Epsco A-D converter, the relay buffer, and the 12-bit counter that BBN wanted on the machine. All the panels for these things are made, and it's just a matter of time in tying them together and installing them in the cabinet. We hope to have this machine completed on time, and a few of the BBN people will come up before it is shipped and run it for awhile.

ITT, Prod. #1

The ITT Production machine arrived in the Systems Assembly area today, and we immediately started putting in plug-in units and doing some of the special wiring that is involved on the ITT machines. We hope to be able to turn the machine over to Al Blumenthal and his test crew within a week.

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E. Harwood (cont'd)

For the past week I have kept one of the draftsmen in the drafting room busy full time correcting all of the little mistakes that have shown up on our block schematics on both the standard Systems and the special ITT systems. Bill English from Cyburtek picked up most of these mistakes and marked up the drawings and sent them along to us. This included getting the same labels on all drawings pertaining to the same lines and making them either all capital letters or small letters, whichever they should be - also adding the little details that have been overlooked.

J. Cudmore

EN 2055	50%
EN 1026	30%
EN 1000	20%

Chuck Cotterman of SEI was out Monday to look over his 4096X38 memory system (2008). He seemed pleased with the system, and we shipped it on Tuesday.

I talked with Charles Molnar of Air Force Cambridge Research Center, who is also working for Lincoln Lab, and he is interested in a 1024X12 8μs memory for "Link", a computer to be used in biological research. He would like to use our modules as much as possible.

I am still working on a mag. tape read amplifier switch.

M. Sandler

This week I spent three days at the AMA Academy at Saranac Lake, N.Y. attending a seminar on New Techniques for Management Control. A new scheduling and follow-up technique, known as PERT-Program Evaluation and Review Technique, is the latest method. It is being used by all the military and many government agencies, as well as by many prime contractors. These people feel that shortly the use of PERT will be mandatory down to subcontractor and supplier level. I plan to gather together my notes and write a paper on adaptation of PERT to some of our work.

D. White

2301 Scanner	85%
Sales	5%
Quality Control	8%
Misc.	2%

The 2301 Scanner is now in the assembly phase. Most parts for the cabinet are all set, but the tube mounting is not done yet. Some of the logic has been checked on the bench; we

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D. White (cont'd)

hope to start testing parts of the system next week.

Circuits class for technicians is well under way. The class started the first of the month and has covered the inverter, diode and flip-flop, thus far. The turn-out has been very good - so good, in fact, that the conference room is not large enough. John Culkins informed me today that we now have blackboards in the auditorium, so we will move shortly.

With the release of the Burst Generator literature, we should begin to prepare ourselves for a flood of inquiries on how to test modules. We already have one or two such inquiries. Hence, I will be working on a more or less general description on how to test the standard units - inverters, diodes, flip-flops, delays, clocks and PA's. Hopefully, this information will cover the 500 kc and 5 mc lines in one pass. For special units, we will most certainly have to write up individual sheets. There is some demand for test procedures for the memory tester read-write switches already.

Incidentally, the 2309 Burst Generator model was checked out this last week. We are now building ten - most will be used in Quality Control.

L. Prentice

2076	5%
1000	10%
1053	40%
2062	20%
1027	30%

In regard to the last Biweekly Report - of course, we are all lions!

Mr. Scott Miller has joined this office effective Wednesday, October 19, 1961. It is hoped that he can add considerably to our output of design work. It is particularly hoped that people will use his ability for Logical Design of front panels on all equipment.

ITT Operator Console:

The sheetmetal work for this unit is now at Precision Silk-Screening in Cambridge, Mass. They promised today to have this back to Colonial Engineering, ready for assembly Friday afternoon. All of the problems pertaining to the table-top have been resolved satisfactorily, as far as it is known at this time, and this unit probably will be the last to be delivered to Colonial from Pine Crest Products in the Kendall Square area in Cambridge.

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L. Prentice (cont'd)

New design problems pending are:

Anelex Reader
Precision Display
21" Color Display
2301 Scanners

All the parts for Geo-Tech M-Core mechanical sections have been released to production. One small item for mounting power unit drawing remains to be done. This would be released to the Machine Shop as a Machine Shop manufactured unit.

R. Best

Three new mounting panels have been added to the line. The 1918 is a 25 unit Wire Wrap Mounting Panel, selling for $220. The 1923 is a 20 unit Wire Wrap Mounting Panel, selling for $185. The 1924 is a special Mounting Panel that we do not plan on selling at this time. It is like a 1901, except that there is four inches of space between the front panel and the logic wiring. It is going to be used in the 2303 Burst Generator so that the front panel of the unit can be put directly in front of the logic.

A 772 is a new Dual 36-Volt Power Supply that will supply 4 1/2 amps from each output. It is on a 17 X 8 inch panel suitable for mounting on the back door of the computers.

K. Fitzgerald

EN 2076	15%
EN 1056	10%
EN 1024	15%
EN 1000 Soldering mach.	20%
EN 1000 Circuit Bd. Drill	10%
EN 1000 Supervision and misc.	20%
EN 2094	10%

The circuit board drilling machine has been almost ignored in the past two-week period because of lack of the new type board with which to experiment. However, there has been some additional design work done, and it seems that the problem of dust adhesion seems to be solved. When this machine is ready for production, the method of registering silk-screening on the printed circuit boards will have to be improved so that the screening from board to board will be within ± two-thousandths of an inch.

Bob Savell has encountered some problems in the display assembly, which has necessitated a further change in the housing which holds the focus coil and yoke assembly in position around

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K. Fitzgerald (cont'd)

the neck of the tube. This housing was previously made of steel. Now, we must make it of non-magnetic stainless steel. Also, a large stiffening plate has been added to the back of the housing so that the complete focus coil and yoke assembly will slide readily on its mounting pins.

Scott Miller, who has recently joined this office, has been busy from the first day designing the exterior covers for the panel mounted teletype punch and the total design concepts for the Anelex Printer. As soon as he gets cleared up on that, he is going to start on the design for mounting a reader and spooler for table-top use. There are many other projects waiting for this type of work, but this is the schedule for the present.

Because of the way that the work load has been coming to the Machine Shop in the past two months, we actually were able to clear up all pending jobs for one day (Monday, October 16). We used this day to start making parts for a new tape reader, which Ken Olsen is currently working on. Progress to date on this new reader is good, and it looks as though we will be able to build a small mechanical reader head for a cost of approximately $200. All the electronics for the reader would be incorporated into standard mounting panels within the computer, thus enabling the easy and economical replacement of the mechanical parts of the reader.

D. Dubay

Test Equipment Service

The following Tektronix oscilloscopes and preamps have been calibrated within the last two weeks.

Oscilloscopes

Type 543 Ser. #526
Type 543 Ser. #368
Type 543 Ser. #1232
Type 543 Ser. #1167
Type 581 Ser. #110
Type 543A Ser. #3159

Preamplifiers

Type CA Ser. #20725
Type CA Ser. #29300
Type CA Ser. #31896
Type CA Ser. #1899
Type CA Ser. #32559

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D. Dubay (cont'd)

Preamplifiers cont'd

Type 80 Ser. #174
Type CA Ser. #144
Type S Ser. #174
Type S Ser. #389

Also calibrated were the Hewlett-Packard sampling scope, Hewlett-Packard V.T.V.M. and Type 575 curve tracer Ser. #1431.

We recently acquired a Twinco meter calibrator. All Triplett 630NA meters have been calibrated, and all other meters will have been calibrated by the end of this week.

Sign-out and color coding of all test equipment has been completed. The code for assigning equipment is as follows.

Red	Special Systems
Yellow	Engineering
Dk. Green	In-out Group
Brown	Transistor Testing
Grey	Quality Control
Lt. Green	Applications
Black	Computer Group
Blue	Test Equipment Service

All Sterorette machines have been signed out to those persons needing them. They have been labeled with grey tape bearing the signer's name.

Five Sterorette TD's and one portable Versatile were received on October 25th. These machines have been signed out to engineering personnel.

It would be appreciated if persons who remove equipment from the test equipment service over the week-end would notify me on the following Monday.

The following list of test equipment is now available. Oscilloscopes, Type CA plug-in units and 630NA meters have been permanently signed out to sections. All other equipment has been permanently signed out to test equipment service and may be borrowed on a temporary basis.

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D. Dubay (cont'd)

Manufacturer	Type	Description	Quantity
Pyramid Inst. Corp.	RS-1	A.C.Amprobe	1
Tektronix	190B	Sine Wave Generator	1
Hewlett-Packard	AC-16V	Delay Line	1
John Fluke	801H	Differential DC volt meter	1
Bendix Radio Corp.	LM-7	Frequency Meter	1
Millen	90651	Grid dip Meter	1
General Radio	650-A	Impedance Bridge	1
Delta Design	7000A	Enviromental Test Chamber	1
Polaroid	2620	Oscilloscope Camera	1
Tektronix	130	LC Meter	2
Harrison Laboratories	800B	Low Voltage P/S	1
Tektronix	108	Mercury Pulser	1
Bausch & Lomb	40X	Microscope	1
Bausch & Lomb	10X	Microscope	1
Bausch & Lomb		Microscope Light	1
Triplett	630	Multi-meter	1
Triplett	630NA	Multi-meter	35
Simpson	260	Multi-meter	3
Weston	433	AC volt meter	1
Weston	931	DC amp meter	1
Weston	931	DC volt meter	2
Weston	931	DC milliamp meter	1
Weston	980	Multi-meter	25
Tektronix	321	Oscilloscope	1
Tektronix	515A	Oscilloscope	1
Tektronix	541	Oscilloscope	2
Tektronix	543	Oscilloscope	19
Tektronix	543A	Oscilloscope	14
Tektronix	545A	Oscilloscope	2
Tektronix	581	Oscilloscope	2
Hewlett-Packard	185A	Oscilloscope	1
Tektronix	53/54C	Dual Trace Preamp	2
Tektronix	CA	Dual Trace Preamp	34
Tektronix	E	Differential Preamp	1
Tektronix	H	Wide Band Preamp	1
Tektronix	K	Fast Rise Preamp	1
Tektronix	L	Fast Rise High Gain Preamp	2
Tektronix	R	Transistor Rise Time Preamp	1
Tektronix	S	Diode Test Preamp	2
Tektronix	Z	Differential Comp. Preamp	2

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D. Dubay (cont'd)

Manufacturer	Type	Description	Quantity
Tektronix	80	Preamp for 581 Scope	1
Tektronix	81	Plug-in Adapter	2
National	NC109	All Band Receiver	1
Heath Kit	PS-3	Regulated P/S	1
Electro Scientific Lab.	230-R	Resistance Bridge	1
Tektronix	105	Square Wave Generator	1
Tektronix	107	Square Wave Generator	1
Anchor Optical Co.	23X-80X	Stereo Microscope	1
General Radio	1531-A	Strobotac	1
Simpson	389-3L	Thermo-meter	1
Tektronix	180A	Time Mark Generator	1
Tektronix	181	Time Mark Generator	1
Tektronix	575	Transistor Curve Tracer	2
Heath Kit	TC-3	Tube Checker	1
Hewlett-Packard	412A	V.T.V.M.	1
General Radio	W5MT3	5 Amp Variac	3
General Radio	W10MT3	10 Amp Variac	3
General Radio	W20MT3	20 Amp Variac	1
Simpson	880	Watt meter	1

J. Fadiman

I have spent the past eight weeks traveling in Europe and exploring the market possibilities in Holland, Belgium, France, Germany, Switzerland and England. Two weeks of my trip was spent at the Philips Electric Company in Eindhoven, Holland installing the Memory Tester 1516B. The installation is complete except that we still have some work to provide before they will fully accept the machine. We have learned a great deal about the 1516 from Philips in Eindhoven. In the first place, our spread of drive pulses on the X and Y lines is much too large because of the difference in wiring length to the switches and from the switches to the output panel. This wiring length must be shortened and standardized. Secondly, our read-write switches will not properly conduct 1 amp of current the way we say they will. We are evidently not testing them with a sufficiently fast rise time, and we are not looking at the rise time of the pulse when testing these switches. We must provide more base drive in order to fully saturate the switches. This is now being done with a new power supply which we are designing.

Concerning markets in Europe, there is a definite market for both our plug-in units, especially system plug-in units, and our systems. Siemens Halske, Munchen, Germany, is very interested in our Memory Test Systems and Core Testers. And indeed, they have just sent us a letter asking for a formal quotation. In France, both the Philips Co. and Cofelec in

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J. Fadiman (cont'd)

Paris are interested in our Automatic Core Testers and Memory Testers. The Philips Co. in England, known as Mullard, is interested in our Automatic Memory Plane Tester. Several other companies whom I visited in Europe expressed considerable interest in our plug-in unit test equipment. In general, the feeling in Europe tends much more toward building their own test equipment than buying it. Everybody wants to build their own, and there is very little standardization. However, I get the feeling that this is beginning to change and the more enlightened engineers realize the usefulness of buying standardized test equipment which they do not have to bother designing.

There is a good deal of nationalistic prejudice in Europe, which is sometimes difficult to overcome. Switzerland is, perhaps, most free from this prejudice and was, in general, very receptive to buying American equipment. The biggest stumbling block to large sales in Europe is, of course, price. Our prices are high compared with European prices, and the import duty makes them higher. Our main competitor in Test Equipment so far is Philips, who sell 100KC building blocks at very low prices. For instance, a flip-flop costs $5.00. However, computer technology is advancing rapidly in Europe, and there is no adequate test equipment being manufactured there. Therefore, it is definitely our place to step in as soon as possible. However, we must have a Sales and Service Office in Europe if we intend to do this seriously. People want to know that service and parts are available in Europe and that engineers are available who speak their language.

I have dictated three tapes while I was in Europe and these are being prepared in the form of an inter-office memo, which will be available to anyone interested in the details of the people to whom I have talked and what I have learned in Europe.

R. Beckman

Since Mr. Beckman is as busy as a one arm paper hanger, I decided to give the Biweekly Report a whirl.

He has just returned from Norfolk and also the show in Greensboro, North Carolina. The show was apparently rather slow and not much going on, but DEC's presence was advantageous.

While Mr. Beckman was out of town, NASA sent me a diagram to be forwarded to him to fill in the details. This should take care of those long evenings out of town with nothing to do. Seems we will be getting a request for bid from NASA written "made to order" for DEC.

Georgetown Hospital has been knocking at our door to get assistance on setting up their equipment. Mr. Beckman spent this morning giving them a hand.

We started out with a personal call to the Corp of Engineers, Washington Area Office and wound up with a request for information on DEC's PDP-1. Seems they may possibly be expand-

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R. Beckman (cont'd)

ing their facilities in 1962 and wanted to read up on our computers. Mr. Beckman has a tentative appointment for the first week in November to visit them.

Mr. Beckman drew up a logic diagram for Bell Telephone Labs in Winston-Salem, for which they have already ordered equipment. They were quick on the trigger and ordered the equipment even before they received the final diagram.

The remaining travel plans include FAA in Oklahoma City for a couple of days and then a hop to Denver to visit the Martin Company.

Needless to say, he has been fast at work on the proposed new Logic Book in between visits to the various firms in the D.C. area, such as APL, etc.

Last, but not least, we were honored with a visit from General Doriot of ARD while he was in the city last week. He seemed very pleased with our offices here.

A. Blumenthal

PDP-1C-6 was delivered to Cambridge Research Lab on Monday, October 23rd, after exhibition at Concord High School.

PDP-1C-7 (BBN, California) is undergoing the final stages of test, with sequence break and magnetic tape being worked on in separate shifts.

W. Farr

Transient Voltages in the:	
Tape Reader, Punch, Flexowriter	50%
Punch Control	50%

T. Johnson

After an interesting and enjoyable week of long walks through the Maynard plant, I returned to meet with two sales disappointments. An interest in PDP-1 at UCLA Medical Center was thwarted because of inability to purchase or lease, and an "in the bag" system for STL was lost to Navcor on price (they didn't even describe their engineering approach).

Ken Larsen has dug right into the many jobs at hand here. In the past month or so, Ampex (formerly Telemeter Magnetics) has kept us quite busy with their flurry of tester orders.

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T. Johnson (cont'd)

We are looking forward to the first West Coast PDP-1 installation at BBN (Los Angeles) in November. The outstanding recent sale was two PDP-1's to Beckman Systems. These computers will end up at the Saturn Static Test Facility at Redstone Arsenal.

Current potential customers for modules are:

Acoustica Associates
Hughes - Culver City
Ralph Parsons
U.S. Naval Post Grad. School
JPL

Two off-shoots from Ampex (TMI) are Electronic Memories, Inc. and International Computer Co. EMI is already a customer for a 2102, and both are good, new, potential customers in this amazing ferrite core business.

I think there should be more communication between sales offices on applications and customers. I have requested that we receive sales histories. New areas are often less obvious than before, and we could all profit by some stimulation in conjuring up new approaches and targets.

If any DEC people visit this location, there is a standing order to bring along some clams and lobsters (obtainable at Logan) for yours truly, if you have a spare hand and baggage allowance. I had quite a feed when I got back here.

R. Tringale

EN 2088 100%

The logic drawings for PEPR are almost complete. There are a total of 8D size drawings completed at present, and I would say that the final number of drawings will be around ten or twelve.

L. Cleary

PDP - Development (1020) 100%

I have been engaged in the checkout of a reader test program which will put the paper tape readers through various speeds, and checking the results.

Also, I have started another maintenance which tests the various brake and clutch failure possibilities.

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D. Wardimon

PNP NPN Ft Tester	25%
Checking 1687 Model	10%
1802 Relay	15%
771 Power Supply	20%
Checking 4689 Light Model	5%
1607 Pulse Amplifier	25%

D. Adams

Semiconductor Testing

Transistors and diodes that are bought by the company, to be used in our various units, have to be individually tested to make sure that they pass the manufacturer's specifications and that they are usable in our circuits. This means that each transistor and diode is tested for at least one specification, and it can run up to as many as six tests on a given transistor. These tests include, for a transistor; ICBO, IEBO, VCE (SAT), VEB, Ft, ICES, V.P.T., and some special tests which include Grounded Base VCE and ICEX. For diodes, the tests are; Forward Drop (Static and Dynamic), Inverse Leakage, Reverse Recovery, and Zener Voltage Tests.

The average transistor has about four tests which it has to pass before it is sent down to the production stock room. This means that in a lot of 1000 transistors, we are actually handling 4000 transistors.

For testing these semiconductors, we have 2 Type 575 Transistor Curve Tracers, 2 Type 541 Scopes with 2 Type S Diode Recovery Plug-In Units and 1 Type R Transistor Rise-Time Plug-In Unit, an Ft Tester, and 2 D.E.C. made transistor testers. In the future, 2 automatic testers will be added, one for transistors and one for diodes. These new testers will enable the tester to make all the DC tests at one time. So the semiconductors will only have to be handled twice, the second time is for the few that have special AC tests which will have to be done on another tester.

The following is a list of semiconductors, manufacturers, total amount tested (from August 4, 1961 to date), and percent that have been rejected for failing various tests.

Semiconductors	Mfr.	Units Tested	Percent Rejects
D-001-1	Transitron	40604	0.33%
D-001-1	Clevite	77000	1.1
D-662-1	Clevite	25632	1.7
D-662-1	Tex. Inst.	663	54.
D-003-1	Clevite	4812	21.8
D-664-1	Clevite	10000	2.5
IN 67A	Transitron	2000	0.55

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D. Adams (cont'd)

Semiconductors	Mfr.	Units Tested	Percent Rejects
IN 270	Transitron	8003	0.4%
IN 1220	Westinghouse	250	2.
IN 1227	Westinghouse	250	3.2
IN 1341	Westinghouse	1225	0.0
Q-6-100	International Diode	100	1.
IN 429	Hoffman	100	0.0
IN 750A	Transitron	194	0.0
IN 764	Transitron	100	0.0
IN 1322	No. American Elec.	10	0.0
IN 1998	U.S. Semiconductor	10	0.0
IN 2974B	Dickson	150	0.0
IN 2974B	Motorola	30	0.0
IN 3005A	Motorola	14	0.0
IN 3156	Transitron	60	0.0
IN 3314B	Dickson	120	0.0
1/4 M 6.8AZ5	Motorola	21	0.0
1.5 M 100Z5	Motorola	9	0.0
MA-80	Philco	2330	0.13
MA-80	Sprague	9390	0.64
MD-27	Sprague	5279	0.46
T 1796	Philco	2000	0.3
2N 398A	Motorola	2000	2.
2N 438	Gen. Trans.	250	0.44
2N 456A	Tex. Inst.	206	1.
2N 457A	Tex. Inst.	10	10.
2N 598	Philco	8	0.0
2N 599	Philco	2010	0.43
2N 674	Philco	1674	7.85
2N 711A	Tex. Inst.	750	0.66
2N 744	Tex. Inst.	446	0.0
2N 1065	Gen. Trans.	2500	0.44
2N 1184	RCA	262	4.6
2N 1184B	RCA	400	5.25
2N 1204	Philco	1795	0.67
2N 1301	RCA	500	2.4
2N 1304	Tex. Inst.	475	1.3
2N 1305	Tex. Inst.	10313	4.5
2N 1310	Gen. Trans.	505	7.5
2N 1370	Tex. Inst.	4000	2.6

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D. Adams (cont'd)

Semiconductors	Mfr.	Units Tested	Percent Rejects
2N 1499A	Sprague	1000	6.5%
2N 1719	Tex. Inst.	650	0.93
2N 1754	Philco	5915	0.35
2N 1908	Tex. Inst.	49	79.5
2N 2099	Sprague	100	6.

While looking at one of our completed PDP-1 computers, I noticed that the outside blue doors have a space between them of approximately one inch wide. This space, in my opinion, marred the otherwise smooth appearance of the complete unit. After closer inspection, I found this space was needed in order to open the doors, due to the outside edge of the door swinging in as the door is opened. If the doors were hinged on the outside edge instead of the inside edge, as they are now, it would be possible to have the doors almost touching in the closed position, thus eliminating this space and still be able to open the doors. This is possible because instead of having the outside edge of the door swing in, as it does now, the inside edge of the door will swing out as the door is opened. Thus, no added space is needed to open the doors, and it would make smooth and unbroken sides, adding to its general appearance.

J. Atwood

We have two outside organizations helping with our technical publication problems. Cyburtek has completed its part of the work on the AMCT 2102 Manual, and the copy and illustrations are being put together here preparatory to printing on the Davidson. Meanwhile, Cyburtek is proceeding full blast on the new PDP Manual copy.

Also in the works is a rewrite of the DECAL description. Bill Barton, of ANCO Technical Services, is on duty here for a couple of weeks to get this one off the ground. The present DECAL description is being reprinted "for internal use only" while the new manual is being written.

Recruitment of technical writers is an amusing, if non-profitable, pursuit. A good share of the applicants seem to be six-week wonder graduates of Raytheon-Andover's course on basic electronics for would-be technical writers. And the salaries they want!

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Jim Burley (J. Y. Schoonmaker Co., Dallas)

As reported earlier, Michoud has been selected as the site for the S-1 and S-1B Saturn booster production and may also be used for assembly of the liquid propellany NOVA launch vehicle. It is also anticipated that two static test facilities will be constructed approximately 20 miles south of New Orleans. The entire complex will be operated by the winner of the booster competition - for which a bidder's conference was held on September 26. It is expected that the prime contractor will be selected in 3-5 weeks. While some 37 firms were invited to submit bids, it is unofficially reported that the prime contenders are General Dynamics (Astronautics), Douglas Aircraft, and Chrysler. Executive management will be by the Marshall Space Flight Center in Huntsville, Alabama.

The selection of the architect-engineer for the Manned Space Flight Laboratory in Houston is expected momentarily. The present schedule calls for completion of all architectural-engineering effort by March, 1962 and completion of construction by June, 1963. This facility will house NASA's Space Task Group under the direction of Dr. Robert Gilruth and will include a Flight Project Building, an Equipment Evaluation Lab and Environmental Testing Lab and a Flight Operations Facility.

Additional information may be obtained by contacting Mr. David Newby, Chief of the Office of Technical Services, Marshall Space Flight Center, Huntsville, Alabama.

R. Hughes

EN 1010
EN 1011

Components

We have been using Philco 2N224 transistors as indicator drivers. We didn't like the device because its leakage varied from minute to minute indicating probable moisture contamination.

Recently we tried using Texas Instrument 2N1370's in place of the 2N224 in certain sockets. These devices had lower leakage than the 2N224 and lower Beta. Meanwhile, we dickered with General Electric and now have a type with low leakage and high Beta. It is Type 4JXIC741. The replacement type for this is a 2N527.

Effort is being made on the 5 mc line to center our pulse outputs at 70 nanoseconds with limits of 60 and 80. Narrow pulse widths (50) give low margins.

We still haven't received any 2N1908 transistors for current drivers.

A diode has been found for the V.H.F. line. It is a CTP1093 and sells for about $1.40.

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R. Hughes (cont'd)

A new counter made by Rowan was purchased and tested. It is a nice, low, inertia device with a push button reset. It operates on about 120 ma at 24 volts and costs $23.46 in quantities of 12-24. The type I ordered, which would do the core tester job, is Model #CA-161-SF-25-24D.C. This is a plug-in type; life expectancy is 400 million counts. The Veeder-Root counters, which we buy, cost about the same but require 500 ma at 28 volts and are not as good (what bias).

We are still overhauling our transistor saturation voltage specs on plug-in units which have such specs. This will take a few weeks yet.

A transistor tester and a diode tester have been purchased from Teradyne, Inc. These testers will speed up testing considerably and will be very accurate.

We have offered to build a sample and hold circuit for Cornell University, Radiophysics Center, in Puerto Rico. They designed the circuit, and we will package it.

I made a one day trip to Universal Instruments in Binghamton, N.Y. to see the automatic transistor and diode handlers they make. A diode handler, which would straighten leads, test (in our tester), polarize and put the diode on a taped reel, costs about $10,500. A transistor handler which orients leads and plugs the transistor in our tester socket, then decides where to throw it, costs about $3,500. This was enlightening and, as a result of thinking about this, our new diode and transistor testing instruments will have signals available on a plug to control such automatic machinery.

A new form has been designed which will be used to specify our own types of transistors. It is sort of complicated but so is the business of specifying transistors.

J. Smith

The System for J.P.L. will be available for checkout November 1, 1961.

In order to produce Systems at the rate of projected sales demand, we must manufacture parts in larger lot sizes. This, of course, brings about the justification of engineering changes. We all realize that engineering changes are necessary in order for us to maintain our lead in the industry. But when making a change, we should all keep in mind that we are no longer affecting just one system. There will be many systems in various stages of construction. Taking into consideration the inventory of manufactured parts, and the time needed to replace these parts, may justify the delay of a change until such parts are used. On the other hand, a change may be of such consequence that it should be immediately generated. In such cases, we in Production are only too willing to revamp schedules to allow for the change. Formal Engineering Change Notices are available and should be used.

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J. Smith (cont'd)

We are still greatly hampered by the lack of up-to-date parts lists. In some cases, parts lists are completely non-exsistent. It was agreed on a while back that the Project Engineer would be responsible for the generation of a parts list. We would appreciate your cooperation in this matter.

R. Lassen

We are still interviewing prospective Cost Accountants, Applications Engineers, Engineering Writers, Test Technicians, female Assemblers, Mechanical Draftsman and Secretaries. Test Technicians and female Assembly openings are steadily being filled. However, candidates for some of the other openings have not met our requirements. In addition to a new Detail Draftsman (trainee), we have also hired a Clerk-typist for the Drafting Department. Shortly before this report was written, we at long last culminated our search for a much needed Secretary for Dick Mills.

On October 25th, I spent the day at M.I.T. talking with some very bright, mature young men who will graduate from various engineering programs in June. Their interests varied from Circuit Design, Applications, and Industrial Management, to Computer Programming Development. I have invited eight men to visit us, and they all appear to be interested in our career opportunities.

Our first edition of "On Line" was mailed to all employees on October 24. Many of our people have asked me about the paper, and I feel that they are looking forward to receiving it. Some of the "bugs" have already been corrected which will make the publishing of subsequent issues easier. However, we should be able to improve the contents of the paper later on.

The Employee Handbook (which, incidentally, will no longer possess this title) has been re-written, and Jack is now preparing a newer, more attractive format.

Barbera Stephenson

We have really entered the A to D and D to A business in a big way. We now have four different types of ladder networks (including BCD) and three different types of single ended bridge level amplifiers in addition to our standard level amplifiers. Soon we will also have two reference supplys. The customer interest on this subject has been overwhelming, and after much ado, we will soon have a new expanded version of our analog-to-digital application note. This will include the complete logic diagrams for implementing typical systems using each of the three methods and also some short tables giving facts about the different modules. Hopefully, it will not be too long before we can add some more detailed product bulletins on each of these modules and also more detailed specs in regard to accuracies,

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Barbera Stephenson (cont'd)

stability, effects of power, supply variation, temperature, and time etc. Although it has been something of a struggle to get all the facts the customers have been asking for, they all seem to be quite pleased with the results,and that sure is nice.

All of the articles on the bi-weekly regarding the new modules have certainly been a help to those of us in the Sales Department. I am trying to follow up all of these with mimeographed product bulletins, which I hope will help to fill the gap between the time the units are available and the time the completed literature is available. I hope this will also help to make the writing and checking of the literature somewhat easier, and to avoid the last minute rush that we seem to be having. I have been working my way up from the really old ones and so far sheets are available on the 1669 indicator driver; 667 level amplifier; 1667 level amplifier; 1671 BCD light driver; 6208 dual flip-flop; 1501 level standardizer; 1130 parity circuit; 1616 output pulse amplifier; 1113 diode gate; 1608 dual pulse amplifier; 1204 dual flip-flop; 4303 integrating single shot; 4604 pulse amplifier; and 6106 inverter.

Thanks to a lot of hard work in the Advertising Department, we now have literature on the burst generator. The number of customers for this is not large, but they are all our biggest customers (naturally, or they would not need this). For example, Bell Labs in Whippany, has purchased several hundred thousand dollars worth of our equipment and always spends some part of their end of year money on DEC Modules. This year they will include at least one, or perhaps more, burst generators for maintenance purposes. Boeing also has been waiting for this for their incoming inspection. Considering the number of hours that have gone into the design and use of this, I really think it is a bargain item - I hope, if we can educate people to use the burst generator, we can sell quite a few.

We have a bid going out to High Voltage which looks like a very interesting system. They have a neutron generator which is set to irradiate a sample with a given number of neutrons which, after going through several interactions, will produce a number of particles (gammas, I think) which is directly proportional to the percentage of oxygen in the sample. Since the number of neutrons generated is not always constant, it is necessary to scale the final answer by multiplying by the number of neutrons which should have been produced and dividing by the number which actually were produced. Since the data comes in as pulses (1 pulse for each particle), the system will use binary rate multiplication and division methods. The answer will be printed out in decimal. The selling price of the system will be $14,800.

A. Falco

EN 1014	20%
EN 1018	20%
EN 1010	20%
EN 1000	40%

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K. H. Olsen

This "Fable for Managers," appearing in the October issue of Management Review, seems to be a timely contribution to the Biweekly Report:

The Indispensable Tiger

A powerful old tiger, the leader of his pack, was preparing to go on a hunt. Gathering the other tigers about him, he said, "We must go out into the plains and hunt, for the winter is coming. You young fellows come with me; perhaps you will learn a thing or two."

The young tigers were pleased to hear this, for the old fellow had hitherto shown no interest in tiger development. He usually left them behind when he went foraging, and they were tired of doing nothing but keeping order among the cubs and performing other routine tasks.

The first day out, the old tiger spotted a herd of elephants. "Here's your chance, Bernard," he said to one of the younger tigers. "Look at it as a challenge."

But Bernard had no idea how to go about hunting. With a roar, he rushed at the elephants, who ran off in all directions. "It looks as though I'll have to do the job myself," said the leader philosophically. And so he did.

The next day, the tigers came upon a herd of water buffalo. "Suppose you take over now, Jerome," said the old tiger, and Jerome, reluctant to ask silly questions but determined to do his best, crept up on the grazing buffalo. He leaped straight at the largest of them, but the big buffalo tossed him to the ground, and Jerome was lucky to escape in one piece. Mortified, he crept back to the group.

"No, no, no!" said the old tiger. "What's happening to performance around here?"

"But you never taught us how to do it," cried one of the young tigers. The old tiger was in no mood to listen. "The rest of you stay where you are," he growled, "and I will do the job myself." And so he did.

"I can see," said the old tiger, as the others gathered admiringly about him, "that none of you is yet ready to take my place." He sighed. "Much as I hate to say it, I seem to be indispensable."

DF633 DIGITAL EQUIPMENT CORPORATION · MAYNARD, MASSACHUSETTS

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Time brought little change. The old tiger sometimes took the younger ones along with him on hunts, and occasionally he let one of them try to make a kill. But having received no instruction, they were unequal to the task. And the old tiger still made no effort to teach the others his tricks; he had forgotten that he himself was a product of tiger-to-tiger coaching.

One day, when he had grown quite old, the tiger met a friend--a wise lion he had known for years. Before long, the tiger was launched on his favorite topic of conversation: the lack of initiative in the younger generation.

"Would you believe it?" he asked the lion. "Here I am getting a bit long in the tooth, and I still have to do all the hunting for my pack. There seems to be no one of my stripe around." "That's odd," said the lion. "I find the younger lions in my pack take well to instruction. Some of them are carrying a good bit of responsibility. "In fact," he continued, "I'm thinking about retiring next year and letting the younger fellows take over."

"I envy you," said the tiger. "I'd take things easier and relax myself if I only saw a little leadership material around me."

The old tiger sighed and shook his head. "You can't imagine," he said, "what a burden it is to be indispensable."

MORAL: Managers who won't share the burden must bear the burden.

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R. Lassen

Response from the employment agencies and our newspaper ads has been heavy. This gives us an opportunity to screen extensively in our search for good people. The openings for the Graphic Illustrator and the Production Control Trainee have been filled pending physical exams, and we have worthwhile candidates for the Detail Drafting opening and one for an Executive Secretary position. Incoming applicants for the Test Technician openings are infrequent, after a good start (5 hired to date). The interviewing and selection of female Assembly people is still fairly steady, and we are gradually adding to our present group.

Thus far, our applicants for Cost Accounting, Technical Writing and Applications Engineers have not been impressive - all candidates have been disqualified to date.

The local Personnel Management Group is again in session. This group consists of Personnel people in the Maynard, Concord, Acton, Wayland area and meets once a month to communicate local personnel problems and to share ideas and experiences.

Current projects nearing completion are the new Employee Handbook and the first edition of our new Company newspaper.

Response to the new Tuition Refund Plan has been slow - very few applications have been received thus far. This is a tremendous opportunity and should be encouraged by all.

M. Sandler

Our Company sick-pay plan is generous and is appreciated by all our people. As the number of people in the Company has increased, it has become imperative that we restate the rules governing sick-pay. When a person is absent from work, that person must notify his or her supervisor. Each supervisor must submit a daily slip noting absences and reasons to my office. I, in turn, will authorize sick-pay (or other paid-for absence) on the clock cards every Monday.

Several of our people have called in sick and have not been paid because (1) his supervisor failed to notify me or (2) his supervisor mentioned it to me in passing and I forgot it. These employees have been understanding and patient, but the non-payment can be a source of irritation. Written notice to my desk will help.

D. Denniston

While reading the New York Herald Tribune last Sunday, I came across the following and thought I might pass it along for what it's worth:

"The Univac division of Sperry Rand Corporation has introduced a desk-size binary computer

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D. Denniston (cont'd)

for applications ranging from training in computer maintenance to the solution of many problems. The unit, marketed by the Univac Military Department, is $34,500 and occupies four square feet of desk space."

To me this would indicate that perhaps some other people are moving into the field of training.

While on the subject of training, I stopped in at the Naval Training Device Center last week to show some of the people there our Classroom Modules. The reaction was the same as experienced by Bob Beckman at Dam Neck. In other words, the color combination is unsatisfactory for classroom use.

During the past two weeks I have also spent time visiting Bell Labs in Murray Hill and Whippany, Ford Instrument Co., Republic Aviation, I.B.M. Watson Labs, and Columbia University's Hudson Labs. Ford Instrument may have a large requirement, and Bell Labs just continues to place orders.

R. Beckman

I've been concentrating on the metropolitan D.C. area the last few weeks. This is a hot bed of computer activity right now, from the standpoint that everybody and his brother seems to be going into the business of telling other people how to use computers. Of course, none of these people have computers, but this doesn't seem to slow them down any. At first, this sounds like it ought to be good for business, but in the long run I wonder if it really is. In many cases, these "consultants" convince people that the only way to do a certain job is with a full-bore computer, when actually a relatively small digital system would solve their problem. When the potential customer then looks at the cost of the computer, he naturally comes to the conclusion that it is too expensive for his particular application, and turns away from digital techniques completely. This all points up the need for educating people as to the capabilities of digital techniques.

Some of my time in the last couple of weeks has been spent on a new version of the logic book. It is about half finished now, and I should be able to finish it up in the next week or so. I am hoping this can be formalized and printed up in the near future.

I am a little concerned with the number of minor goofs that have occurred recently in deliveries. Taken individually, they are all small, and few customers would get perturbed at them. Unfortunately, these things have a tendency to compound themselves and one or two customers get the total of all the little mistakes. I guess that you could say that this is a corollary to Finagle's first law; "If a piece of bread and butter is dropped, it will always drop butter side down."

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W. Farr

Button pusher for PDP-1 check out	25%
PDP-1 check out	25%
Punch relay transients	50%

J. Smith

In addition to our own wiring capabilities, it may become necessary to add on outside contractors to help us with our wiring load. Five contractors have been contacted to date.

We have a problem with the delivery of the major outside manufactured components, punches, memory stacks and readers. Yesterday we plotted our present delivery schedule of these components and found it to be quite inadequate. I have reviewed the situation with Henry Crouse and have given him a list of required delivery dates for each component. I have high hopes he will come through, as he has done so often in the past. Purchase requisitions have been written up to insure we will not have to face a similar situation in the future.

Our present Special Systems schedule indicates that we will complete all production wiring of Special Systems by November 3. I suspect John Fadiman will change the situation when he returns. Fadiman and numerous Special Systems orders have a way of showing up at DEC at the same time.

While we are hiring new personnel to increase our rate of productivity, we must continue to work on techniques and methods that will enable us to increase productivity with our present capabilities. I hope to be able to spend more time in this capacity with the addition to our group of a newly hired Production Control trainee. Present projects currently being looked into are as follows.

A. Faster etching process
B. Photo etching process
C. Multiple drilling of printed circuit boards
D. Dynasert automatic insertion of components

J. Cudmore

EN-2055	50%
EN-1026	20%
EN-1016	10%
Q.C.	10%
EN-1000	10%

Memory System 2008 has reached the check out stage. Many small problems have been ironed out and the system should be ready to go by the middle of next week.

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J. Cudmore (cont'd)

I have started to investigate a switch for the Mag. Tape amplifier to be used with the Rem. Rand format.

The 1540 Sense Amplifier and 1973 Memory Driver circuits are being analyzed in operating system.

L. Prentice

EN 2062	50%
EN 1027	20%
EN 1053	20%
EN 2065	5%
EN 1000	5%

This report really covers a four-week period rather than a two-week period. Shop drawings were issued to Colonial Engineering Shop on ITT prototype operator console on October 2. However, when we checked yesterday the progress seems to be considerably behind schedule and unless the painter can make up some of the time, this job will be at least one week late. They are to call us when any significant progress has been made, which will probably be during the next several days when the parts will be brought together and assembly started. Paint has been delivered to them and painting instructions. Paint chips and a sample of the brushed aluminum will be forwarded to them together with the drill jig for operator panel.

A call was made to Mr. Robert Smith of Lippincott and Margulies to advise him of changes, or proposed changes, to the Mag. Tape units which will be used in the ITT system. He requested three changes, which we have been able to incorporate into the design. Pictures will be forwarded to him as soon as the first units are complete. Also, any pictures that we may take of the prototype operator console for ITT to keep him fully informed as we progress on these items that are of consequence to Lippincott and Margulies.

A short conference was held with people from Lawrence Radiation Laboratory of Livermore, California in regard to a camera mounting on precision display unit. I believe all major mechanical problems have been resolved satisfactorily. The first of the two-bay display tables is now in assembly. Several small bugs have come up which need attention. These concern a few drawing changes and some assembly procedures. Revision to the Mag. Tape units was of such magnitude that complete drawings are required. The job has been held up until these prints can be released from Drafting. Release date for the first of these prints should be today. Details for conversion of EMCOR cabinets for PDP-1C-9 units are approximately 90% complete. These are all being made up in sketch form and released as fast as possible. Additional parts for EMCOR cabinets should be shipped from factory in Elgin, Illinois, today.

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K. Fitzgerald

EN 1056		10%
EN 1047		10%
EN 2062		10%
EN 2076		10%
EN 1000	Circuit board drill	30%
EN 1000	Island Console	5%
EN 1000	Supervision and misc.	25%

The first system (Memory Buffer 2007) utilizing the computer cabinet frames has been mechanically completed and is a very nice looking unit. It differs from PDP's in that it only uses a trim strip at the top and bottom of the cabinet and no trim strip on the end panels. The new door spacing that I mentioned in my last biweekly is also being used, and it works out well.

During the past two-week period, we have assembled from standard purchased parts an automatic circuit board drilling machine. Mechanically it performs well, but we still have a few bugs to work out before we can put it in production. The biggest problem to date has been trying to stop the dust from seeping between the stack of boards being drilled and adhering.

A method of mounting the new teletype punch to a panel and sliding the whole arrangement has been worked out, and three sets of hardware for this are being produced at this time. One of these punches will go on the Geo-Tech machine, one on the ITEK machine, and we will have parts available for our own machine in the computer room.

We have two customers at present who are interested in having the PDP control panel mounted as an island on the table, the same as the earlier model PDP's. If this becomes a reality, then it is also advisable to have the tape reader and tape punch both mounted on the surface of the table. Along this line, Scott Miller has drawn some design sketches so that we might get a better feeling for the appearance of such a unit.

It seems that there is still a great deal of confusion about the new standard colors for PDP's, so in the works at present is a new set of renderings for all of the possible combinations of cabinets, tables, frames, etc., with the correct colors called out. This information will be issued as a permanent memorandum for Distribution Lists A, B, and C, possibly within the next two-week period.

R. Doane

4 New 10Mc Modules	55%
Other 10Mc work	15%

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R. Doane (cont'd)

VHF	15%
Test Equipment	10%
Miscellaneous	5%

Test Data Sheets and tester design for the new 10Mc modules are finished, and the data sheets are in the process of being printed. The new burst generator converter for 10Mc tests has been tested, and two of the testers are built, with the other two on the way.

I finally got back to VHF for a short time. The new flip-flop has been seen operating with a 40Mc input prf, but the emitter-follower buffers oscillate loudly. The output appears to be a 160Mc sinusoid with hiccups.

In order to properly check the flip-flop, I need the new logic module, which is now about ready to be tried. Meanwhile Dave Denniston has asked a whole series of questions about the 10Mc line, and Barbera Stephenson lately has been needing similar data, so I am compiling old and new experimental data in a form that will indicate as many as possible of our customers' detailed questions. The number and complexity of possible interconnection geometries prohibts an exhaustive study, but I hope this data will offer a bit better guidance at least.

H. Crouse

Up until 4:30, this day, there have been a series of changes of delivery schedules in the major components we have on order for Memory Systems and Computers. I shall publish for those concerned a quantity and delivery schedule shortly.

New Books - October 1, 1961

"The Executive Secretary" by Marylin C. Burke, The Bureau of Business Practice

"Fluorescent Lighting Manual" by Charles L. Amick, McGraw Hill Book Company

"Elevators" by Fred A. Annett, McGraw Hill Book Company

"Cybernetics" by Norbert Wiener, M.I.T. Press and John Wiley & Sons, Inc.

"Sequential Decoding" by John M. Wozencraft & Barney Reiffen, M.I.T. Press & John Wiley

"Methods of Applied Mathematics" by F.B. Hildebrand, Prentice Hall, Inc.

"Technical Drawing" by Giesecke, Mitchell, Spencer, The MacMillan Co.

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H. Crouse (cont'd)

"Webster's New Collegiate Dictionary" by Merriam Webster, G. & C. Merriam Co.

E. Towle

Comments by Fort Monmouth on Classroom Modules and other DEC Equipment.

1. Mounting Panels cannot be interconnected but have to be connected directly to Power Supply.

2. The power cord attachment on the Mounting Panel is not long enough if the connection is going to be made directly to the Power Supply.

3. The lights on the flip-flops are not bright enough to be seen from the rear of the classroom.

4. Also, the blue symbology is difficult to distinguish at any distance.

5. In order to solve the problems of hanging and interconnecting the Mounting Panels, they are constructing a permanent arrangement. The 3 panels will be mounted in parallel on a large rack which has wheels. All panels will be permanently interconnected and plug into one Power Supply mounted at base of the rack. An arrangement of this nature will handle several Mounting Panels and have the advantage of mobility between classrooms.

6. They realize, of course, these modules are a new design and offer their comments only as constructive criticism.

The Signal Corps School at Ft. Monmouth is completely sold on DEC Equipment (despite poor delivery) and have indicated their thoughts to me. They explained an experiment that recently was performed. One of our Laboratory Modules was dropped from a height of 6 feet onto a tile covered cement floor. The impact dented the tile and laid the transistors over, but when the unit was inserted in the mounting panel, it worked perfectly. This experiment was worth more to us than several sales calls and left an outstanding impression on the people at the Signal Corps School.

Dan Freedman, Head Instructor at the Signal Corps School, spent several days at DEC last week during the final checkout of the Buffer Memory System. He was very pleased with the operation of the system and is extremely anxious to include it in his training program.

Most of the above comments do not directly involve the Sales Department, but they were discussed at some lengths, and I thought other people at DEC might be interested!

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G. Bell

I visited the United Kingdom during September 24-October 7 for the purpose of visiting some ITT installations, seeing the ATLAS, and going to the British Computer Conference. I reported on some of the interesting machines I saw to people in the computer group here. The highlights of British design include:

1. Manchester-Ferranti-ATLAS

ATLAS is a large (new generation) machine. It has a 48 bit word, 2 μsec memory cycle, and allows multiple users through a unique drum system. Of special interest is an 8K-48 bit fixed core (slugs) memory with a 0.2 μsec access (and 3 μsec cycle). It is used for storing fixed programs (the true software) and routines such as log, exp, sin, etc. The machine is generally great. Ferranti's part in the operation will be the development of the production machine from the prototype. Prof. Kilburn, at the University of Manchester, headed the design.

I visited Ferranti and watched them assembling the first ATLAS, which will go to the University of Manchester. Ferranti machines are probably the best in Europe. The people there gain from being near the University of Manchester (personnel and ideas). Ferranti's cabinets are outstanding, and their modules are nicely made. The modules generally consist of printed circuit boards which are mounted in a molded plastic rig. Ferranti has developed 5 megacycle circuitry for some of their work and this is used in the ATLAS. Ferranti component packing density seems to be about the same as ours, although they do use larger boards in the ATLAS. As a historical note, the people at Manchester got some of their initial impetus from the TX-2 group of Lincoln Laboratory. Ferranti has sold another ATLAS to the English Atomic Energy. In summary, the ATLAS is vast, and, I believe, good.

One other thing of interest is the Ferranti fixed store. It consists of one bay about 5 feet high, with a cycle time of two microseconds and has 1024 words of 24 bits each. The thing was very nicely packaged, and I was very impressed with the way that the trays pulled out and information changed in a clean fashion. I would really like us to make a fixed store, but right now it seems a little hard to justify from a market standpoint.

I spent about three days at the Computer Show and Symposium and made the mistake of going to one of the Symposium sessions, which was exceptionally dull. I did, however, enjoy looking at all of the equipment and spent quite a bit of time examining the devices in detail.

Also worthy of note were the machines built by English Electric. English Electric is sort of hooked up with RCA and are building the RCA 601 which they call a KDP 10. The main thing that English Electric gets from RCA is the know-how to build their tape unit, the RCA card reader-punch and the printer. What was interesting at English Electric was their KDN2, an 18 bit machine (I don't know who ever built an 18 bit machine). Unfortunately it isn't too good, since they have a core memory of 10 or 15 microseconds and then

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G. Bell (cont'd)

mistakenly put a delay line arithmetic unit to do an add in about 70 microseconds. They didn't quite know what they were going to do with the KDN2 or what it was good for except process control. (I think process control is the thing that everybody sort of describes their machine is good for if they can't think of anything else).

The machine that was extremely interesting was their KDF9. This machine had 48 bit word and 6 microsecond cycle time and featured Polish notation for programming language. Polish notation is a language similar to Fortrand, and one of the nice things about it is that if you have a set of push-down registers for the arithmetic element the thing can be implemented quite nicely, and this is what they have. They also have a set of push-down registers (nesting store) which handle subrouting returns. Both of these nesting stores are 16 registers deep. The nice thing about the machine is that the words are used very efficiently, since each of the 48 bit words is broken up into syllables of 8 bits. The first two bits of the syllable determine whether this is a single, double, or triple syllable instruction and then it looks on when it needs to. Instructions carry over from memory word to memory word if need be. One-half, single, and two word floating points were built in.

R. Hughes

EN 1027	1%
EN 1000	9%
EN 1010	20%
EN 1011	30%
EN 1017	30%
EN 1022	10%

Components - Bell Labs buy our mounting panels. Then they remove our Amphenol connectors and install a U.S. Component UPCR-DW-22 wire wrap receptacle. We will price up a mounting panel for them.

The new computer, which is being checked out, had 12 bad back panel diodes. I would suggest we stop checking these panels out with a buzzer.

Texas Instrument stopped making 2N1908 transistors about 3 weeks ago. We use a selected version of this device in our Model 62 Current Drivers, so now we have no transistors for this unit. They are going to start production up with a modified device which may be slower in speed. We will know the answer in a week whether we can use these devices.

Texas Instrument has brought out their version of an FSP-2 (Fairchild). It costs about $33.50 in small quantities and as it is equal in performance to the FSP-2, we may use it and save about $20.00 per transistor.

The capacitors which we use for decoupling in computer mounting panels look cheap because

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R. Hughes (cont'd)

they have a yellow wrapper. We are switching to a clear mylar wrapper to make it look better.

The 6.8 MFD 25V aluminum electrolytic capacitors, which we used to use for decoupling regular mounting panels and in various circuits, have been replaced by a 6.8 MFD 35V 20% tantalum capacitor. The aluminum one gave us some trouble.

A survey of test specs is being made in order that we may have standard specs and tests where we should. I.e., VCE SAT measurements are different for identical transistors.

A new F_t tester is being constructed which will be more accurate than our old unit. This measurement tells us whether a transistor has sufficient speed to operate in our circuits.

We are about to buy some automatic diode and transistor testers from Teradyne, Inc.

Shortly we will bring out a 722 Power Supply. This will be like a 721 but will also supply +10 volts at up to 8 amps. Customers will be able to trade off +10 and -15V with a maximum of 130 watts out of the supply.

A new level amplifier has been designed which will be capable of switching its output between 0 to +6.5 volts and 0 to -6.5 volts. It is a 1687.

Getting transistors to saturate to a particular degree in circuits is often a problem. One reason for this is that the manufacturer doesn't specify his transistor where we use it. They drive it from a current source, and we drive it from a voltage source. Under these conditions, all we can do is use transistors with high gain and hope they will pass our tests, but finding bad transistors in our circuit test department is expensive. If we take a new approach and make a Thevenins equivalent to our circuit and convert it to a Nortons equivalent and get the manufacturer to test our transistors this way, we can guarantee that they will pass our VCE SAT specs.

We would also test them in this way on incoming inspection.

R. Whipple

MT1516E	15%
MB2007-1	8%
Tester Development	27%
2211A	25%
MT1519	10%
ME2207	10%
Interview	5%

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R. Whipple (cont'd)

The Special Systems group is plugging away at its mammoth schedule fairly well. Next month will be our record work load requirement, since we have seven systems scheduled for delivery. There is no doubt in my mind that some will be late because we do not have the manpower to assemble all of them, even if we were able to receive all the required mechanical parts and modules as they were originally scheduled. After November, however, I am sure we will be back in the groove on future system deliveries by using better scheduling techniques. I am also trying to hire an individual who will be called a Special Systems Engineering Planner, for lack of a better title. One of his primary jobs will be in making certain all of the necessary information is generated as required by production. At present we are sorely lacking some system parts lists and assembly information.

Recent complaints from Ampex have definitely made us aware of the necessity for us to come up with some terminating techniques for our transistorized drivers. I have been working with Dick Best on this problem, and it looks like by next week we will have some very valuable information to pass on to our customers.

For those people who are interested in what the MT1519 might be, it is merely a MT1516 with a couple panel changes as desired by Ampex and one switch addition. We will probably never make another one, except maybe for Ampex.

S. Lambert

The call for maintenance programs has been ringing in my ears for the past few months. As a result, many diagnostic programs have been generated. The following maintenance and maintenance aid routines are now documented.

Diagnostic Routines
Checkerboard for 1,024 and 4,096 word memorys
Memory address test program
Read Binary Test
Combined Reader and Punch test (Alpha)
Instruction test programs (10 routines)

Maintenance Aids
TC-FRAP
Read-In-Mode Simulator
Octal Dump and Read-In-Mode Punch

A program format for PDP-1 maintenance programs has been laid out, and it is expected that all persons involved with such programming will adhere to the simple rules mentioned in Memo - 1127.

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S. Lambert (cont'd)

Recent programs not documented, but available, are:

Maintenance Compiler - (for putting several independent programs under typewriter control)

Alpha read - (IBM card code converter to concise code)

Random Number Generators (pseudo)

Binary to Decimal converter (5 digits decimal)

Punch Out English Title Block - (alpha characters punched on paper tape)

Concise to Flexo converter

The Advertising Department now has one of three programs for PDP-1 mailing list application. This routine: (1) reads two IBM cards (2) translates the information from card to machine language (3) checks to be sure that the proper card or set of cards was read in (4) checks parts of card one against card two (5)if the check is not valid, the difference is displayed via the online-typewriter (6) if card one and two check, the two are combined and read onto mag. tape for future reference (7) the person's name and address appearing on the two cards are translated into Flexo code and punched on paper tape (8) the tape is read through Flexo for type-out of the mailing list.*

*As soon as the Analex Printer is attached to PDP-1, the Flexo will be obsolete as an output device.

Much of my time in the past week has been involved in writing a subroutine for mag. tape control 51 that simulates many options of control 52, such as scatter read and gather write operations. This program is yet to be tested but should be working within a week.

R. Best

Several new 10 megacycle circuits have been introduced.

A 6101 is an Inverter package selling for $192. It contains 13 inverters. Internal connections for these inverters were specified by SEI. It is not expected that this will be a very popular item.

A 6106 is the 10 Megacycle equivalent of the 1103 and 4106, 6 inverters in one plug-in unit. It sells for $138.

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R. Best (cont'd)

A 6160 is another Logic unit that contains 12 inverters and some diode logic. This is a very special purpose unit for SEI that probably will not be very popular. It sells for $228.

A 6208 is a Dual 10 Megacycle Flip-Flop selling for $230. Both flip-flops have complement inputs but no P pulse outputs. One flip-flop has an inverter wired to the set and to the clear input terminals. The other flip-flop has none. They both have direct set and clear and normal set and clear inputs.

A 4157 is a special purpose Diode unit for SEI that is not expected to be popular because of its special internal connections. It contains 8 transistors and sells for $96.

A 1687 is a new Level Amplifier containing three channels. Both the upper level and lower levels are determined by external voltages. The upper level can be as great as +6 1/2 and a lower available as negative as -6 1/2. It can supply 10 ma at either level and will have a rise and fall time of less than 0.1 microsecond. A lower level can be made more with negatives than with -6 1/2 if less than 10 ma is needed.

A 743 Power Supply is a dual 15 volt supply similar to the 741 except that the current rating is 1 to 8 amps. It will probably replace the 741 one day.

A 728 is a 17-inch computer-style Power Supply that will supply 8 amps at -15 and 1 amp at +10. It will probably replace the 729 some day.

D. Wardimon

Power Supplies: 722, 728, 763, 767, 771	40%
Indicator Drivers: 4689, 4690 - Tester and Data Sheet	5%
Level Amplifier: 1687 " " " "	10%
Testing the model of Pulse Amplifier 4604	13%
Testing the model of Level Amplifier 4686	5%
PNP and NPN FT Tester	12%
Miscellaneous	5%

A. Falco

EN1000	25%
QC	15%
EN1010	60%

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A. Blumenthal

1020 100%

PDP-1C-6 (CRC) was sent to Adams Associates on Friday, October 6, for a few days use in conjunction with an educational program. The machine was operational although checkout was not complete. The last week of test was extremely unproductive because of modifications made to all three in-out devices which entailed both logic and wiring errors. The machine is now back in the house for completion of checkout.

The three major in-out devices on PDP-1C-7 (BBN) are now operational. The sequence break system and mag. tape are the last remaining major areas. The final indicator and control panels have not yet been installed.

The documentation of step-by-step production test procedures is progressing with the addition of procedures for cycle zero and the defer cycles.

A meeting with ITT people this week has led to arrangements for them to send two engineers here to work on test of the first production ITT machine. This is being done to assure their maximum familiarity with the machine in preparation for its maintenance. It has also been arranged for an ITT man to spend a couple of days at Soroban to acquire an understanding of the Computerwriter and a similar arrangement will be made with Teletype in connection with the BRPE punch.

J. Atwood

Steve Lambert has completed the mailing list program for PDP-1. We can read the tab cards, check them for accuracy of coding, store the information on mag tape, punch a name-and-address tape for the Friden (either coincidentally or by reading the mag tape), and get a read-out of any incorrectly coded cards on the Soroban. Line spacing on the punched tape can be varied for use with either of the two types of pressure-sensitive, pin-feed labels or with pin-feed envelopes which we have on order.

The employee publication is going together on sort of a high-low priority basis. This type of deal takes a lot of time the first time through, and while we are anxious to get it out on schedule, it has to be fitted in between the income-producing jobs. We have high hopes that the publication will be a real credit to the company, even if it is completely homemade.

Copy for the 4000 Series catalog is being set, and this should finally be on its way to press this week. New ideas for the Logic Handbook are coming in from all sides. Luckily the number handed out at the West Coast shows was so small (in comparison with other shows) that we got back a goodly supply to tide us over.

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J. Atwood (cont'd)

We're at the North Carolina IRE Symposium in Greensboro Thursday and Friday, October 19-20, and at the Concord Industrial Fair Friday and Saturday. Next up, the magnetics conferences in Los Angeles and Phoenix the first two weeks in November and NEREM November 14-16. Then it's on to EJCC in Washington in mid-December. Next year's show schedule looks like a busy one, what with some 20 shows from Los Angeles to Munich pretty well decided on.

Mailings currently under way include announcements of the opening of the New York and Washington offices (now that Dave and Bob are getting caught up on the initial flow of calls) and invitations to stop by our booths at the magnetic shows.

R. Mills

Work has progressed on the Accounting and Cost System, and it is expected that a trial run will be made using one department within a few weeks' time. It might be of interest to describe briefly the over-all concept of this new system.

Our goal is one of recording, reporting, interpreting and analyzing our expenses by functional areas. In order to do this, we must accumulate records for each type of expense for each area, report them to the Area Manager in such a way that he can use them to control, versus the traditional concept of straight reporting. A provision is made for charging any area from any other area for services purchased. In order to accomplish our goal, we created a new chart of accounts for our balance sheet, profit and loss, inventories, and expense elements by area. The net result of all this will be to allow the Area Manager to more closely control expenses charged against him. A supplement to this system is a separate job cost system for areas other than manufacturing, such as selling, administration, advertising, research, and engineering and development, which will enable the Area Manager to set up a job for accumulating costs on anything that he deems important in his area operation.

This is a very condensed statement of our progress and goals, which will be expanded in future reports.

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S. Olsen

Friday, September 15, we held a successful Sales Meeting with our three East Coast Offices. Some of the topics discussed were:

1. The need for more basic literature in easy-to-read form. In general, we agreed that perhaps the Logic Book could start somewhat more basically and work gradually into DEC logic symbology.

2. A means of notifying new customers of the Sales Offices, which they can call upon for help, was the next topic. The methods we decided to employ are:

    1. A form letter offering help to customers, schematics and standard literature to be sent to purchasing with the request that the information be passed on to the engineer concerned.

    2. Stickers indicating locations and phone numbers of the various DEC Offices be produced and attached to bubble packs.

    3. Suggested that in conjunction with the above, Jim Myers' department indicate new customers on sales office copies of orders.

3. We discussed the possibility of producing stickers of each module for logic diagrams, similar to the "Digital" nameplates used on our drawings.

4. A suggestion made that furnishing high quality hand-outs could be used effectively to replace a greater number of courtesy visits, thereby reducing sales costs.

5. The marketing of new racks for systems (similar to those now being used on PDP-1) introduced at this meeting.

6. Another "future" change - all modules will contain glass boards in the future. However, during transition stage, any customer desiring "all glass" will be charged $5.00 extra per board while the phenolic board type is still stocked.

7. Another important item - the need for a new form to report quality defects concerned in the field. When the new form is introduced, 2 copies will be forwarded to the Sales Office in Maynard and 1 directly to Quality Control.

8. The need for a maintenance setup for the various Sales Offices was determined, and agreed upon.

9. Discussed need for possible changes and/or additions to our symbology to facilitate production of logic diagrams by both our own Applications Engineers and users of DEC equipment.

10. The establishment of a system for sending out all application drawings made up in the Home Office was introduced. This would result in each Sales Office being able to keep its drawing files up-to-date.

11. Also, the need for and means of checking out members of the Sales Department on our

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S. Olsen (Cont.)

PDP-1 brought up. This particularly applied to those people working out of branch offices.

The meeting ended with the suggestion that there should be another Sales Meeting about two months from now and every other month thereafter to help DEC Sales Department function to its fullest.

I would suggest that if any of our staff members could spend the time, it would be very interesting to go through some of the Sales Call Reports that have been pouring in lately. If all this grand work pays off, Maynard Sandler had better "WATCH OUT."

This Sunday, I leave for Toronto, Canada, for the Canadian IRE SHOW, and next Sunday I head to Chicago for the NATIONAL ELECTRONICS CONFERENCE. That's Show Biz!!

D. White

EN 1000	2.50%
EN 1011	5.63%
EN 1014	51.25%
EN 1017	2.50%
EN 1019	3.75%
EN 1048	1.87%
EN 2056	2.50%
EN 2060	30 %

As the time for the 2301 Scanner draws closer, I am finding myself more and more involved in systems work. I'm presently working on a circuit to be used with a pair of Digital-to-Analog converters which will form an analog voltage proportional to the square of the incident number. This circuit might also be used to form the analog product of two digital numbers. It is an amplifier which will supply a variable reference voltage equal to the input voltage. More info when the design is final.

The scanner itself is well under way. All major parts are on order, and I hope we will soon start getting mounting panels, etc. If you soon see a closed-in area somewhere in the vicinity of systems, it will be my doing. The cathode-ray tube we will be using has a relatively low light output and burn easily, so I'm going to have to make myself a dark corner in which to hide.

A. Falco

EN 1000	10%
EN 1010	65%
EN 1011	10%

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A. Falco (Cont.)

EN 1048 15%

The redesign of the front panel for the 2303 Burst Generator has been completed, and prints have been forwarded to production. With the redesign, which has been made for easier and more efficient operator handling, the Burst Generator has been assigned a new number and is now the 2309.

ABCD ladder number 1566, which uses three complete decades and an optional most significant bit, is in process and the production of a model for Engineering test is in the making.

At the present time I am working on the 1556 Slice Amplifier. A customer request to speed up the Slice Amplifier is the reason for this project.

W. Farr

Computer Checkout	50%
Synchronous Pushbutton Simulator for checkout	50%

H. Crouse

Bob Blackwood is expediting all production items and Debbie Lloyd, administration, engineering and major components (memory stacks, etc.). If a need for follow-up arises in your area, please contact either according to their responsibilities. Priority is given to orders only if we know they are priority.

The memory stack delivery problem has not improved in the last two weeks, RCA delivered the last three but two were returned for repair. One has been repaired and is due for return September 28, the second is estimated for Wednesday October 4. General Ceramics expects to ship all four by September 29.

Three 16 x 32 x 16 stacks were ordered from Fabri-Tek for D. Whipple. The price of these stacks is $165.00 less than an RCA stack using RCA cores.

Our quotation request system has been devised and the format of the form will be completed shortly.

We are updating the catalog files, requests are going to every vendor now in the files for their most recent catalogs. If you are working in an area that has no or little information available in our files, please advise Joanne Terrasi or myself.

The following books are now available in the library:

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H. Crouse (Cont.)

"Lets Get Down to Cases" - by Lydia Strong - American Management Association

"The Cost Minded Manager" - by John D. Staley - American Management Association

"Developing Executive Skills" - by Harwood F. Merrill and Elizabeth Marting - American Management Association

"Optimum Use of Engineering Talent" - by Jerome W. Blood - American Management Association

"Management for the Smaller Company" - by Elizabeth Marting - American Management Association

"Selection of Management Personnel" - by Joseph M. Dooker and Elizabeth Marting - American Management Association

"Purchasing Department Organization and Authority" - by George H. Haas, Benjamin March, E. M. Keech - American Management Association

"Management Talent Search" - by P. W. Maloney - American Management Association

"Management of the Physical Distribution Function" - by Daniel C. Cady - American Management Association

"Managing the Materials Function" - by Daniel C. Cady - American Management Association

"Labor Turnover: Calculation and Cost" - by Frederick J. Gaudet - American Management Association

"The Commercialization of Research Results" - by H. R. Dittmar - American Management Association

R. Savell

EN 1015	5.3%
EN 1022	6 %
EN 1024	6.6%
EN 1025	5.3%
EN 1027	22 %
EN 1038	5.3%
EN 1048	1.9%
EN 1058	6 %
EN 2062	2.5%
EN 2065	32.1%
EN 2078	2.2%
EN 2098	4.8%

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R. Savell (Cont.)

Work on the two displays for Itek and CRC is proceeding as fast as possible. It looks as if both units will be practically complete by the end of next week.

Drawings of the character set for the LRL Anelex High Speed Printer have been received and forwarded to LRL for approval. The circuit design for the Hammer Driver module is being laid out and is to be ready to construct next Friday.

Much time was spent with people from LRL during the past two weeks discussing specific details of their peripheral equipment and answering questions in detail about the timing of all this equipment and the instructions which control it. LRL is preparing a huge chart which contains all this information and has promised to let us have copies. Since they are getting almost every piece of optional peripheral equipment we offer, this will be very useful to us.

Work has commenced on the special logic panels for the Geotech PDP-1.

D. Denniston

The past two weeks have been fairly busy ones as far as the NYO is concerned. I have managed to fit into my schedule visits to American Type Founders in Elizabeth, N.J., Sperry Gyroscope in Great Neck, N.Y., IBM in Yorktown, N.Y., The Hudson Labs. of Columbia University, Information Storage Systems in Pompton Lakes, and General Precision Labs. in Pleasantville, N.Y.

In reference to Sperry Gyroscope, I visited them concerning a recent request for quotation. It seems this request was not only very vague, but it omitted several things. As this could be a very large order, I'd like to think I've interested them somewhat in using DEC modules. We will be competing with (1) General Applied Science (2) Computor Techniques (3) Ransom Research in California (4) Navcor and (5) 3C.

Sperry is very concerned with two things: the first being the company reputation, the second being the delivery time.

It has been brought to my attention by the people at Ft. Monmouth that there is no means of interconnecting power from one Classroom Module Mounting Panel (901-C) to another. This is quite undesirable in the opinion of the Signal School people and I will have to agree with them on this. This imposes a serious limit on the number of panels that can be connected to a 721 supply. Also, they are confused as to how to try to interconnect the panels mechanically. It is their suggestion that some accessory be made available to allow the panels to be stacked together so they can be moved about as a unit. Perhaps there is a simple bar of some type that could be marketed for the purpose of strapping one panel to another.

I have also spent an appreciable amount of time talking to customers that are presently slightly

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D. Denniston (Cont.)

disheartened about the late delivery of their orders. I hope that this small amount of "crying in harmony" with these people will cause them to look on us in a somewhat more favorable manner, and I will continue to try to do all I possibly can for them.

D. Wardimon

Change Notices	30%
1022 Power Supplies	40%
1802 Relay Tester and Data Sheet	5%
4868 Level Amplifier Tester and Data Sheet	10%
Miscellaneous	15%

R. Doane

10 Mc Models, Testers, and Data Sheets	85%
Miscellaneous	15%

The four new 10 Mc system modules for Scientific Engineering Institute cannot be tested on the existing 10 Mc Burst Generator. A converter, by means of which any 5 Mc Burst Generator can provide timing signals for the generation of 10 Mc bursts, has been designed and built. Special testers plug directly onto the converter, and modules to be tested plug into the testers. Eventually testers can be provided to test all of the 10 Mc modules we make, so that the old 10 Mc Burst Generator will not have to carry a heavy work load. The new method provides for much greater flexibility and ease of servicing, while still allowing signal wires to be kept short.

L. Cleary

EN 1020	100%

During this period I have been writing some programs that will be used to check out future computers. A multiply and divide step program has been finished. A reader program is in the initial phase.

R. Tringale

1516 C	50%
1516 D	50%

The final checkout of the 1516 C was completed September 22 and shipped to Ampex Int. in California.

The final checkout of the 1516 D is almost complete and should be on its way to RCA on schedule.

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R. Lassen

The Tuition Refund Plan announcement will be distributed Monday, October 2. It will describe the operation and requirements of the plan and will urge our employees to select schools and courses with careful thinking. We have also urged employees to seek the help of their respective supervisors or department heads in setting up their course program.

We are compiling editorial material for the first edition of our new company newspaper. However, it looks as though the first issue will not be published until October 20, subsequent issues are scheduled for publication on the 20th of each month. We again ask for your ideas and contributions which will be of general interest to all employees.

Preliminary recruiting literature has been sent to Tufts, Northeastern, M.I.T. and Worcester Polytech. The current recruiting schedule for these schools will start in the latter part of October and will continue to the first week of March. We will be on the lookout for bright young men who have an interest in our various areas of engineering.

Interviewing over the past two weeks has been heavy. However, results have been fairly good in some areas and disappointing in others. Pending physicals we will send four new men to the Production Department during the week of October 2. These men have had some electronic school background and are starting at trainee level. We have also hired several girls for assembly, a sheet metal trainee and a janitor. Full scale recruiting is on for Applications Engineers, Cost Accountant, Secretaries, Production Control Trainee, Mechanical Draftsman, Technical Writer, Graphic Illustrator and an Inventory Clerk. We have several possible candidates for a few of these openings but have made no decision.

Since the company newspaper will contain all of the new additions and personnel changes, we will no longer include them on this report.

J. Cudmore

ME 2210	50%
MS 2008	20%
Q C	10%
MB 2007	20%

The Memory Exerciser 2210 is on the air. The Memory System 2008 - 4096 x 38 (SEI) is being checked out. It has been checked as far as possible, and we can't proceed until we get two stacks. The RCA stacks were received but have been shipped back because of an open inhibit line in one and an open address line in the other. These troubles are in the stack itself and not in the wiring from the stack to the plugs. The stacks all contained a wiring error which was on our drawings, and this has been corrected.

I have been giving John Mackeen help with the checkout of the Memory System used in the MB2007

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J. Cudmore (Cont.)

and that finally appears to be working.

I have been working with a technician on the ME2210 and it now is apparent that a large number of our new technicians have no feeling for the logic in the machines. Perhaps a formal or informal course in DEC logic should be given for their benefit.

R. Mills

Due to our continuing expansion of activity, we are converting from our present manual to an IBM basis of preparing payroll checks. We included a notice in last Thursdays checks about the change-over in order to smooth the transition and avoid any misunderstandings. We have reassigned clock numbers and changed the method of computing overtime. We haven't as yet received the IBM checks, but the calculations will be completed by IBM Machines for the payroll to be paid October 5th. This system will greatly simplify our weekly payroll duties and speed up considerably the preparation of quarterly and annual tax reports, W-2's and other payroll reports.

B. Stephenson

The Digital Logic Handbook Supplement describing the quadruple flip-flop applications is finally out in all its glory and all its errors.

All the copy and all the logic diagrams have been turned into the Advertising Department for a new 4000 Series brochure which will describe all the 4000 Series units which are now listed in our short form catalog as well as several which are not. These extras include the 4682 positive solenoid driver (output driving ability up to 100 milliamps); the Model 4604 Pulse Amplifier described by Dan Wardimon in the August 18 bi-weekly; the Model 4686 positive level amplifier described by Dan Wardimon in the September 1 bi-weekly; the Model 4139 diode unit with eight 2-input AND gates ORed together; and the Model 4141 diode gate which is similar to the 4139 except that the interconnection between the two levels of logic is available on pins inside the board so that it can be connected in any of a variety of different ways. The descriptions for several of the other units have been expanded to include more detailed information on the load presented by the input, output driving ability, and delay times.

This new bulletin will also avoid referencing output driving abilities from one unit to those of any other. The reason for this is it was discovered that the new transistor used in the 4105 would allow us to state that the transistor could conduct up to 20 milliamps (instead of 17). However, we were not able to do this because of the large number of units which do not use a new transistor but were referenced to the 4105 for driving ability. By the way, the 4667 level amplifier package also uses this new transistor and will now be rated in the literature as being capable of conducting 20 milliamps.

Logic diagrams also have been prepared and turned over to the Advertising Department for all units

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B. Stephenson (Cont.)

now on our short form catalog. These will probably be printed up on a special sheet and we hope that in the not too distant future we will also be able to have technical descriptions of all these units and more detailed descriptions of many of these special input-output devices, amplifiers, etc. This is a big project because it includes all of the following units: 1113, 1115, 1117, 1204, 1501, 1667, 1130, 1540, 1547, 1550, 1554, 1555, 1556, 1561, 1562, 1563, 1564, 1516, 1669, 1671, 1672, 1678, 1682, and 1703, as well as the new units not yet in the short form catalog. Some of these are quite straightforward units but unfortunately some of them aren't and any description that we could receive from the engineers that designed these various units would be greatly appreciated.

Jack Dennis from MIT is going to purchase a 32-channel digital-to-analog converter system from us. This will be used with the TX-0. The system will be known as the Model 2311, 32-channel DAC. It will use one new plug-in unit which is the Model 4218. This is identical to the 4213 except the P1 output and the shift ONE and shift ZERO inputs are being replaced by conditioning level inputs for the clear side of the three flip-flops where this terminal is not presently available. This unit can then be used for jam transfer, shift left, or shift right operations. The price will probably be the same as the 4213.

Quite a few other AD and DA applications have come in recently. These include Dr. Stark's group from MIT, who is interested in a two-channel A to D and a two-channel D to A converter for use with a PDP-1. Mr. Fred Smith of Minneapolis Honeywell in Minneapolis visited here this week to discuss a three-channel A to D converter system. The group from Lincoln Lab., who is building their own computer from our modules are also interested in AD and DA attachments. They presently have some of our modules on loan so that they can evaluate some of the characteristics we are not able to give them yet. Mr. Bostick of Applied Research Associates of Texas Inc. is also interested in attaching an A to D converter to a system which he is building from some of our modules.

J. Atwood

The last Biweekly was the most worthwhile in many months. Because of its size, it didn't get out on time, since it had to be sandwiched in among the other priority jobs we process. (Strange as it may seem, there are operating areas in the organization where virtually every project is "RUSH" and where the repetition of this designation is not considered sufficient grounds for inaction.) We hope to do better with this one, especially if the handwriting improves.

Two mailings totaling approximately 5,000 pieces (about half of these addressed to people not yet on our mailing list) went out last Monday in connection with the I.R.E. Canadian Electronics Exhibition and the National Electronics Conference. These should help to promote booth traffic and to uncover some new prospects for Digital products in Canada and the Midwest. And if we can

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J. Atwood (Cont.)

keep the press rolling this week, the general mailing will be on its way.

Run-offs of the complete mailing lists for their respective areas have been forwarded to our district men and our sales representatives. These listings included all available information on the prospects and their interests as entered on our tab cards. This should make sales prospecting a bit easier.

The reworked PDP Manual and Brochure are in, and the revised PDP Instruction Card should be delivered momentarily. Top priority projects include the new 4000 Series Catalog, the expanded Short Form Catalog, and the fourth edition of the Logic Handbook. Also being rushed through are reprints of the MT 1516 Manual and the new Training Module and Classroom Module Catalogs.

Two small shows have been added to the fall calendar. The North Carolina I.R.E. Symposium and the Concord Industrial Fair are both scheduled for the third week in October. Bob Beckman will man the new exhibit at Greensboro, and we hope to be able to get our 20-foot booth and a working computer into the Concord event. The latter "show" is basically a vocation guidance project for the benefit of secondary school pupils in the Concord-Carlisle school district - non-commercial but good public relations.

An effort is being made to establish a schedule which will allow us to move regular monthly projects through the shop on a more orderly basis. Such things as the general mailing, product publicity, space advertising, and the employee publication, for example, can be be handled more efficiently and with better results if we can keep them from piling up in typing, at the camera, on the press, or in the mailing section. We hope this type of scheduling will let us keep pace with the growing demand for service without completely overloading our hard-working crew.

R. Best

We have two new versions of the 4202 Dual Flip-Flop. The 4202 A is 1/2 of a 4202; Flip-Flop B is the only one included. The shift right input terminals are the terminals that normally are the output terminals of Flip-Flop A. The 4202 B is a 4202 with shift right path changed so that the shift right input terminals control what shifts into Flip-Flop B. Flip-Flop A can shift neither way.

The 4689 Indicator Driver will have the same pin connections as the 1669 Indicator Driver but it will be able to drive up to 100 milliamps at up to -20 volts. The input load will be 2 base loads. The price is $62.00. The 1677 is a 5 megacycle equivalent to the 4677 single ended bridge. Four circuits are in the module and the price is $140.00. It is intended for driving fast digital-to-analog converter made of metal film resistors for a fast digital-to-analog conversion. The price has not yet been established. The 4700 Printer Buffer Element is being designed. It will be on a plug-in unit frame that is twice the length of our standard plug-in unit.

The 4677 A Level Amplifier is like the 4677 except that the transistors used are Philco Type T1796.

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R. Best (Cont.)

These transistors have a much lower saturated voltage drop and should be used whenever a real precision voltage is required. The price is $100.00.

The 4604 is a Pulse Amplifier with three pulse amplifiers in the module. It is a pulse standardizer; that is, it may be triggered by a narrow or a wide pulse and it will always put out the same standard width pulse. There are a pair of terminals brought out to the plug for each amplifier and if these terminals are shorted together the standard pulse that it generated will be one microsecond long. If they are not shorted together the pulse will be 0.4 microseconds long. It can be triggered by a positive or a negative pulse or DC level. The price is $92.00.

The 4686 is a Positive Level Amplifier similar to the 4667 except that the output voltage is 0 to +20. There are only five circuits on the card because one pin is needed to bring in the +20. It can be used to generate +10 by bringing +10 to this pin, or +20 can be brought in and the diodes can be connected to some intermediate voltage. The price is $70.00.

The 4218 is a quadruple flip-flop with all the read-in gates brought out. There is one Clear terminal and one Pulse Inverter input terminal. The pulse inverter samples the positive capacitor-diode read-in gates. The price is $96.00.

E. Harwood

My Biweekly Report actually takes in four weeks instead of the usual two. I'll begin with a short resume of what happened this past month:

Due to a great effort of all services of the company, we were able to ship both the ITT and the MIT machines on schedule. The ITT machine went right down to New Jersey and the MIT machine went out to California for a show. It came back from California and was subsequently shipped to MIT where it is now operating 24 hours a day.

ITT Installation at Paramus, New Jersey

The only real damage to the machine during shipment was the bending of the bottom plates due to an insuffieient number of casters being on the machine. This is being remedied by putting casters on all positions on all bays. As far as the electronic portion of the machine went, we found one shorted wire and after this was fixed, the machine was able to run programs. We will have to make another trip down to ITT to actually complete the installation. This includes putting the extra casters on, installing a new operator control panel, installing a new in-out indicator panel and doing some touch up on some of the paint. We also plan to send new long doors down to replace the short ones. This will mean taking the cables out of the frame through the fan holes instead of under the short doors.

MIT Installation

Actually the MIT machine has not been put in its final area yet. It is presently in some professor's

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E. Harwood (Cont.)

office where they are very cramped but able to run the machine. As soon as the room is finished, it will be moved into the new area. We made one trip down to MIT to install the doors and check it out and it seems to be working well.

CRC Machine - At present the CRC machine is only lacking the in-out indicator panel and a few odds and ends of hardware. We have all the electronics tied in and it is being checked out by Al Blumenthal's crew. We expect this machine will be able to be shipped on schedule.

BBN Machine - The BBN machine is still lacking a memory module and console and an in-out panel. The Sequence Break System is being built in the shop and we should have it in a few days. There will be some extra cabling involved for the Sequence Break System and we will do that upstairs. All plug-in units have been ordered including those for the Mag Tape and Sequence Break System.

The next machine to come into the assembly area will be the ITT production #1 and we expect it will go on schedule.

K. Fitzgerald

EN 1000	20%
EN 1027	20%
EN 1053	40%
EN 1059	10%
EN 2052	10%

We have recently added another person to the Machine Shop Personnel so that we now have three full time employees and one Northeastern Cooperative student presently working in the shop. These people have been averaging approximately 15 hours a week overtime in order to maintain the schedule necessitated by the numerous quantities of small parts that must be produced for Systems, PDP's, and regular production work. Because of this increased load on the shop I have had to spend more time in Supervision and scheduling.

Bob Savell has discovered a problem on the focus coil and yoke arrangement for the display which has necessitated changing the method of centering and holding the focus coil. We have accomplished this by adding three set screw to the assembly so that it can be positioned more easily and then firmly locked in place. We are in hopes that this will solve his problem and therefore eliminate the necessity for redesigning the whole assembly.

It has been decided to follow the recommendations of Lippincott and Margulies on the door arrangement for the ITT computer, on all of our computers and systems. This necessitated the redesigning of doors, method of hanging, and trim strip mounting assemblies. Because of the load presently on the drafting room, we have not been able to get these design changes made on the velums, so we are presently working from marked prints on a limited release basis. We plan to have this new door arrangement on all computers and systems from here on out.

Reports from Paramus, New Jersey, indicate that there are still many things to be done on the ITT

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K. Fitzgerald (Cont.)

prototype machine which we shipped to them on September 5. Most of these things will be done at Paramus, sometime within the next two week period and any other major changes or revisions will be done in February, when it comes back to us before being shipped overseas.

Some of the changes to be made on this machine:

1. Eliminate all short doors and add new panels in the bottoms of 3 of the bays in order to allow the cables to pass out under the machine and through sub flooring.
2. Exchange the operator control panel with one that has been painted and epoxy coated.
3. Install 4 casters on every bay of the machine. It has been discovered that because of the weight of the machine and the method in which it is rolled around and handled, that there are times when the total weight of the machine is resting on only four casters which causes the bottom pan of the machine to buckle.

E. Towle

The deluge of correspondence during the past few months has necessitated a change in my biweekly format. A listing of customer correspondence would at least double the number of pages in the biweekly report. Instead I will try to list what might be considered interesting and possibly very important leads. In this way all Sales Branches will be reminded of a possible sales lead for follow-up purposes. The following is a list of definite hot prospects:

Mr. William E. Bearry, Jr.
I. B. M. Corporation
Federal Systems Division
10301 West Lake Drive
Rockville, Maryland

Extremely interested in 3000 and 4000 Series Modules and accessories. I.B.M. – Rockville is one of our new customers and according to Bob Beckman this initial order should open the door to a good account.

U. S. Naval Training Device Center
Port Washington, New York

These people are interested in acquiring training devices. They are preparing to send invitations to bid and DEC Equipment should fit their needs to a "T".

Mr. Elliott Strongin and Mr. S. Kass
Republic Aviation Corporation
Department 61
Farmingdale, L.I., New York

The 3000 and 4000 Series Modules seem to be of most interest to the people at Republic. They were

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E. Towle (Cont.)

furnished with Dave Denniston's address and a complete catalog.

Lt. Van Der Pool
U. S. Army Electronic Proving Ground
Automatic Data Processing Dept.
Ft. Huachuca, Arizona

A recent letter expressed their need for descriptive literature on DEC Products. They purchased approximately $6000 of DEC Equipment during the last few months and only had one (1) outdated logic book to explain DEC logic and symbology. Anyway, a box of literature has been shipped to them and should be of immeasurable help. I would like to suggest to the branch offices (this was discussed in the recent East Coast Sales Meeting) that a call be planned to meet new customers when the equipment is delivered and thus be able to offer any needed assistance.

The Branch Office's have recently been furnished with a complete schematic book. Weekly additions are being forwarded to the branches to keep them abreast of the latest schematic changes. I am trying to keep our branch offices posted on new developments at the home plant. A little coordination with our branches should save a lot of duplication and probably cause a little more satisfaction among our customers-present and future. If I cannot furnish the needed information, at least I will know who to contact.

Probably most employee's know that DEC has taken another big step in expanding its already large market. A new market for DEC Equipment is slowly being opened in foreign countries. Exporting is an entirely new field for DEC and from all reports should prove to be an unlimited market for our products. As of this writing, we have customers in Switzerland, Belgium, The Netherlands, West Germany, and Japan. Our list of customers is small now, but we are anticipating a tremendous increase in the next few years (world conditions permitting).

M. Sandler

Production of modules has fallen considerably behind delivery requirements. Measured by my own admittedly biased method we are 3-4 weeks behind, measured by Stan's also admittedly biased method, we are 6-7 weeks behind. At best or at worst, we are behind.

Although we will fall short of the 5000 units goal this month, we will have produced 4200-4300 units, our highest monthly total to date.

In the past two weeks we have hired ten more assembly workers and their productive weight will be effective within another week or two. We have also hired three test technicians to increase our final test capacity. These people will do wiring work until our new scopes arrive.

As we hire and train additional people we look forward to taking over the work up to checkout for all Memory Systems. Engineering is working to make drawings and diagrams for us now.

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J. Smith

All construction work on the CRC system has been completed. Work still remains to be completed on the BBN system. We expect to clean this up by the end of next week.

ADX-1 for ITT is coming along very nicely. The sequence break sub-assembly and the I.O.T. sub-assembly will be tied into the main system within two weeks. Delivery of the system to engineering is scheduled for October 18th. This will allow two months for checkout. If requested by engineering the system could be delivered for checkout without the sequence break and finished trim the end of next week. I would prefer to complete the system but if engineering feels valuable time can be gained by taking the machine as is, we will be happy to cooperate.

I would like to caution everyone involved with the 50 and 51 tape control systems that time is running out. We are scheduled to deliver both a 50 and a 51 tape control to BBN the end of October. To date I have not received the necessary mechanical prints to start these systems.

This past week I have received enough information to enable me to mount sections 1 and 2 of the J. P. L. system and to start inter-bay wiring. This machine is scheduled to go into checkout November 3 to allow two months for checkout. I feel our greatest problem with this machine will be mechanical design. We are not dealing with our standard cabinet and a great amount of design must be completed in a short time. Therefore, there must be very close communication between our mechanical people and myself. I would appreciate notification of any delays on problems which will affect the completion of the job.

We ran into a little trouble on the 2211A and fell a couple of weeks behind schedule, but because of fine cooperation and understanding between Engineering and Production we have gained ground this past week. I feel we will still meet the delivery date of October 15th.

All other special memory systems are on schedule and have no special problems to date.

D. Chin

EN 2094	50%
EN 2098	50%

Type 30A, 30B Displays - Most of the engineering changes in plug-in packages for use in the standard and high speed displays have been completed. Special 20 ohm, 10 watt, wire-wound, non-inductive resistors from Tel-Labs have 18 uhenries of inductance and cannot be used in the high speed display due to increase in step response time of the preamplifier-amplifier combination from 1.3 usecs to 2.5 usecs. A temporary resistive substitute will be used until metallic film resistors on order are received.

J. MacKeen

MB 2007-1	65%

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J. MacKeen (Cont.)

MB 2007-2	30%
ME 2211A	5%

The first Memory Buffer 2007 is in final setup and checkout. Representatives from Fort Monmouth will arrive on Monday, October 1 to be checked out on the unit and to set up some of the logic circuits they plan to use in the school.

The second 2007 is well under construction and initial checkout can begin next week. (Week of 10/1) We are waiting for the second stack, just as we waited for the first one. We have profited from our mistakes on the first buffer and construction on the second unit is moving much more smoothly.

Serious trouble was encountered in the first buffer with feedback from the Hewlett-Packard printer. Positive transients approaching 80 volts in magnitude were blasting back through the binary-octal decoders and into the MA register counters. The idea of a transistorized printer with levels more compatible with those of our logic will be looked into.

Representatives of Philco and Ampex were in on September 27 to check on the status of the first 2211 Memory Exerciser (EN 2074). They appeared pleased at its state of construction and questioned only our estimate of a week to 10 days checkout time.

A. Blumenthal

EN 1020 PDP-1 development	80%
Miscellaneous	20%

Now that the big rush with the ITT and MIT computers has subsided, I can devote more time to systemizing the checkout procedures and set up better systems of record keeping.

The step by step procedure for the time pulse generator has been completed. A great amount of work still remains to be done in this area.

Jay Cleary is working on a reader test program which will cycle through a wide range of speeds while checking, eliminating the need for changing the speed manually. It will operate with a single test tape having alternate lines of all ones and all zeros for routine test or with a tape having a complex pattern if pattern sensitivity is suspect.

Bill Farr is refining the 60 cycle button pushers we use for checkout of the console controls, the existing ones being rather crude both physically and electrically. The problem has been a little ticklish because of the RC filter at the pulse generator inputs which makes them just barely able to operate at a 60 cycle rate. A circuit has been arrived at, however, which should prove satisfactory.

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A. Blumenthal (Cont.)

A modification has been made to the tape reader control, which will make it possible to write a program to measure the stopping distance of the tape. It will then be a simple matter to make routine checks on the brake and clutch action and see the need for adjustment before actual failure occurs.

Jay Cleary has recently modified the typewriter test programs, TP2 and TP3, to take advantage of a change made in the typewriter logic which makes it possible to check the type in function of the typewriter while typing out. This greatly simplifies the procedure where formerly it was necessary to operate the typewriter manually to do this.

A combination of typewriter troubles on PDP-1C-2 (ITT) made it necessary to send Bill Newell and John Shields to Paramus New Jersey this week to correct them. The difficulties were all in the typewriter itself, making it necessary to install a replacement and bring theirs back for repair. Troubles exist in the power unit, decoder and contacts.

A service call on PDP-1C-5 (MIT) revealed a wiring error and an incorrect module. Obviously, the test program area needs considerable work. A trouble call from Itek on PDP-1C was handled via telephone trouble shooting with Ed Spignese at the Itek end of the line. The trouble was caused by dirt on the tape reader lens and photocells. The marginal checking system was used to help determine this. This was the second time trouble shooting had been done this way and it appears to be a reasonable and successful method. We hope it will be possible to avoid many long trips this way.

The memory and tape reader have been installed in PDP-1C-6 (CRC) at this writing and in-out checkout is under way.

A temporary control panel and the 1K memory have been installed on PDP-1C-7 (BBN) to allow further checkout of the control computer. The paper tape punch on PDP-1C (Itek) has not proven to be stable enough for Itek's requirements. The difficulty has been in maintaining the longitudinal line spacing within close enough limits to reliably operate on IBM tape to card converters while using either fan-fold or roll tape. The teletype punch will give better performance in this respect and one will be used to replace the existing Tally punch.

J. Koudela

PDP-1 Suspects, Prospects, and Customers.

Since August 1, 1961, PDP-1 sales activity has been as follows:

Customers (orders received)

8/1/61 Massachusetts Institute of Technology (1 Drum System)

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J. Koudela (Cont.)

8/2/61 Jet Propulsion Laboratory, Pasadena, California (1 PDP-1)
8/16/61 Bolt, Beranek, and Newman, Cambridge, Mass: (1 Mag Tape Transport, 1 Type 51 Tape Control, 1 4096 Word Core Module, 1 Memory Control Type 13, 1 Automatic Multiply and Divide Package)
8/22/61 Massachusetts Institute of Technology (1 CRT Display, Type 30, 1 Light Pen)
9/1/61 International Telephone and Telegraph (1 Special Computer Console)

Prospects (price quotations and/or technical proposals submitted)

1. Cambridge Research Center (Communications Sciences Laboratory) carried forward
2. RCA, Camden, New Jersey (Surface Communications Division) for Air Force Project 477L
3. Burroughs Corporation, Paoli, Pennsylvania (Burroughs Laboratories) for Air Force Project 477L
4. Systems Research Laboratories, Inc., Dayton, Ohio (carried forward)
5. Department of Public Works, State of New York, Albany, New York
6. Data Technology Corporation, Palo Alto, California
7. Cornell University, Center for Radiophysics and Space Research, Ithaca, New York
8. Electric Boat Division of General Dynamics Corporation, Groton, Connecticut
9. Beckman Systems, Fullerton, California
10. Sylvania Electric Products, Inc., Massachusetts, for Air Force Project 477L

Suspects (those seriously investigating PDP-1)

1. Massachusetts Institute of Technology (Electronic Systems Laboratory)
2. Raytheon, Waltham, Massachusetts (Equipment Division Headquarters) For Air Force Project 477L
3. RIAS (Division of Martin Company), Baltimore, Maryland.
4. International Telephone and Telegraph, Nutley, New Jersey, for Air Force Project 477L
5. Bendix Corporation, Boston, Massachusetts, for Air Force Project 477L
6. Bell Aero Systems Company, Buffalo, New York
7. Bell Laboratories, Whippany, New Jersey
8. General Electric, Syracuse, New York
9. UCLA Medical Center, Los Angeles, California

H/TG File

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K. Olsen

We all should feel very proud of what we accomplished in getting out both the ITT System and the MIT Computer. This is indeed an accomplishment, and ITT was both pleased and impressed.

There was more strain and effort in getting these machines out than we would like to go through on a regular basis, and we should learn a number of things from this experience. First of all, we should schedule all projects so that all the parts are together well before the delivery date. Secondly, on many new projects we should build models or schedule enough time so that we can make a second pass after we see the results.

At the start of each project, we should make a panel layout and a cabling layout. This will, I believe, make any illogical or nonoptimum layouts obvious and will allow one to get opinions and suggestions from other people.

I have proposed a new layout for the tape system which eliminates the mass of cables which took most of the time in assembling that system. We will now wire the whole tape control unit as one large assembly, and eliminate all interconnecting cables. This assembly will contain the indicator panel and a cable socket panel which will contain four large 50-pin sockets that will go to the computer and to the tape units.

We have decided to place the tape control panel above the transport, so that it is in line with the control panel of the tape control unit. We are also putting the master duplex switch rack along side the tape control, so that all the cabinets with control panels on the top will be in one unit.

We removed the control panel from the line unit cabinets and have individual controls on each of the line unit assemblies.

We have now standardized on the new 50-pin rectangular Amphenol connector which is a much more rugged and reliable unit than the round AN type we used before. This connector has contacts which are very nicely numbered 1 to 50 in even rows.

We have ordered a new spool of 50 conductor cable with individual shields on each cable. We will now use this in all interconnecting cables that carry signals. Jack Brown says that the shields will cut down the number of conductors he needs from 100 to 50, because he was using conductors for shielding. This shielded wire should make reasonably good transmission lines and should give good pulse transmission. It should also eliminate the cross-talk which we had trouble with in the ITT System.

We have already laid out a new duplex switch panel which uses the large Amphenol connectors and new 10-pole relay units which we have now built into our standard plug-in unit. This relay is not only much easier to use because it goes into our standard socket, but also makes it possible to put resistors in series with the contacts if we find this is necessary to eliminate noise transients.

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K. Olsen (cont.)

In duplexed system, there will be three 50-pole switch panels in the duplex control cabinet with which will switch the signals to the computers. There will also be one 50-pole switch in the tape unit cabinet which will switch the bus to tape control units.

We have designed a double length plug-in unit which will contain six flip-flops and a hammer driver for use in the high speed line printer. If this large plug-in unit works out well, we might find other uses for it. We plan to mount the Anelex printer on a table which is a copy of the old console. There are nine mounting panels in the back that will hold the logic, and we will mount power supplies on the front. We will have to make a simple holder for the paper supply in the knee space of the console. The printer will simply rest on the top of the table.

We made new indicator mounting assemblies for the computers which contain transistor drivers. This is a significant contribution to the computer because it eliminated a whole mounting panel of indicator drivers, and a large number of connectors and cables. However, there is no obligation for other people to remove their indicator driver plug-in units just because that was done on the computer. In the tape system and in the in-out system, for example, the saving in getting rid of the plug-in units is not worth the cost of relaying out the logic. However, the method of assembling the indicators is very convenient, and one should use these where they fit in, and when there is no need for the transistor in the panel, they should simply be shorted out.

Some people have requested teflon ribbon cable because we have been wearing the insulation on the polyvinalchloride material we are now using. This is because we have poor construction techniques in a few areas in the company, and the answer is not to get stronger material, but to straighten out these construction techniques. No wire, teflon or polyvinalchloride, should be left in contact with sharp surfaces or run directly across solder lugs. Where this wire has to be clamped or bear on sharp surface, it should be taped first with white thermo-setting glass scotch tape. If those areas in the company that are propagating these poor construction techniques will learn how to do it right, I'm sure we won't have trouble with this wire we're now using. And I'm also sure that going to teflon is not an alternate solution.

TOOLS:

Tools are expensive, and we would like to avoid losing them, but not having tools is much more expensive in loss of production time. I have been somewhat shocked, in looking around, at how poorly equipped with common tools many of our technicians and shop people are. It is the responsibility for everyone who supervises to be sure that his people have all the tools necessary. If they deserve a lecture on carelessness, maybe they should have it, but above all they need good tools to work with. I would like to make this point particularly clear to engineers who supervise technicians, because they do not always realize responsibilities that go along with having someone work for them.

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H. Anderson

Planning and Scheduling
As DEC becomes larger, the need for more coordination and communication between activities is increasing. I would like to urge the use of more Inter-office Memos, Biweekly contributions, etc. to help fill this need.

In addition, our procedures and paperwork for planning and scheduling special engineering jobs and computer production, is being improved. I plan to take a more active part in this in the near future.

Another important area where we plan to have changes is the accounting system. We hope to make the accounting a vital and integral part of our day-to-day activities in all areas, particularly engineering. We will try to tie this into formalizing our pricing technique, so that performance can be measured against prediction and used as a part of future pricing. This will include standard products as well as special projects.

R. Beckman

Being a newcomer to DEC, there are many things that I notice that most of you probably take for granted. In particular, I have been impressed by the cooperation, on all levels, that I have received. (This is in contrast to my Navy days, when I often had to figure out how to get something done in spite of the help that other people gave me). My thanks to all of you and especially the following: Al Andrews and Jim Myers, who by this time must consider me sort of a hair shirt, but have never failed to come through when I needed something; Dick Best, Bob Hughes, Don White, Dick Whipple, and the rest of the engineers, who always have the right answer even if I don't have the right question; Joanne Terrasi in the library who did a real mule hauling job for me and did it quickly and efficiently; and long suffering Barbera Stephenson and the rest of the Sales Department. This spirit of mutual cooperation is undoubtably one of DEC's greatest assets.

I have been traveling most of the last two weeks, all the way from deep in the heart of Dixie to the New Jersey shores. There is a lot going on in the deep south, and I plan to spend more time in several places that I touched briefly in this last trip. Plans for this week include two days in North Carolina and then to Maynard on Friday. The DC area itself, of course, remains quite active. The biggest problem here is deciding who to see first.

To me, variety continues to be the outstanding characteristics of this job. In addition to the items I mentioned in my last Biweekly contribution, I am now involved in Marine Navigation Systems, Fetal Electrocardiograms, Missile Control Problems, and, of course, Training Applications. Conclusion: DEC is the spice of life.

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D. Denniston

The new voice that you will hear when calling the New York office will be that of Millie Omifracke. So that you may all feel you know her slightly, I have asked her to write a small blurb to more or less introduce herself to you. At this point I might add that although Millie has been here for only one week, she has found more than enough to keep her busy. At last I feel the office is beginning to run fairly smoothly.

During the last two weeks I have visited Vitro in West Orange and F.A.A. in Atlantic City with Bob Beckman, Ft. Monmouth, the Naval Training Device Center in Port Washington, L. I., Brookhaven National Labs. in Upton, L.I., and Picitinny Arsenal in Dover, N.J. Also, I have spent quite a bit of my time on applications for Bell Labs., and I intend to visit both the Murray Hill and Whippany locations of the labs. shortly.

Concerning Ft. Monmouth, my former fear of a visit there was unjustified. They are pleased with the equipment and our progress on the first Buffer-Memory System, even though there will definitely be a late delivery on this item. This is backed-up by the fact that another order for a large quantity of equipment looks definite at this time. I spent one day there helping their instructors become acquainted with the system. To my surprise, I found they had done more in the way of logical design for circuitry to be connected to the Buffer-Memory than I had expected. They really had some worthwhile questions and comments to make, the most important of which was the suggestion that the Shift-left-Shift-right jacks should not be connected to the 16th bit, since this will be their sign bit. The feeling is that separate shift jacks for the sign bit would be helpful in later models of the 2007, if this is possible.

There is the possibility of a Training Device Center contract in the air. I have talked with both Lt. Gannon and Mr. Deusch. I have little information as yet, since the Request For Bid has not been released. I intend to get over to visit them again very soon. The proposal sought will be for a Digital Computer Classroom Demonstrator. Although we should not know these facts, this will be the NTDC Device 6B4 and will include a memory. Although I have been unable to pry loose any specifications as yet, there may be a possibility of proposing a Buffer-Memory System used in conjunction with Classroom Modules. I might add that the initial contract will be for two such units, and Lt. Gannon suggested that many more will be required upon approval of the initial two. Training is certainly turning into a big chunk of business.

M. Omifracke

Let us call this an introductory paragraph. Not a paragraph to introduce the following paragraphs, but rather to introduce me. I've taken over Margaret Rand's position as secretary to Dave Denniston.

I think a little background might be in order at this point. I was formerly employed in the Technical Publications Department of Walter Kidde & Company, Inc. When our seven-week

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M. Omifracke (cont.)

old son came bouncing along, he rather brought my employment to an abrupt halt. He's pretty much made himself the major part of our lives, and I have happily joined the Digital clan.

I'd like to take this opportunity to thank all the people who were kind enough to offer their assistance. Your notes and well-wishes made my first week with Digital much easier and a lot more comfortable.

S. Olsen

The past couple of weeks have been spent mainly in the office to catch up on several very important things.

We have a very definite shortage of application engineers, Barbera Stephenson being the only one we have and she not being free to travel. We've been busy interviewing applications engineers with zero result so far. We are also looking for someone to do writing, and, here again, we are having a difficult time.

Some of the time lately has been spent working with Ben Gurley on setting up a system for handling the present computer customers and potential customers. Whenever the system is completely set up, Peter Bonner will act as coordinator.

Within a couple of weeks I hope to have a Japanese Sales Representative signed up.

We have been pretty busy getting ready for two shows in October. The Canadian IRE in Toronto on October 2-4 and the National Electronics Conference in Chicago from October 9-11.

On September 15th we are having an East Coast Sales Meeting with Bob Beckman and Dave Denniston coming into the plant.

D. Chin

Display Preamplifier 1567 and Output Amplifier 100%

Type 1567 display preamplifier is designed to be used with a solid state output amplifier. Each side of a balanced difference amplifier drives an emitter follower which in turn, drives the base input of the output amplifier. Voltage is fed back from the emitter resistors of the output transistors to the base input of the difference amplifier. Input and feedback impedances are equal for unity gain from input of preamplifier to output of output amplifier. Voltage control of 20 ohm emitter resistors determines the current through each side of a push pull deflection yoke.

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H. Crouse

Robert R. Blackwood is joining the Purchasing Department as an expeditor. Bob is due to begin work on the 25th of this month.

A quote/inquiry request system is being developed--more on this later.

Delivery status of major components

New Orders
Potter Instrument - 20 tape transports, Delivery--November 15th, one each week thereafter.

Soroban - 5 computeriters, Delivery--December 11, 1961.

Teletype - 6 punches, Delivery--December 11, 1961.

Digitronics - 10 readers, Delivery--2 November 20, 1961, balance 2 each month.

Anelex Corporation - 5 printers, Delivery--2 November 20, 1961, balance not scheduled.

Open Orders
RCA - Memory stack--4 ordered, 3 delivered, last unit scheduled for shipment September 15, 1961.

General Ceramics - Memory stacks--4 ordered, none delivered, first unit 5 weeks overdue, schedule as of September 12, 1961-1 September 22, 1961, one each week thereafter.

Ampex, TMI Division-3 1K Memory stacks, first unit delivered 7 1/2 weeks late, last two units scheduled for September 19, 1961 and October 1, 1961. 12 4K Memory stacks, initial request, 4-November 1, 1961, 4-December 1, 1961, 4-November 1, 1962. A 16 day extension of those dates was taken by TMI at the time Al Blumenthal visited their plant.

Semiconductor prices have generally eased back in their decline. Now it appears only specific groups are falling as fast (5-20%) as previously recorded.

The following are new books recently added to the library.

"Games of Strategy: Theory and Applications" by Melvin Dreshee, Prentice Hall, Inc.

"Industrial Instrumentation" by Forrest C. Tyson, Jr., Prentice Hall, Inc.

"Reliability: Its Theory and Practices" by Igor Bazovsky, Prentice Hall, Inc.

"Industrial Control Electronics" by Matheu Mandl, Prentice Hall, Inc.

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"Adventures In Algebra", U. S. Industries, Inc. by Norman A. Crowder and Grace C. Martin.

"Trigonometry: A Practical Course" by Norman A. Crowder and Grace C. Martin, U. S. Industries, Inc.

"The Arithmetic of Computers" by Norman A. Crowder, U. S. Industries, Inc.

"Introduction to Electronics by Robert J. Hughes, Peter Pipe, U. S. Industries, Inc.

J. MacKeen

MB 2007-1	85%
MB 2007-2	15%

With the wiring of the Memory Stack which arrived 9/12 (6 weeks late), the first 2007 Memory Buffer System is nearing completion. Full scale checkout will commence on 9/14. Preliminary checkout is completed. We are aiming for a delivery date of 9/22 (unofficial), which is eight days late. I understand the Army is fairly happy about this as they expected a delay of a month.

The rough draft of the 2007 Instruction Manual is 95% complete.

Preliminary panel wiring and assembly for the second buffer is complete. Logic wiring has started. Tentative arrival of the second stack is sometime in the week of the 17th.

R. Whipple

ME 2211A	15%
CN 2310	10%
Scheduling	10%
Sales	15%
MB 2007-1	20%
MT 1516C	20%
Personnel	5%
ME 2207	5%

Things are still hopping within the Special Systems group's activities. The CN 2310, mentioned above, is a precision engineering coding and pattern recognition controller I am starting on for M I T, which will contain about 500 modules and sell for $92,000. Dick Best and Dr. Pless of M I T have been organizing the controller for over a year now. It is scheduled for delivery at the end of January. When it operates satisfactorily, they will need a PDP to work in conjunction

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R. Whipple (Cont.)

with it. The complete PEPR System will essentially consist of a Controller, Computer, High Precision Scope, and Photographic and Optical equipment. It will process Bubble Chamber photographic data. This is my understanding, so far anyway, because I'm really still out in left field as far as knowing how the whole system operates.

The Memory Stack for the first MB 2007 came in September 12, just 6 weeks late. Hopefully, we should have the system operating and maybe ready to ship by the end of next week, just one week late.

The MT 1516C for Ampex, which was scheduled to be shipped to Hong Kong, is apparently going to be installed at their plant in California because they are swamped with work. I believe they will be ordering another MT 1516 for shipment to Hong Kong. We are already making another MT 1516 for them to be delivered November 1, and three Memory Exercisers, and one Core Tester.

As of Monday, September 18, our Special Systems Group will consist of eleven technicians and four engineers.

J. Cudmore

ME 2210 100%

The first Memory System to be tested on the ME 2210 pointed out some severe limitations in the operation of the Exerciser. The Exerciser was designed as an exerciser and not as a tester. The assumption was that the Memory System was operational upon delivery. Changes have been made in the Exerciser to overcome these problems.

A very serious problem was discovered in the first system to be checked. This system was a 4096 x 18 PDP-1C Memory System, and it was constructed using the same techniques as all previous PDP-1C systems. Strip cable was used to connect the selection sw., inhibit sw., and sense amps., to the memory stack plugs. This strip cable has fairly poor insulation. The cable is very simple to use, but the insulation is very easily cut and has a low melting point. The cables from the Memory Plugs were arranges neatly but made some very sharp turns around the ground lugs which connect the 1901 racks together. These ground lugs are very handy for bending wires around but unfortunately many of the lugs are razor sharp. In this instance, at least eight wires had been nicked and were shorted to ground. These same wires run next to the pins on the individual module plugs. Three of these wires were soldered to many other pins accidently when the heated pin melted the insulation on the wire passing by.

We cannot continue these wiring practices and hope to manufacture reliable working systems. The Memory Systems are now being wired with single Teflon insulated wire. This insulation resists

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J. Cudmore (Cont.)

heat and is much less prone to being nicked. However, the use of the strip cable continues elsewhere, and I seriously question this practice. Strip cable is available with Teflon insulation and although more expensive, I am sure the cost would be justified by increased reliability.

M. Sandler

During the past two weeks we have moved the stockroom to the third floor of Building 12. We now have more space, which will enable us to better store and identify our materials.

The list of materials is growing more and more extensive, and the need for adequate identification becomes more necessary. The stockroom can only stock those materials which have been called out in the design of products; we cannot stock materials of which we have no knowledge or need. It is most difficult to operate on the basis of floor conversations about new parts.

The need for new products or parts is properly handled with the Production Release Form. Design of a product must mean follow-through to insure that drawings, parts lists, and parts numbers, as well as schematics, are available to Production.

R. Lassen

During the past two weeks we have had a fairly heavy schedule of interviewing for Assembly Workers, Purchasing Expeditor, Mechanical Draftsman, Applications Engineers, Cost Accountants, and Secretaries. Next week we'll be recruiting for trainee level Technicians and Janitors in addition to the above. The Employment Agencies have also been alerted for a Technical Writer and a Graphic Illustrator. The response to Mechanical Draftsman and Applications Engineers has not been good with respect to both quantity and quality, so we are now contacting additional agencies and are working with Jack Atwood in surveying our applications for area response.

Because so many of our employees have expressed an interest in forming a bowling league, we set up a committee consisting of: Cliff Fuller, Fred MacLean, Jess Piecewicz, Fred Gould, and Sheila Paul. They are now conducting an interest survey as the first step towards organizing a league.

We are putting together a staff to publish a monthly company newspaper. Although we will have correspondents in each department for the purpose of reporting "newsy" events, we will also be calling upon the department heads for news pertaining to the business activities of each department. We want to make this an informative, well rounded, yet entertaining house organ; therefore, we will be asking for your cooperation.

We are pleased to announce that Paul MacDonald has been selected to replace Dick Kangas in Shipping, Dick has moved up to Drafting. Promotions from within are good for our employees and

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R. Lassen (Cont.)

therefore good for our company. We urge your consideration in cases where promotion from within is a possibility.

New Employees
Kathleen Travaglini - Assembly
Mildred Gibson - Assembly
Lois Baker - Assembly
Dorothea France - Assembly
Elsie Buhrig - Assembly
Gloria Rego - Assembly
Mildred Omifracke - Secretary - New Jersey Office
Barbara Bergeron - Secretary - Engineering
Michele Moore - Clerk-typist - Sales Order Handling
Alida Stone - Switchboard-Receptionist
Tom Quinn - Mail
Dick Flaherty - Technician
Arthur Vartanian - Drafting (returning veteran)

R. Savell

1015	5%
1024	8.7%
1025	6.5%
1027	57%
1054	.8%
1058	22%

Designs of both the standard Type 30-A display for PDP-1 and a special display for Itek are practically completed. Both of the displays have new solid-state deflection amplifiers to replace the vacuum tube amplifiers used on the old Type 30. Further improvements include a faster deflection yoke, a much more stable focus coil circuit, a faster intensification circuit whose amplitude can be varied by the computer, and improved packaging of the CRT biasing circuit.

The display will be mounted in a two bay table in order that all necessary power and logic may be included in the table so it may be marketed independently of PDP-1.

Work has commenced on special circuitry and logic for the Anelex High Speed Printer.

R. Doane

VHF Building Blocks 60%

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R. Doane (Cont.)

New 10 Mc Building Blocks for SEI	30%
Test Equipment Committee and Miscellaneous	10%

Layout and circuits for the VHF line are close to final for the logic board and the flip-flop. The logic board consists of three pulse amplifiers and five two-input level gates that can be connected to the pulse amplifiers in several combinations by jumpers on the board. Everything operating at high frequencies is within three inches of the end of the board, and the pulse output is directly from the output transistor case. Each pulse output can drive a 25Ω load (two 50Ω Co-ax cables). There are 11 transistors and 16 diodes in the high-frequency circuitry, of which 3 transistors and 10 diodes are soldered or mechanically connected directly to the connector. Standard output pulse width is 10 usec, and rise and fall times are 2-3 usec.

The flip-flop board has eleven inputs and five outputs. They are arranged as follows:

3 direct (ungated) "set" inputs
2 direct (ungated) "clear" inputs
2 "set" pulse inputs to be gated, with
2 level inputs to gate then
1 "clear" pulse input to be gated, with
1 level input to gate it
2 direct flip-flop outputs from short-circuit-proof emitter-follower buffers
2 delayed flip-flop outputs
1 standard indicator driver output.
16 pins used (the other 6 are for 3 ground and 3 power connections.)

The flip-flop has not yet been tried in its present form. The printed board is ready to be made into a model as soon as the new 10 Mc circuits are out of the way.

No pulse transformers will be used anywhere in the VHF line. The Silicon epitoxial mesa transistor being used can supply 100 ma pulse current to a load without ever coming close to saturation, and still be within their power ratings. Pulse transformers present very tricky problems when good coupling coefficients must be obtained consistently for harmonics in the hundreds of Megacycle range. In addition, it is easier to terminate a co-axial cable if no backswing occurs after a negative pulse, and the delay through the transformer is eliminated. Flip-flop gated inputs use two complementary emitter-coupled transistors instead of a transistor with a pulse transformer.

The third and final module in the new line is in the "pace the floor and think some more" stage. A geometry I have on paper would combine the delay multivibrator and variable clock functions in a single-shot with essentially zero recovery time, so that its output can be connected to its input for use as a clock. Shorting one point in the circuit to ground provides a push-button pulse generator function, while inclusion of a crystal socket at another point allows crystal-

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R. Doane (Cont.)

controlled-frequency operation.

Four new 10 Mc modules in the 6000 series have been added at the instigation of Scientific Engineering Institute, who is building a computer using them. Two of these will have many advantages for other customers as well.

The 6106 10 Mc Inverter module is like the 1103 in every respect except for speed and the length of the printed wiring leads. Six 6101 - Type Inverters and six 10 Mc loads are provided on this module, with lugs for connecting the loads to the inverter collectors as desired.

The 6208 dual 10 Mc flip-flop has two 6202-type flip-flops, but without p-pulse outputs and with only one complement input for each flip-flop. One flip-flop has two inverters (for set and reset) connected to it, and can be complemented by a positive pulse from a Pulse Amplifier. The other flip-flop is complemented by a positive pulse from an inverter collector, exactly as is the standard 6202. Each flip-flop has both direct and normal set and clear inputs, like a 6202.

The other two boards have a special configuration to allow them together to perform all the logic needed to form a save-the-carry multiply drain (a technique used in the MIT Whirlwind computer).

The six-inverter and dual flip-flop packages will soon be available for sale, but the other type will be made only on special order, since little or no demand is expected for their very specialized configuration.

The new specifications for MADT transistors to be used in the 10 Mc line are still being negotiated with Sprague.

D. White

Sales trip to MIT	19%
2301 Scanner	38%
QC - circuit trouble and specs.	38%
Misc. - interview prospective tech, etc.	5%

Some of the parts for the scanner are coming in. We have tubes and deflection yokes from CBS. Incidentally, for those who have not already heard, CBS has closed out its tube and semiconductor operations. The VHR group (from whom we bought the above equipment) is in hopes that they can find backing and remain in business as a unit. Most of my time this week was with ordering shields, receiving equipment, and the usual details which have to be ironed out.

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D. White (Cont.)

Barbera Stephenson and I took a trip to MIT yesterday to check with a man who was having difficulty with a digital-to-analog converter. He was using the 100 ohm outputs from the single ended bridges and getting erroneous conversion. Some clarification should be in our literature on the use of direct and series-resistor outputs on the 4677.

Without seeming to overly wave the flag for DEC, I must say that I was very impressed with this man's appreciation for our circuits. He's completely sold, and will do a lot of selling to his colleagues on our behalf.

Speaking of flag-waving, I would like to say a word on Jack Atwood's problem of finding biweekly contributors. Jack, I'm sure, finds himself in the position of the man who puts RUSH on every purchase order - sooner or later the order is completely ignored. While we all are sidetracked to some extent, we can do better. One way of helping us all in this regard would be to make the biweekly more regular. There have been times when there has been no report for months. If we plan 26 biweeklys per year and stick to every other Friday as a publication day, the deadlines will be easier to meet.

Few of us realize the work which is done by some of the permanent employees at Quality Control. We all owe Dick Mangsen and Herb Norton a bit of thanks for their work. Although the walk to Quality from Engineering is a long one, and we all gripe about it, the necessity for that walk is somewhat constant despite increasing production. Thanks, Dick and Herb. We don't realize how many circuits you debug without our ever knowing it.

A. Blumenthal

Test on PDP-1-C2 was completed on September 1 and shipped to ITT the following day. Only minor troubles were encountered during its installation. On September 13 a Memory Driver unit (1973) failed. This was successfully located and corrected by ITT personnel. The following day the computer failed to operate, and it was necessary to assist in the trouble shooting via telephone. A bad IR flip-flop was found to be the cause.

The MIT computer (PDP-1C-5) has completed test and is being shipped today. This machine performed well at the ACM show in Los Angeles. The sense amplifiers will be replaced, however, as soon as an improvement is made in their circuitry. The need for this was revealed by the new checkerboard program which subjects memory to a much more severe test than the old one.

PDP-1C-6 and 7 are now under test. The central computer has been checked out on both and they are awaiting the installation of memories and in-out equipment.

R. Tringale

1516C

100%

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R. Tringale (Cont.)

The final checkout of the 1516C is almost complete. The system was going to Ampex Int., Hong Kong, but it is now destined for Ampex Int. in California.

B. Stephenson

Applications which have been coming in recently have been principally on analog-digital converters, high speed counters, and low speed arithmetic with our new quadruple units. A lot of questions have been coming in as usual, on our special input-output devices. If we could get information on these various things in printed form, it would make things a lot easier on the customers who are far away and don't have any way to find these things out except by calling here.

We have almost completed a preliminary version of the Logic Handbook Supplement given with the use of the new quadruple flip-flops. This includes information on the serial arithmetic and BCD arithmetic, which we have been having an increasing number of questions about. I have again started an application note on BCD arithmetic and hope that this time I will be able to get it in some sort of finished shape before I get sidetracked.

Fred Edwards left a lot of information on analog-to-digital conversion units. However, this will still need some rewriting before it will be ready to print.

The high speed applications are particularly for 16 and 20 mc counters and this situation will, of course, be somewhat eased when our new high speed line comes. In the meantime, we are pushing the 10 mc on for all the speed we can get.

The last problem is still the old problem of the input-output devices. In particular, our write-ups are extremely brief and neglect such details as mentioning which pins are inputs and which are outputs or in which direction the output current can be supplied. This leads to some difficulty for customers who aren't able to get schematics before they do up their wiring or get their units.

G. Bell

ITT Machine Checkout and Installation 100%

The last two weeks have been spent in the assembly of the various sub systems which connect with PDP-1 to form the ITT Automatic Data Switching (ADX) system.

B. Gurley

It would appear that I chose the near optimum time to go on vacation. The two weeks (28 August-8 September) I was gone were, as it has been reported to me, the most hectic weeks of DEC history. Everything seemed serene when I returned, the ITT machine is gone and the MIT machine had

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B. Gurley (Cont.)

paid a visit to our ACM friends in California.

Next Wednesday and Thursday is the DECUS (Digital Equipment Computer Users Society) meeting. Approximately 40 people from 15 - 20 organizations are expected. John Koudela has handled the arrangements in a most admirable manner. We should be sure to get some good publicity from it.

L. Prentice

Work is progressing satisfactorily on the drawings for the proto-type operator console for ITT. This work is being performed at Colonial Engineering, Cambridge, Massachusetts. Completed drawings are expected by Tuesday, September 19, at which time, unless there is some unforseen delay, Colonial can begin fabrication of the unit. Mechanical drawings have already been forwarded to Lippincott and Margulies for their inspection. We anticipate no unsatisfactory reaction from them as the design concept has been adherred to quite carefully.

Work is progressing satisfactorily on the revisions and additions needed to produce a new type display unit consisting of a display tube and its associated equipment plus a two-bay table to replace the one-bay table that had been previously used. These changes are the result of a breakthrough in circuitry and design, and they were released to us only at the first of last week. Revisions to PDP cabinetry and Magnetic Tape units are being made up in sketch form and will be released as soon as possible to production. The first units will have to be done on drawings in sketch form rather than drafting because of the unavailability of sufficient draftsmen to produce these prints.

I would like to congratulate everyone who participated in the final assembly of ITT's PDP-1 and MIT's PDP-1, during a considerable hot and hectic week. The machine shop personnel were employed on a full-time and over-time basis in order to release these units in time for shipment.

J. Atwood

Trade Shows - Apparently the ACM show in Los Angeles was a relatively quiet affair, but the people who dropped by the booth had heard about PDP and were genuinely interested. Replies from the mailing made just before the show are coming in at a good clip.

Mailings are now being prepared to promote the Canadian IRE show in Toronto October 2-4 and the National Electronics Conference in Chicago the following week. Also being readied for the Toronto event is a self-contained exhibit, which should make these one-man shows a lot easier to set up and take down.

Direct Mail - The completely coded, completely punched, completely sorted master mailing

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J. Atwood (Cont.)

list was delivered this week. A lot of time, effort and expense has gone into this changeover from Addressograph plates to tab cards, but it has resulted in a very potent sales tool which we intend to capitalize on to the fullest.

Steve Lambert is now working on a program to take us the next step along the line -- from tab cards to magnetic tape. The goal, of course, is to keep the list on magnetic tape for ease in sorting out particular markets we want to canvass either by mail or by manpower. Type-out and editing will be done on the Flexo's.

Our press and a couple of others are busy two shifts turning out the material for the general mailing, which is now only a matter of days away. This should help to reassure a good many of our friends that they really are still on the Digital mailing list.

Product Literature - The new Short Form Catalog will have to be reprinted shortly. If you have any additions or corrections, let us know. Also reprinting are the new PDP Folder (F-11A) and the PDP Instruction Card. Just enough of the latter two were printed to get us over the show hump. Now they are being turned out in quantity in corrected and spruce-up versions.

Also due shortly is the new PDP Manual. This underwent such extensive last-minute revisions that 1000 copies had to be printed and bound in our own plant in order to make the ACM show. This is now being rerun letterpress.

Technical Publications - Recent publications include "preliminary" DECAL Manuals, Input-Output Manuals and Quality Control Manuals. A second preliminary version of the DECAL Manual is in the works to satisfy requests from PDP users and ACM show-goers (and show non-goers).

R. Mills

As mentioned in the July 28 Biweekly Report, we have taken out a company membership with the American Management Association, which provides for 12 divisions of AMA Reports coming into DEC. This is just a gentle reminder that we are not going to get full benefit from the company membership unless publications received and once read are forwarded to Bob Dill in Accounting for maintenance of the central file.

Due to the increased work load and new applications going into our IBM room, we have had our electronic sorter and tabulating machines speeded up quite considerably. Very shortly, hopefully the early part of October, we will be preparing and issuing all payroll checks with the exception of the monthly checks on our IBM machines.

R. Hughes

COMPANY CONFIDENTIAL

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R. Hughes (Cont.)

EN 1011	10%
EN 1039	10%
EN 1000	20%

The transistor test list, which describes the various tests on transistors used in DEC circuits, has been brought up to date. It now also lists the manufacturers, frequency specs., tells what the material is (NPN and PNP transistors are available in either silicon or germanium), and what its power ratings are.

The same thing has been done for diodes. The drawing numbers for these lists are D-00573 and D-00572 respectively. These lists should not be given to vendors and are Company Confidential.

We have purchased 1000 ED-7 transistors from Sprague, these will be used in Memory Circuits and in the Current Drivers if we don't get delivery on the Philco 2N1204's. The ED-7 is a diffused collector, and the 2N1204 is a diffused base. Therefore, the ED-7 won't switch as fast at low voltages as the 2N1204, but it will probably work in most circuits.

Motorola has available a PNP germanium transistor (2N964) which has an F_T of 300 mc when saturated (F_T 300 mc Vce 0.15V) This is quite fast and is quite constant over a wide current range, it has an emitter to base voltage rating (BVebo) of 2.5V and a latchup voltage (LVcex) of 11.5V, power dissipation is 150 milliwatts.

Quality: Jim Cudmore found four or five shorted wires on the core memory which was recently built. These were intermittent type shorts and were caused by running interpanel wiring around ground lugs. The sharp edges of the lugs are like a razor and are difficult to pass over without cutting any insulation. The cuts in the insulation are hard to see, and when they press against the lugs a short results. Several months ago we shipped a Memory Tester to the west coast, and Wally Weeton found six such shorts. This type of trouble, when intermittent, can cost a fortune if it exists in a machine in a remote location.

I propose that we eliminate the eight ground lugs on each mounting panel and use the lugs on the P1U sockets for inter-mounting panel grounds and make it a rule not to ever let a wire touch a lug. The second wiring problem is when a 20 conductor cable is wired to a socket. Due to our wiring technique, which is neat, the insulation is melted by the soldering iron when the pins are soldered. A solution to this is to use 20 conductor teflon insulated wire. The cost is $1.60 a foot, which is expensive but I believe it will pay for itself if it avoids a few service calls and much reworking. The stuff we are now using is so poor that we should switch to glass insulation single wire rather than continue its use.

We are now buying and testing about three million semiconductors a year. The testing problem is so huge that we must now consider automatic machinery. The price of this equipment might easily be twenty to thirty thousand dollars.

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M. Sandler

During the past two weeks we have been striving to move on to our next goal of 5,000 modules produced per month. We have added seven assembly and inspection girls to our group and have begun to see some improvement in the material procurement program. Sales has been bringing in orders in lusty fashion and we know that 5,000 is only an interim goal to 6-7,000 units.

Our custodial crew requires two more men. If you know of someone interested in a janitor job, have him apply. In the meantime, please have your people help John Culkins by using wastebaskets and ash trays and by closing windows when leaving the plant. It is urgent that people who work at night close windows when leaving.

R. Lassen

The following policies and procedures are now in effect:

Military Leave Plan - (announcement letter to all employees to be released on 9/1/61). This is a new fringe benefit which will provide our people who are obligated to serve two weeks of active military duty each year with a more liberal pay and leave of absence policy.

Inter-departmental Transfers - announcement letter has been released to all Department Heads.

If there are any questions regarding new Company Benefits or new Personnel Procedures, please contact the Personnel Office for clarification.

We are now finalizing the details of the new Tuition Refund Plan, which will be announced very soon.

This week we amended our Group Life Insurance Contract to include various Death Benefit Settlement Options. This will allow a more diversified selection of the distribution of death benefits by the insured. The election of these options is subject to a minimum death proceed of $5,000.

Plans are under way for our annual outing to be held at Camp Ararat on September 16. The various committees are planning activities for both children and adults. We expect a good turnout, lots of interesting games and contests and plenty of food and refreshments.

Recruiting continues for Assembly people, Senior Mechanical Draftsman, Applications Engineers, Switchboard-Receptionist, Clerk-Typist, Janitor and Silk Screening. Response

DF633 DIGITAL EQUIPMENT CORPORATION · MAYNARD, MASSACHUSETTS

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R. Lassen (cont'd)

to our ads has been steady and our openings are gradually being filled.

New Employees

Shirley Wright - Clerical-Drafting
Jack Williams - Technician
Larry Conley - Technician
John Duffey - Technician
Don Desrosiers - Drafting
Miriam Dailey - Assembly
Jean Woods - Assembly
Alice Johnson - Assembly
Beverly Dielane - Assembly
Helene Butcher - Assembly
Sandra Bell - Clerical-Inventory

D. Denniston

I would first of all like to "cheer" a little for some of the things Bob Beckman mentioned in the last Biweekly. At the present time it is most apparent to me that the quality of the report should be better than ever, and although this is partly from my own selfish viewpoint, I feel that as time goes on it will become harder and harder for us individually to keep track of the work going on in various departments except through the Biweekly. Let's face it - I'm in the position now where the Biweekly must replace all the "gossip" I was so in the habit of picking up in a somewhat less formal manner.

Now, as for the happenings in the greater New York area, I guess that I should first mention that Margaret Rand will be leaving us very soon - most likely by the time the Biweekly is "run off". I probably will be the one most sorry to see her leave because she certainly has been extremely helpful here during the period when I needed someone with her knowledge of the company policies, and her capabilities, the most. Margaret has been travelling over 60 miles daily and although she enjoys working for DEC, a day that begins at 5:30 A.M. is no fun at all! In other words, it's not me or DEC that she's unhappy with, but with the commuting situation.

Bell Labs. continues to demand a considerable portion of my time, not to mention ITT, but I feel that these hours are far from wasted. The new Information Systems Division of ITT in Paramus, although incomplete as far as construction is concerned, should also contribute to keeping us busy.

As for Fort Monmouth, I am getting somewhat afraid to go down there again, but my hope is that they will be happy with the Classroom Modules, and that the prospect of late delivery of the first Buffer Memory System has not disheartened them too much. Nevertheless, later this week I will try to get down to Monmouth to do my best at keeping them happy.

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D. Denniston (cont'd)

Besides these "big" people, I have spent quite a bit of time with several others, Electronic Associates, Inc., being one of the larger time consumers.

D. White

2301 Scanner	39.5%
vacation	50.0%
miscellaneous	10.5%

Logic for 2301 Scanner is 75-85% designed and being drawn. Jim Hogan is taking care of logic drawings and layout. The yoke we are buying from CBS is now being tested and we hope will soon be delivered. Two UHR tubes are on order, the Litton Isolation Amplifier is on the way, and some of the power supplies are also on order.

I'll see you all September 11. I'm taking my vacation while I'm able.

R. Whipple

Manual Proof Reading	5%
ME2211 Design	35%
MB2007 Design, Testing	10%
CT2102 Installation	20%
Sales - Scheduling	10%
ME2207 Design	5%
MT1516C Testing	15%

J. MacKeen

Memory Buffer 2007	60%
Instruction Manual 2007	40%

Logic wiring for the first 2007 Memory Buffer will be complete on or about August 31. Check-out has already started. Major block to meeting delivery date is failure of TMI to produce the memory stack on time. Latest word from Hank Crouse indicates probable shipping date for the stack of 9/5 by air express.

F. Edwards

EN1014	50%
EN1055	50%

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F. Edwards (cont'd)

Product Bulletin on Analog-to-Digital and Digital-to-Analog conversion with additional information on the Type 1547, 1561, 1562, 1563, 1564, 4677, and 4677A Modules.

Memory Exerciser 2210 is presently being checked out with PDP Memory System and manual is being prepared.

T. Johnson

The sales engineering staff of the Western Regional office has now doubled with the addition of Ken Larsen, who joins us from Ampex Computer Products. Ken's experience with memory systems and field engineering experience with IBM will be a very strong assist to DEC and its Western Regional operations, particularly with the increasing amount of memory test equipment business in this area, the rising number of customers in modules, and the impending installation of PDP-1 Computers. Ken has been spending several weeks at the main plant and at the time of this reading I would assume that most of the readers have had the opportunity to get to know him.

The largest part of current business here in the West has been the flurry of orders from Ampex Computer Products for memory testers. It is expected that this will be followed by additional testers in the very near future for the same company.

Two new companies have started in the ferrite business, Electronic Memories, Inc., and a firm started in this area by Modlinski, formerly chief engineer of the Ampex Components Division. EMI, is also composed of Ampex people including Milt Rosenberg, Trude Taylor, and Bob Weiss. EMI has already ordered a 2102.

Three PDP-1 Computers are scheduled for this area:

1. U. of California, Livermore
2. JPL, Pasadena
3. BBN, L.A.

Our PDP-1 is being bid in several outstanding systems, key among which is a system for Aerojet, Aetron to be installed in the L.A. area. Several other strong interests at Holloman AFB and Lockheed, Sunnyvale are apparently stymied by the requirement for equipment rental as per Air Force policy.

Other strong interests are at the UCLA Medical Center; Electro Optical, Pasadena; United Electrodynamics, Pasadena; and Thiokol Chemical in Brigham City, Utah.

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T. Johnson (cont'd)

Two new areas of module sales are STL and Edwards AFB. STL holds strong promise for additional equipment and Edwards is currently evaluating available modules. The sale at Edwards is a result of almost two years of continual effort, but we finally managed to squeeze some of the equipment into this data acquisition center.

It would be of interest to DEC engineers to know that our equipment is playing a significant role in the Ranger space probe shots which are currently under way. This ground support equipment is installed here at the Goldstone Base and in Australia and South Africa. The PDP-1 Computer on order will be part of the Mariner program. It is very likely that additional computer sales will result at JPL following this initial order.

The Wescon show was not outstanding in the number of very strong interests for new business, but it was a very necessary opportunity to keep our name before the Western Regional engineers. The ACM show in the coming week here in L.A. should be much more specific and as a result more beneficial to our sales effort, particularly with regard to PDP-1.

In general, business in the L.A. area seems to be experiencing renewed energy and Rush Drake in Seattle is doing an excellent job of module sales at Boeing; G.E., Richland; and Minneapolis-Honeywell, Seattle. There has been relatively little interest in the Northern California area and business seems to be slacking up there in general. Wescon show may have been very timely and important, however, in revitalizing our penetration of that market.

D. Wardimon

Positive Level Amplifier 4686	35%
Tester and Data Sheet for Pulse Amplifier 4604	25%
Reference Power Supply 1565	30%
Trouble shooting in Transistor Tester	2%

The Positive Level Amplifier system module is a new unit that contains 5 inverters. The load resistor is brought out to pin E and can be connected either to +10 V or to external source up to +20 V. The output can be clamped to a desired positive level.

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H. Crouse

Delivery status of major components for computers and systems:

Memory Stacks, RCA
Four memory stacks ordered on 5/25/61, two delivered. The balance to be delivered 8/30/61 and 9/15/61. Schedule with RCA seems to be O.K.

General Ceramics
We ordered four memory stacks on 6/14/61, requested delivery by 7/26/61 and one every fourth week. As of this moment General Ceramics has not made a delivery. We talked with a Mr. Stephen Csik August 16, 1961. They are having difficulty with the cores and do not expect to be able to ship until the end of the month. Mr. Csik wrote a letter yesterday explaining the problems in detail.

Telemeter Magnetics, Inc.
We have twelve 4K memory stacks on order. Delivery is scheduled for: 4 on 11/1/61, 4 on 12/1/61, 4 on 1/1/62. We also have three 1K memory stacks on order. First delivery was scheduled for 8/1/61 as of this date they have not delivered the first stack. The explanation for not delivering is failure of a subcontractor to deliver a mechanical component to them. They are returning from vacation on the 21st, better communication will be available then.

Teletype Corporation
Five BRPE11 high speed punches were ordered 5/24/61. The first has been shipped on August 16, 1961. The balance of units are scheduled to be shipped on 8/31/61.

Soroban Engineering
Five computeriters ordered on 5/31/61. We have received one unit to date, the balance of four units are to be shipped momentarily.

Potter Instruments
Six magnetic tape handlers. Delivery schedule for shipment of one on 8/18/61.

Clevite Corporation of Waltham is supplying us with our new D001-1 Germanium Diodes. A blanket order was placed on August 8, 1961 for 1 million units, priced at .135 each, in addition, they are supplying us with the D-662-1 Silicon Diode, 500,000 units at a price of .16 each. Delivery of 50,000 of the first D001-1's are scheduled for August 29.

Texas Instrument in a bid to gain more of our semiconductor business have made an interesting offer which we have accepted. They are willing to accept blanket orders in the 1000 piece level and drop ship partials. For example we purchase 2N744's at $15.35/ea. for current drivers in quantities of 100 to 200 pieces from local distributors. We now purchase 1000 pieces for $8.05 and release shipments. Net savings $7,300.00. I am feeling out our other semiconductor suppliers on similar arrangements.

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H. Crouse (Cont.)

This Friday evening the 18th, Frank Kalwell and myself will become riggers as we are moving over to Building 4.

Amphenol has notified us of significant price changes on their blue ribbon connectors, effective September 1, 1961.

	OLD	NEW
143-827-1002	$2.55/ea.	$1.85/ea.
143-022-04	$0.68/ea.	$0.48/ea.
133-022-21	$1.28/ea.	$0.84/ea.

J. Cudmore

Summetrical Flip-Flip and Level Amplifier	60%
1973 Memory Driver	30%
Transformer Core Tester	5%
Quality Control	5%

The digital to analog conversion system for the high-speed high-precision display, has become a real problem. Due to different switching characteristics in the flip-flops transients occur in the output of the resistance ladder. By minimizing, the differences in switching these transients will be reduced. This switching problem extends to the level amplifiers which will have to be modified.

The 1973 memory driver has had a very high failure rate when using 2N1204 transistors. Changes have been made which should correct this situation. A new board has been made and several models will be built and tried in the computers on the floor.

J. Atwood

Tech publications are getting to be a major (if not the major) item in our department. We are currently producing and/or reproducing manuals on the 2105, 1516, DECAL Program, PDP In-Out Manual, and Quality Control Procedures. And there are more lurking just around the corner.

Show activity is returning to the frantic level as the fall series opens. WESCON next week and ACM Labor Day week are the next two big ones.

Product literature is getting done bit by bit. The new Short Form Catlogs (sometimes referred to as the "price list") is on its way to WESCON, and copies will be available here the first of the week. Our home printed Training Module catalog has been popular enough to justify

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J. Atwood (Cont.)

a commercial printing job, and we are sufficiently encouraged to push ahead with the preliminary Classroom Module catalog. Also on a stop-press basis are a new PDP folder (F-11A) and PDP Manual (F-15B).

The general mailing is scheduled for September 18, and it is going to go out on time, come what may. Next Tuesday or Wednesday we will make a special mailing to some 14-15,000 ACM members to promote attendance at our exhibit at the San Francisco show and, incidentally, general interest in the PDP-1.

Our space advertising (and radio advertising) at the moment are acute confined to help wanted matters. In view of the shortage of the particular kinds of help we are looking for, this advertising is drawing extremely well. While not all of the recruits are up to the standards we have established, we are getting a good flow of applicants from which to choose, even in the secretarial category.

Mrs. Helene Shebak, who has been associated with Bill Hall at Aid-O-Matic in Concord, has joined the department and will be concentrating on advertising production. We hope that Nan Bickford, the AID girl who has been with us off and on during the past year or so, will be back again in September. We can use the help.

R. Beckman

As a newcomer to DEC, I would like to start my first contribution to the Biweekly Report with some remarks about the reports themselves. About a month ago I requested all available back copies of the report. This turned out to be a pretty thick stack dating all the way back to January 1959. I had planned to go through them gradually, in my spare time, but they turned out to be such interesting reading that I wound up taking them home with me and spent several evenings absorbing them.

I wonder how many people realize how much of a thumb-nail description of DEC and its development these Biweekly Reports represent. To me, they have become the most valuable single item in my efforts to assimilate DEC's policies, procedures, accomplishments and aims. On many occasions I have referred back to the reports to gain necessary information. In other instances, a chance remark that someone may have inserted into a report has lead me to the right person, with the proper question, to find what I needed. In all probability, the very people who made contributions to these back issues would now consider much of what they said then either unimportant or "obvious to the most casual observer." To the new employee however, these items are extremely important and revealing.

By this time the point to this dissertation must be painfully obvious. The deterioration in both quantity and quality of recent reports is most distressing. Increased work load and responsibility have obviously lead many to place a low priority on the Biweekly Reports. However, we should remember that, regardless of departmental responsibilities or individual job responsibilities, we all share one over riding responsibility: collectively and individually we bear the responsibility for the continued success and growth of the Corporation. In my opinion, the Biweekly Reports are important and certainly deserve a few minutes of con-

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R. Beckman (Cont.)

scientious effort once every two weeks or so.

The Washington Office has been open for a month and a half now and it got started with a real bang. The word that we had an office in the area got around in a hurry, and I have had to sandwich the work of setting up the office itself in between visits to see people that called and asked for information. The EMEA Show at the Mayflower was small but important. As Jack Atwood mentioned in the last report, the special mailing about it brought a lot of people in who would otherwise have had no interest, and several very good contacts have resulted.

To me the most interesting part of this job is the variety. For example, the things I have been working on range from: oceanographic research systems that would involve at least one PDP and quite a few modules, to 4 or 5 modules for controlling experiments in nuclear magnetic resonance; and from random pulse counters for satellites to random pulse generators for communication systems.

We have added at least one new customer, IBM's new Communication Center at Rockville, Maryland. APL continues to be a good customer and the people out there are very pleasant to work with. We finally got some gear into Goddard Space Flight Center and this has turned out to be a real "in." I have hopes, and there are indications, that this will lead to more and bigger orders in the future.

In addition to all the traveling around the immediate D. C. Area, I have made trips to Philadelphia and Baltimore. I am planning a trip to Atlantic City the 21st with Dave Denniston to meet the people at FAA and the week of the 28th I am making a swing through about a half dozen selected areas in Virginia, North Carolina, Georgia, Alabama, and Mississippi.

Let's see, Stan just got back from a week in New York, Andy is in Europe, and I am heading for Dixie: Conclusion: don't join the Navy, join DEC and see the world.

R. Tringale

1516B	Memory Tester (Philips)	50%
2102G	Automatic Core Tester (Philco)	50%

Working on the checkout of the 1516B memory system. The 1516B has been completely checked out and is now on its way to Holland.

Working on the checkout of the 2102G Automatic Core Tester which contains high speed logic and a special sense system for Philco. The system has been completely checked out and is ready for delivery to Philco.

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Gordon Bell

ITT Checkout	50%
PDP-1 Documents	50%

I have been working on the ITT machine specifically, but generally on the documentation system of PDP-1. I would like to see a recommended step-by-step systems design procedure implemented with appropriate controls through to production.

The procedure would:

1. Provide systems design criteria
2. Aid in the accounting of systems
3. Allow scheduling of engineering talent.
4. Provide appropriate documents of various phases of idea through manufacture and test.

A. Blumenthal

Currently under test are three PDP-1's, those for ITT, MIT and CRC. Work on the ITT machine is devoted mainly to integration of mag. tape into the system. A major problem uncovered is that of cross-talk in the connecting cables induced by MB switching transients.

Work on the MIT and CRC machines has progressed well considering the absence of console controls, in-out equipment, and the memory in the case of the CRC machine. Wiring errors resulting from changes currently being made have also caused much lost time.

S. Butman

EN 1055	50%
EN 1022	50%

1055
In-Out Equipment Tester has been completed.

The Tester has been successfully used in checking out a reader, two typewriters and their logic. Punch and its logic are now being checked out. A manual for using the tester is in preparation. Note: the tester can be used in checking itself out.

1022
The type 735 power supply has been readied for production - only a few minor design changes were necessary.

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R. Doane

VHF Building Blocks	85%
Experiments with transformer cores	5%
New specifications for MADT transistors	10%

We have decided to provide Bendix Systems Div. in Ann Arbor, Michigan with a few models of our VHF line in early October (the First is our target). While we have had flip-flops able to operate at 40 and 50 Mc for some time, we have lowered our sights for production units to 30 Mc, just at the bottom edge of the Very High Frequency band. This will make it easier to build circuits with desirable flexibility and will allow wider operating margins.

Logic in the VHF line will be performed with the use of two-input level gates driving single-stage pulse amplifiers. A layout for the first printed board of this type is complete, and allows for 5 two-input level gates and 3 pulse amplifiers. Connections between level and pulse circuits are by means of movable jumpers, much like the load connections on the 1103 inverter board. For large systems, one board for each of the five useful interconnection patterns could be stocked as spare, though in small systems the need to keep track of internal jumpers is an impairment to flexibility. Nevertheless, the use of this system probably cuts wiring distances by nearly half, because:

a) wiring between level and pulse gates does not have to pass out through a connector and back
b) the number of connector pins involved in a given amount of logic is cut by one third, increasing packing density by a like amount.

Wire lengths are extremely important at this frequency, so the inconvenience occasioned by the use of the jumpers will be the price paid for VHF operation.

The flip-flop has not been laid out for printed board yet, so it is not possible to say how many imputs it will have. The goal is 3 direct and 2 gated "set" inputs, with 2 direct and 1 gated "clear" inputs.

October 1 is so close that a clock will not be attempted until the logic board and flip-flop are well on their way. These three boards will be all that is required for introduction of the line. Delay units and special circuits will follow at a later time.

R. Lassen

A Personnel Committee Meeting was held recently and the following items were covered:

1. Tuition Refund Plan (second proposal now being drafted for final approval.)

2. Military Leave Plan (announcement letter will be issued shortly)

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R. Lassen (cont'd)

3. Company Newspaper (format approved)
We would appreciate any suggestions regarding the selection of correspondents and news items.

4. Interdepartmental Transfer Procedure (announcement letter to be issued shortly)

5. Commendation Letters - pending further consideration

6. Personnel Requisition Procedure - This procedure is now in effect. We note that it is not yet being followed by all departments. This procedure is going to be extremely important with respect to the procurement and selection of personnel both from within and outside of the Company. We are sure you realize its importance and that you will all cooperate with us in getting it off the ground.

Interviews are still continuing for Assembly People, Clerk-typists, Secretaries, Senior Mechanical Draftsman, Technical Writer, Janitor, Silk Screening and a replacement for Dick Kangas who will soon move up to the Drafting Department. We are also keeping a continuous active file on Technician applicants.

Response to our latest employment ads was not good. We succeeded in attracting only a few good people even though we are using all the media available to us in this area.

New Employees
Barbara Bergeron - Secretary - Special Systems
Helene Shebak - Advertising - Production
Bill McDowell - Sheet metal shop
Ron Deyo, Jack Williams and Dick Dreslinski - Technicians
Ken Larsen - Los Angeles sales office
John McKeen - Engineering
Dave Nevela and Dave Kicilinski - Co-op students
Margaret Rand - Secretary - New York-New Jersey office

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D. Denniston

Customer Contacts & Applications	60%
Office Work	40%

As far as the New York Office is concerned, I believe that just about all of the minor time-consuming details have now been taken care of, and at last things are running smoothly. Margaret Rand has certainly made it a lot easier for me to get things in working order due to her previous experience working for Stan.

My time working with customers so far has been spent mainly in the Jersey area, but now that things are going more smoothly, I plan to spend several days on Long Island and in upper New York in the next couple of weeks.

As for the Jersey area, I have spent considerable time with people from Bell Labs, Murray Hill, and also I have talked considerably with people from Electronic Associates, Inc. in Princeton. Besides these, I have visited with people in the Signal Corp School and the Research-Development Labs at Ft. Monmouth. I believe that another order for Training Modules is now being initiated by another section of the Signal School.

J. Fadiman

Discussions with Mr. Csonth of Philips about MT 1516B (EN 2050)	45%
Final preparation of 1516B for shipment	10%
Checkout of Core Tester 2102G (Philco EN 2059)	15%
Repair of RCA Core Tester 2102F (EN 2035)	5%
Manual work for 2102 (1057)	5%
Design work on new Memory Exercisers	5%
General Sales, administration and interviewing of new personnel	15%

Almost all of the first week of this bi-weekly period was spent in discussions with Mr. Csonth of Philips and Mr. Mericle of Ferroxcube.

Ferroxcube is interested in the purchase of a Memory Tester 1516, and a proposal has been sent out to them.

The Memory Tester 1516B was shipped out to Philips of Eindhoven, Holland, on August 15.

The Core Tester 2102G for Philco has been completely checked out. It will not be shipped until the end of next week, however. Ken Larsen will familiarize himself with this equipment.

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J. Fadiman (cont'd)

We have received an order from RCA, Needham, for a Memory Exerciser 2207; price $37,000, delivery: about November 7. We have also received an order from Ampex Computer Products Company for two identical Memory Exercisers, Models 2211A and 2211B. The total price for the two is $47,400. Delivery of the first is November 1; the second on November 29.

We are bidding on a large job for Dr. Pless of MIT known as "PEPR". This is in connection with the detection of bubble chamber tracks. Dick Best has already worked out a large part of the logic for this system. We are almost sure to get this order.

The semi-automatic Core Tester 2108C was shipped out to Ampex Computer Products Company last week.

Work is proceeding according to schedule on the Memory Tester 1516C for Ferrotec. It should be ready for checkout at the beginning of September.

R. Mills

In the past week a study has been initiated which will, when completed, be a standard basis for bringing a product idea through application engineering, systems diagramming, the operational introduction memo for feasibility, pricing estimate, and other logical items to the engineering schedule, engineering, the production schedule, on through final checkout to the customer. The need for such a standard approach to product ideas has been brought about by several things, one of which is the rapid growth of DEC, and the resulting multitude of thoughts, expressions and ideas involved with our three major product lines, and in order to channel effort of the organization towards the highest priority item at all times and to present status reports showing items which will cause serious delays in any part of the schedule from idea to final delivery to the customer. Several people have become involved in this project already and when it touches your area, please give it as high a priority as you can. We anticipate that by using our computer for portions of this schedule that automatic status reports will be a simple procedure.

L. Prentice

1000	25%
1053	50%
2076	25%

Three major projects have been under way during the last two weeks:

(1) New location of Machine Shop and Sheet Metal Shop - E. H. Hinds Company riggers have been hired to move all major machinery and tools August 18th. All facilities should be

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L. Prentice (cont'd)

in operation Monday, August 21st, except painting, which will be moved at a later date.

(2) Computer Cabinets and Details - Minor changes have been made in the main frame to facilitate production and to strengthen the base. The first details for the Mag Tape doors have been released and all drafting details except some special panels will be released by Monday, August 21st.

(3) Operator's Control Console for ITT Production Model #1 - Design and control prints were received from Lippincott & Margulies, Industrial Designers, just after August 1st. Decisions have been made that we engage outside vendor to produce mechanical drafting and to provide one prototype unit complete by October 15th. Colonial Engineering Corp., Cambridge, Mass. has been selected as vendor and work was started August 15th. Lippincott & Margulies has not provided sufficient paper slot for standard IBM Soroban 16" carriage typewriter and every effort is being made to adjust this situation.

M. Sandler

Vacation time is almost over and our capacity to produce is again on the dynamic upswing. The new goal for module production is 5000 per month. Two additional girls are now working on panel wiring and cabling is being done by two of our wiremen. Our capacity to produce is going up more rapidly than our vendor delivery rate, but Purchasing is actively looking into second sources where required and doing a lot of old-fashioned "hounding".

Our summer employees will soon be leaving, but Personnel is gradually filling the gaps with people who appear promising.

J. Smith

The mechanical panel for the 2108B has been delivered. The wiring panels 1E and 1F will be delivered August 25. A cabinet will also be available at this time. This will allow 3 1/2 weeks for construction and checkout. It normally takes one man two days to wire this machine.

Mechanical panels for the 2007-1, a one bay machine, have been delivered. Wiring panels A, B and H have also been delivered. A cabinet for this machine will be available this Saturday. This means that construction can start Saturday. This allows four weeks for the construction and checkout of the machine. The memory system for the machine is being built in Production and will be delivered August 26.

The mechanical panels for the 1516E have been delivered. Cabinets for the machine will be available Monday. The first of the wiring panels will be available August 25; construction should be able to begin at this time. The last of the wiring panels will be delivered by

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J. Smith (cont'd)

the week ending September 1. The delivery date for this machine is October 16. This will allow eight weeks for construction and checkout.

Mechanical panels for the 1516D will be delivered the end of next week. The first of the wiring will be delivered September 8, final wiring September 15. Construction should commence on this date. The delivery date for this machine is November 1. This allows eight weeks for construction and checkout.

The 2007-2 is scheduled for delivery to Special Systems September 7. The 2007-3 is scheduled for delivery to Special Systems September 15. I do not contemplate any problems in meeting these dates. This will allow one month per machine for construction and check-out.

From the above information, we can see that we are in pretty good shape on our special systems. We have received some very helpful parts lists from Special Systems personnel. There are a few rough areas left in our communication system between Engineering and Production, but the last few months have showed a large improvement. We will continue to try and improve the system.

Top priority was given the ITT and MIT machines to enable their completion by the end of the month. Although there are still some mechanical parts missing, this should be cleared up by the middle of next week.

Production wiring will be completed on the machine for BBN the middle of next week and will be available for checkout.

Intra bay wiring of ITT production #1 will begin Monday. The panels for the tape unit are nearing completion and will start to be tied together the middle of next week.

The Georgia Tech machine is in the sub-assembly stage.

D. White

1554 cascaded amplifiers	28%
2301 scanner logic	19%
Leaky circuit boards	9%
Sales	7%
Discussion of circuits with man from Phillips	5%
Quality control - troubles with circuits and burst gen.	12%
Misc. circuit development, tester design, checkout	13%
Other misc. - interviews, writing biweekly, etc.	7%

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D. White (cont'd)

A problem which has been growing worse came to a head last week. This is the problem of leaky boards. We were first aware of this problem about six weeks ago when a few boards in a lot of inverters showed high collector leakage. As a matter of fact, they showed high leakage with the transistors removed. Since then the mortality rate has climbed until last week there were two lots of thirty boards in which there were twelve rejects each.

The leakage was definitely surface leakage, since scribing a line around the offending piece of copper cured the trouble. Placing the boards in the oven helped in some cases, did nothing in others. Washing the boards in alcohol was somewhat effective but not conclusive. At this point, we called in the Formica rep, who took some sample boards to send to their plant in Cincinnati for analysis.

Meanwhile, Jerry Bouthiller started looking through his papers and came up with what may well be the answer. A technical bulletin from the people who make our etching solution states that unless boards are rinsed immediately after removal from the etch, a film of ferric hydroxide may be left on the surface. This film can be removed by use of a 2-5% hydrochloric acid bath.

If the acid bath is the answer (and so far it seems to be), we can salvage all boards in stock. However, our whole etching process needs reviewing. The Formica people seem quite alarmed at the length of time the boards are in etch. The acid bath should not be necessary in the future if boards are washed properly. Washing has been a problem because of trouble with the ink used in screening. Perhaps an agitated or spray etch could solve most of these problems at the same time.

Some of the logic for the 2301 scanner is complete. Bruce McCormick of the University of Illinois is due in today (August 17), and we hope to have more of the details settled at this time.

Al Falco has been doing work on cascading sense amplifiers. A few people have asked about testing core zero outputs with a greater degree of accuracy, hence we are checking stability, bandwidth, etc. of two X10 amplifiers in cascade. Indications are that it can be done, but how stable the system will be is still open to question. A gain of 100 and an extremely wide bandwidth make the system tend to oscillate.

D. Wardimon

4604 Pulse Amplifier 100%

The 4604 Pulse Amplifier came out very nicely and is just ready for lay out and production. The unit consists of a single shot multivibrator, the time constant of which determines the out pulse width, followed by a single amplifier stage.

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D. Wardimon (cont'd)

The unit output is:

1. 1 μsec pulse width at P.R.F. up to 330kc (obtainable by shortening two terminals on the connector)

2. .4 μsec pulse width at P.R.F. up to 1mc (normal operation)

3. Any pulse width between .4 to 1 μsec (obtainable by connection of appropriate external capacitor between two terminals) - The max. P.R.F. varies with the pulse width: from 330kc to 1mc

Inputs: There are two input terminals: one for positive or positive going levels (any pulse width from 70 μsec up). The other input is identical but for negative pulses and negative going levels.

Because the intention is to mount 3 circuits on each board, we are short of extra pins on the connector and this gating is not possible with the present unit.

H. Bronstien

EN 2037 (ITT)	10%
EN 2052 (MIT)	20%
EN 2053 (CRC)	20%
Programming	30%

EN 2037 (ITT) - Modifications and checkout

EN 2052 (MIT) - Wiring in console and checking the modifications

EN 2053 (CRC) - Checking the modifications

Programming - Writing a program for any integral mat.

Paper Work - (20%) - Corrections on block wiring diagrams.

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R. Whipple

ME 2207	10%
ME 2211	40%
MB 2007	20%
Recruiting	10%
Scheduling	20%

Many engineers within the company may not be aware of why scheduling is so important.

Let me show the Special Systems Group's needs during the next few months as an illustration of DEC's needs for better group and inter-group scheduling of production and manpower requirements. Between now and December 1, we must deliver 10 systems (several more purchase orders may be coming in within the next few weeks) which sold for better than $300,000. The attached work schedule shows when we need to receive certain items from production and also shows when our own group must complete certain system assembly steps in order to meet delivery dates. The Computer Group requires a production output over and above what I have listed. There are also many more orders through the Sales Department that must be scheduled through production. Somewhere all of these requirements must be married together in such a way that everyone will be happy. This requires realistic scheduling on everyone's part in order to set up reasonable priorities. (Sounds like small company growing pain problems, doesn't it?) Late production delivery not only delays final system delivery but also causes much manpower waste. A glance at the attached manpower schedule illustrates this. Assuming a minimum amount of manpower available during any given week, what happens when some item is late in arriving from production? This may leave a technician with no assigned job for that week, and don't ask me where that lost manweek of work is supposed to be picked up. I know, I'm acting like an idealist because perfect schedules don't exist, but do we have any choice but to try to approach them?

The attached schedules are my attempts to foresee how best to accomplish work within our group. I have used delivery dates as given to me through September, except for the questionable core tester, for which we have no purchase order. The final control for all delivery dates, of course, lies strictly with the Production Department.

The Memory Buffer Systems are proceeding fairly well. Delivery of the first one may be late, contingent on delivery of the memory stack, which is late already.

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SPECIAL SYSTEMS MONTHLY MANPOWER SCHEDULE

SYSTEM	MONTH / WEEK ENDING / DEL. DATE	AUG. 25	SEPTEMBER 1	8	15	22	29	OCTOBER 6	13	20	27	NOV. 3	10
MB2007-1	9/14	4, 12	13, 11										
MT1516C	9/19	2	6	6									
CT2108B	9/19	11	5	5									
MB2007-2	10/5		14	13		4							
MT1516E	10/16			11, 15		6	6						
MB2007-3	10/26				2	11							
ME2211A	10/30		3		1	13							
MT1516D	11/1				3	15							
ME2207	11/7			1									
ME2211B	11/27												
CT210?	10/30			3			○						
SC2301		3											
PRPR					5	5, 14	5						
SUPERVISION		5	6, 5	6, 5	6	6, 5	4, 5						
VACATION		1, 4	2										
OPEN													
TOTAL	MANWEEKS	8	9	10	10	10	10						

① JOHN STEF.
② TED RADZ.
③ JIM HOGAN
④ PETE JAN.
⑤ FRED GOULD
⑥ LEE BUT.
⑦ DICK TRIN
⑧ JOHN MACK
⑨ DICK WHIP
⑩ JOHN FAD
⑪ TED KAUPI
⑫ DICK BANKS
⑬ NEW #1
⑭ NEW #2
⑮ NEW #3
Ⓐ
Ⓑ
Ⓒ

R. L. Whipple

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SPECIAL SYSTEMS MONTHLY WORK SCHEDULE

DATE

SYSTEM	MONTH / WEEK ENDING / DEL. DATE	AUG. 25	SEPTEMBER 1	8	15	22	29	OCTOBER 6	13	20	27	NOV. 3	10
MB2007-1	9/14												
MT1516C	9/19												
CT2108B	9/19												
MB2007-2	10/5												
MT1516E	10/16												
MB2007-3	10/26												
ME2211A	10/30												
MT1516D	11/1												
ME2207	11/7												
ME2211B	11/27												
CT210?	10/30												
SC2301	?												
PRPR	?												

△1 LOGIC DRAWINGS COMPLETE
△2 WIRING DRAWINGS COMPLETE
△3 PANELS ASSEMBLED
△4 SYSTEM WIRING COMPLETE
△5 SYSTEM DELIVERY DATE
△6 MODULES, POWER SUPPLIES ORDERED
▽7 NEED CONTROL PANELS
▽8 NEED WIRED MOUNTING PANELS
▽9 NEED CABINET
▽10 NEED POWER SUPPLIES
▽11 NEED SYSTEM MODULES

R. L. Whipple 8/17/61

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K. H. Olsen

As we get to be somewhat larger a company, it is important that we pass on some of the standards and techniques which we have developed. George Geralds is developing a book of construction techniques, which eventually should cover all the standard ways of mounting components and soldering to them. Any ideas or suggestions or pertinent information that anyone has will be gratefully accepted.

I have asked Maynard Sandler and Jack Atwood to publish a list of standard components which we now stock. I have observed that we are now stocking several component types, which could be eliminated if the engineer specified the item already stocked. Another by-product of this list would be giving the engineers an opportunity to criticize some of the items we stock, because some of them may not be of good quality, or they may not be used any more and should be eliminated from stock.

One of the components which we have outlawed is open contact relays. We're redoing all the power control panels for PDP and tape units and eliminating these open contact relays. The exceptions to this rule are motor contactors, which, because of their very rugged construction, high voltage and high current, will maintain reliably clean contacts.

We have simplified the logic of the power control panel by the use of an Agastat time delay relay. These units do very simply an operation which is very difficult with normal time delay relays, because they are available either slow on-fast off, or fast on-slow off, or slow on-slow off.

I was quite shocked to see the ambiguous way with which our round Amphenol connectors are labeled. I am seriously considering that for our intercabinet cabling, we should go to the rectangular Amphenol connector, even though it is more expensive. As a minimum, we should have Amphenol relabel the round ones, so that they are no longer ambiguous.

R. F. Mills

We have recently taken out a Company Membership with the American Management Association, Inc. There are several Advantages over individual memberships, among them, special member registration rates for AMA conferences, workshops and orientation seminars; consultation and borrowing privileges of the Management Information and Library Service; and six members of the company will be able to receive periodicals, management reports and research studies in twelve divisions. In addition, all members of the company are entitled to purchase publications at a special member discount.

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R. F. Mills (cont.)

We are in the process of establishing a central filing location in the accounting department for these publications. When the six members of the company are finished with the material they receive, it is to be forwarded to the accounting department. These files will be open to anyone in the company. There are eleven divisions of AMA, and the following schedule, by individual and by division, will be of some help in locating any missing publications:

General Management	H. Anderson
Insurance	B. Gurley
R & D	R. Best B. Gurley
Marketing	H. Anderson
Personnel	S. Olsen
Finance	R. Mills
International Mgt.	R. Best
Admin. Services	R. Mills
Manufacturing	M. Sandler
Purchasing	S. Olsen
Packaging	M. Sandler

We hope to see a lot of activity with these publications, as many of them are quite perceptive and exhaustive studies, in addition to being of current interest.

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M. Sandler

Our inventory - taking and pricing period is ended with apparent satisfactory results. I personally thank all who participated- the long hours and pressure were cheerfully borne by all.

We are looking forward to our expansion to the third floor of building 12. Our major problem will be setting up "field" inspection stations. George Geralds will dispatch inspectors to our various and more widely-spread working areas. It is firm policy that all production effort be inspected and passed - on by Quality Control and Inspection personnel, not by the producing department or group itself. George and his people are ready and able to perform our final quality inspection.

J. Smith

The first computer to be completely constructed by production is nearing completion. The in-out panels are all that remain to be wired into the main frame. This computer did not wire up as rapidly as could be achieved, the reason being that a lot of the wiring that could have been done on the bench had to be done after the panels were mounted into the racks.

The second computer for B.B.N. California has progressed at a very rapid rate. Inter-bay wiring will start Monday. This machine has been broken down into 12 basic sub assemblies, in order that most of the wiring could be accomplished on the bench.

Maynard and myself are currently working on a Schedule Chart for all P.D.P.'s that are currently on order. We feel that this will be completed within two weeks. Also in process is a Manufacturing Process Chart.

I am currently having wiring schedules made up for all wires running between bays 1 & 2 on the main computer frame. This will eliminate the handling of several bulky wiring diagrams while wiring between bays and should reduce wiring inspection time. In the future I feel that these wiring runs should be made pluggable. This would enable us to complete almost all wiring on the bench.

R. Lassen

We are pleased to announce that all new candidates for employment who were introduced in the Bi-weekly Report of July 14th were given a clean bill of health. All have reported for work except Dave Pinkney who will report to work on 7/31/61 as a Computer Check-out Technician.

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R. Lassen (cont.)

We are also pleased to announce the following new additions:
Joan Bedford and Ed Unis - Assembly

Roger Turgeon has joined the Computer Division as a Computer Check-out Technician.
Dorothy Bergeron has joined the Accounting Dept. as a Clerk-Typist.
John Shields and Jim McPherson will soon join our Computer Division pending their physical examination. Both John and Jim have a good background in Computer field service with Burroughs.
John Coates will join our technician group as soon as he passes his physical. He will eventually become an administrative assistant to Ed Harwood.

An offer has been made to Harrison Morse for the position of Engineering Programmer. If he accepts our offer, he will assist Gordon Bell with Computer programming.

An offer has also been made to Arthur Hall for the position of Administrative Engineer. He will assist Ben Gurley with liason, planning and other administrative problems. He will also be helpful in the preparation of technical literature as he has some background in this area. He is currently with Westinghouse in an engineering-administrative capacity.

We have also made offers to Ronald Deyo, Jack Williams and Dick Dreslinski who will come to us as technician trainees.

The following projects are now before the Personnel Committee for consideration:
(a) Military Leave Plan
(b) Tuition Refund Plan
(c) Transfer Procedure
(d) Commendation Letter

I would like to re-emphasize the need for establishing more definite policies and procedures. If you have any ideas along these lines, please submit them to the Personnel Department. As the company grows it is becoming more and more necessary to tie up the "loose ends."

Our recruiting program for good Clerical typists and Executive Secretaries has not been successful. The response both from ads and from employment agencies has not been good and the calibre of applicants has been poor. We are expanding our efforts in hopes of getting a better selection of applicants. If you know of anybody with some secretarial background who might be interested; ask her to come in to talk with us.

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J. Fadiman

Proposals & Sales for Memory Tester	30%
Proposals and Sales for Memory Exercisers	20%
Installation of three Core Tester Systems	30%
Core Tester checkout	10%
Memory Tester Checkout	5%
Miscellaneous engineering & Administration	5%

The Automatic Core Tester Model 2102F was installed at R.C.A., Needham.

The Automatic Core Tester, Model 2105 was installed at General Ceramics, Keasbey, New Jersey.

The Semi-Automatic Core Tester, Model 2108A was also installed at G. C.

Construction has been completed on the Automatic Core Tester 2102G for Philco Corp. Checkout was started this week. Final checkout with the new drivers is also being completed on the Memory Tester 1516B for Phillips.

Construction has been completed on the 2108B for Ampex Computer Products, and checkout has been started. We are waiting for drivers.

New orders have been received in the past two weeks for:
Memory Tester 1516E for RCA; price: $55,500: Delivery: Oct. 16.
Memory Tester 1516D for Ampex; price: $53,850; Delivery: Nov. 1.

The order is expected shortly for a Memory Exerciser, Model 2207, for RCA, Needham. Ampex Computer Products expects to order two Special purpose Memory Exercisers, similar to the Model 2205, in a ver short time. The likelihood of their purchasing a lage general purpose Memory Exerciser, similar to that proposed to RCA, is also good.

A. Blumenthal

PDP-1C-2 (ITT)	50%
PDP-1C-5 (MIT)	10%
PDP-1C-1 (ITEK)	10%
PDP-1B (BBN)	10%
MISC.	20%

Good results were obtained in our quest for technicians to perform computer checkout. Two men have been hired, with two others likely to join us. These, with two engineers temporarily assigned to checkout, and three men already in the company provide a well rounded team.

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A. Blumenthal (cont.)

Checkout of the central part of PDP-1C#2 is nearly complete and work on the in-out part has commenced.

PDP-1C-5 has gone through the preliminary phases of tests (special pulses, time pulse generator, all cycle zero & cycle one command pulses) with only a single wiring error encountered. The memory will be tested as soon as the stack is recieved.

Step by step testing procedures for all console controls and special pulses have been worked out and documented with contributions from Bill Farr and Leo Gossel. Procedures for the time pulse generator and command pulses are partially evolved.

PDP-1B (BBN) was modified to reduce the cycle time to 5.1 us from 6.3 us. Some difficulties were encountered with slow selection time of the read-write switches and an investigation of the circuit will be made to determine the cause. A slight change was made in the Cal logic because of close timing between TP1o and TPo. Some clean up work remains to reduce noise outputs from the memory planes.

R. Whipple

MT1516 Manual	35%
MB2007 Manual	10%
MB2007 Assembly	50%
Memory Tester Sales	5%

If you happen to be making a sales trip to any educational institution I think it would be worth while to make them aware of our Memory Buffer 2007. The price of $24,700 is'nt too inviting but its capabilities are. The Buffer is essentally a computer without control logic (it does have and input keyboard and an output printer) and should be of great value to any school that provides courses in logic design. The existing brochure (F-2007) is about 90% accurate.

B. Stephenson

Raytheon	50%
Literature	20%
General Sales	30%

For anyonewho hasn't heard, Raytheon has received an $11,000,000 contract to build radar bright display display systems for the F. A. A. Air Traffic Control. These systems will require about $2,000,000 worth of digital equipment. We hope to convince them that this digital equipment should be made by Digital Equipment Corporation.

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B. Stephenson (cont.)

There seems to be a large need for more information on the new quadruple flip-flops, and capacitor diode gatex packages. One of my recent projects has been working on a sort of logic book supplement to describe these modules in their applications. This would put together under one cover all of the applications information we already have for these modules plus some additional ones, such as building a BCD up-down counter, serial adder, parallel adder, and a BCD parallel adder, with 4215's and also the use of dual 4141 gate package.

R. Doane

Proposal for 10Mc Programmable Pulse Generator	25%
Interviewing Applicants for Technician's Jobs	10%
Correcting out-of-tolerance transformer cores	6%
VHF Circuit Development	59%

IBM (Components, Poughkeepsie) has asked us to bid on a 10Mc version of the 2104 Programmable Pulse Generator that we delivered to them a month ago. It is to have six channels, and a more flexible step-repeat arrangement. It would be our first 10Mc system. The bid is ready to be typed, and preliminary design is done.

The latest version of the 50 Mc flip-flops actually operates at 50Mc. Plenty of noise exists everywhere in the circuit, though, and must be eliminated. Also, the present 4 watt dissipation is too high. The fact that it can count a 50Mc pulse burst with rise and fall times (20% to 80%) of about 3 nanoseconds is encouraging never the less.

J. Koudela Jr.

A master program library is currently being developed for PDP-1. Its content, organization, use, and maintenance will be described in a forth coming DEC memo. Briefly, however, the establishment of such a library is extremely important to DEC to help present PDP-1 Customers make the most efficient use of their computers. It is equally important to have a well documented, large library in order to sell more PDPs.

For each program or subroutine in the library there will be an instruction tape (punched tape), a program writeup (describing the program and how to use it), and a program listing (A list of the instructions that are punched on tape). Part of the library, to be called "The Basic Library," will be supplied with each PDP-1 when it is delivered. The remainder of the library will be available for distribution upon request of the user. As new programs are added, users will be notified so that they may request those that appear to be useful to them.

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J. Koudela Jr. (cont.)

Program distribution is planned to be both impressive and practical. Packaging will consist of an attractive folder containing the write-ups and listings in one pocket and a blue and clear plastic tape tray (manufactured especially for DEC) in the other pocket. The tray is capable of holding as many as 8 individual tapes each up to 120 feet long (Fan-Fold). The folder and tape tray will be ideally suited for storage in standard lettersize filing cabinets.

The library's "source of supply" is DECs own Programmers, Computer Consultant firms, and all PDP-1 users (who have already formed a "users society" for the express purpose of exchanging programs). Users programs will be reproduced and distributed by DEC and thereby become part of the Master Library.

PDP-1 Prospects and Customers

Since June 1, 1961 DEC has submitted price quotations and/or technical proposals for PDP-1 to the following firms:

1. The Teleregister Corporation; Stamford, Connecticut.
2. Radiation, Incorporated; Melborne, Florida.
3. Curtiss-Wright Corporation; East Patterson, N. J.
4. Airborne Instruments Laboratories; Long Island, New York
5. Jet Propulsion Laboratory; Pasadena, California.
6. Consolidated Systems Corporation; Monrovia, California.
7. Systems Research Laboratories, Incorporated; Dayton, Ohio.

Since June 1, 1961 DEC has submitted specification and design progress reports for special PDP-1s under construction to:

1. Cambridge Research Center (Research Laboratories)
2. Cambridge Research Center (Operational Analysis Laboratory)

Firm PDP-1 orders received since June 1, 1961 were as follows:

1. The Geotechnical Corporation; Garland, Texas (1 PDP)
2. Bolt, Beranek, and Newman; Los Angeles, California (1PDP)
3. International Telephone and Telegraph; New York City (2 PDPs)
4. University of California (Lawrence Radiation Laboratory); Livermore, California (1 PDP).
5. Massachusetts Institute of Technology (1 PDP ... Gratuity)

In addition to the above firms, the following appear to be strong prospects to purchase PDPs in the near future:

1. Cambridge Research Center (More?)
2. E. I. Dupont, Wilmington, Delaware.

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J. Cudmore

Memory System 2008	33%
Constant Pulse Width P.A.	33%
1982 Inhibit Driver Tester and Test Data Sheet	12%
Quality Control	8%
2303 Burst Generator	4.5%
D-661 diodes	1.5%
Sales dept. conf.	

The 2008 Memory System is coming along nicely. Almost all the paper work is completed. The 1982 Inhibit Driver Tester has been built and checked out and a test data sheet made. The front panel of the 2303 Burst Generator is being redesigned in order to make it more attractive and easier to use. Al Falco, a new engineer, is now handling this project. The use of a silicon D-001, a D-661, has been considered for use in the modules. These diodes have a lot to offer being more rugged physically, and having extremely low leakage at high temp. but their characteristic differ significantly from the D001. In order to use this diode major circuit revisions would have to made and this idea has been shelved. I have started work on a improvement in our P.A. circuits as suggested by Bob Hughes in Last BiWeekly.

D. Wardimon

1. ½ Usec. Pulse width Pulse Amplifier (4605)	50%
2. 1 MC Pulse Amplifier (4604)	50%

G. Bell

Utility Programming	25%
Itt System	30%
Production Test Equipment	15%
PDP-1 Sales	30%

I have been writing a manual which is entitled "The Electrical Inter-Connections and programming for devices connected with PDP-1. This will hopefully be analogous to the Logic Handbook for people who wish to realize the inherent in/out capability of PDP-1.

E. de Castro

General Sales	100%

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J. Atwood

Direct Mail - The basic mailing list is finally all on tab cards, and the total turns out to be in the neighborhood of 11,000. This does not include all the additions waiting to be made when we get the complete list together in proper sequence. After the basic list has been assembled, a print-out will be made for district sales office listing the names of all prospects in the areas each one covers.

The special mailing to prospects in the District of Columbia and the surrounding states is reported to have helped build booth traffic at this week's EMEA show in Washington. This was an important show, but a small one, and it could have been a rather quiet event if we had depended entirely on normal show traffic.

Trade Shows - Latest addition to the list of trade shows for the balance of the year is the Special Technical Conference on Non-Linear Magnetics at the Statler in Los Angeles November 6 through 8. This is the 1961 equivalent of the conference in Philadelphia last fall to which we took cider and Memory Testers.

This brings the trade show list to eight in the next five months -- two on computers, two on magnetic devices, and four on general electronics. As for 1962, we have applied for three adjoining booths against the back wall on the First Floor at the I.R.E. show (one for each division). After all, it doesn't cost any more to ask for the best than it does for what we'll wind up with.

Product Literature - The new Training Module Catalog, the Diagram Sheet on new 4000 Series units, the Module Integration Rules sheet, and a temporary bulletin on Classroom Modules were produced in time for the EMEA Show. By this afternoon, we hope to have 80 copies of the new Schematics Book assembled for distribution. This book will contain condensed replacement schematics on all units listed in the Short Form Catalog. Schematics on new units and new schematics on old units will be forthcoming shortly.

Mailing and show requirements necessitate our getting back to press immediately with practically our entire line of product bulletins and catalogs. If you have constructive suggestions to make regarding changes in or additions to any piece or pieces, please let us have them right away. (Yes, we'll put the right area code with the Maynard telephone number.)

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J. Atwood (cont.)

Technical Publications - Complete copy for the AMCT 2105 manual and partial copy for the MT 1516 manual have been received, and these publications will be in the works next week. We are changing to a new format which should give our manuals a more finished, professional appearance.

Descriptive information, parts lists, schematics, photographs, and keyed drawings of the units being purchased by the University of Denver are virtually complete. This material will be used by the University in preparing instruction sheets on each unit.

Specialties - The order has been placed for plastic file folders for fanfold tapes. Also under consideration are program portfolios which would make a nice package of the programs and tapes, program forms on which programs can be typed and reproduced, and adhesive labels for tape identification.

Public Relations - Plant and parking maps have been distributed, together with a cover letter on departmental relocations, to all employees. These seem to have been appreciated. Also distributed was a notice of the annual outing on September 16.

The new employment application has been put together in preliminary form. This will be a six-pager (including a cover and a page for recording processing of the application). There is also a special two-page insert to be filled out by applicants for staff positions.

Industrial Design - The first drawings on the ITT production machine are in from Lippincott & Margulies. They appear to be sufficiently detailed to be of real help to us. They are working at the same type of pan mounting for the input-output typewriter that we are developing for the DEC machines. (However, the new IBM output writer may change this whole picture.)

Temporary packaging is being provided for the Classroom Modules and CM Mounting Panels. The packages are simple knockdown-type cartons, but we will be able to silk screen them so that the products will go out looking like an established line.

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DATE July 14, 1961

This issue of the Biweekly Report contains a summary of the time spent by members of the engineering staff on various projects during the period July 3-14. The approximate distribution of each man's time is given immediately following his name. The purpose of this listing is to give some indication of the wide variety of engineering projects presently in process throughout the company and the particular individuals who are working on these projects. We hope you will find this a worthwhile addition.

Contributors

The following people made contributions to this Biweekly:

H. Anderson	J. Brown	E. Harwood	R. Mills
J. Atwood	H. Crouse	R. Hughes	L. Prentice
G. Bell	J. Fadiman	R. Lassen	D. White

These dozen contributors represent approximately 30 per cent of the 41 people who are asked to participate. To put it another way, 70 per cent of the should-be contributors are either unwilling or unable to report on interesting developments in their particular area of responsibility. This lack of cooperation cannot help but impair the value of the Report.

There is also some evidence of flippancy in certain of the contributions and engineering time summaries. This is hardly to be expected from mature and responsible persons, and it in no way enhances the informational quality of the Report.

We ask that between now and the time the next Report is issued you give this matter your serious consideration. The Report is yours to make of it what you will.

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R. Hughes (cont'd)

Components - Effort was expended to get the price of the MA-80 lowered, and it was successful. The price is now $2.65 in quantities of 100,000. This transistor is identical to the 2N1427, except it is higher in speed; i.e. hfe = 16 at 5 MC. When Ic = 5 MA, Vc = 3V. The 2N1427 hfe is 10 at 5 MC. When IC = 5 MA, Vc = 3V. It costs $3.05 in quantity.

The new Philco 2N2048 was evaluated because it looked like a miracle, viz. 50 MA. Beta is 35, 10 MA. Beta is 50. BVCBO and BVCES are 20 volts. Vce Sat is 0.2 volts at 50 MA. Ic when Ib is 5 MA. Vce Sat is 0.14 volts at 10 MA Ic when Ib is 1 MA, and the FT is 150 MC min. at Vce 10V. IE 6 MA. F=80 MC. At first glance, this device looks faster than the MA-80 because this has a gain bandwidth product of 150 MC, versus the MA-80's 80 MC G.B.P., but the difference is in the method of measurement. The 2N2048 is measured Mesa fashion with a high voltage, 10V versus 3V for the MA-80.

It turned out that the 2N2048 is about one-third as fast as the MA-80. Indeed, the 2N2048 is slower than the 2N1754 which we use in our low speed line. However, it has a dissipation rating of 150 milliwatts (the technique of getting higher dissipation in MADT's was to fill the can with alumina), and it could prove useful as a one-megacycle or 500 KC switch with excellent fan-out.

We are attempting to get diodes at a price of about $.16 each in quantities of one million. Several manufacturers are interested, and we are trying to get the most for our money.

The filter capacitors in most all Power Supplies have been changed from 20,000 MFD at 20 volts to 35,000 MFD at 25 volts. This has reduced the ripple and provides a higher degree of AC transient protection for systems.

Circuits - The models 52 and 62 Core Drivers are being modified to have fine control of amplitude. The 1562 Precision - 10 volt Power Supply was modified to make its stability 1% as advertised. A 1565 is being designed, and it is hoped to achieve a regulation and stability of 0.2%.

A new Pulse Amplifier is being investigated which will standardize pulse width at 70 nanoseconds. This is desirable because narrow pulse width can mean low margins.

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H. Anderson

PDP-1 Sales: New order prospects continue to appear very good for the PDP-1. Because of it, we are experiencing a delivery problem at the moment. In the normal quotation we have been specifying delivery as so many months (7 1/2 at the moment) after receipt of order. This is what the customer wants, and this is what is normally done in the industry.

However, it is impossible to know which customer will accept our quote and place an order, and more important, when they will place the order. We now have a large bunching of deliveries in February 1962, due to this phenomenon. We are considering a new quoting plan where we allocate our production capability; e.g. if we feel that we can turn out four PDP-1's per month, then we only issue quotes which must be accepted in a very short period of time. At the moment, they should be effective for no more than thirty days unless special situations arise. They can be renewed with a new delivery date.

Letters of intent are expected from Systems Research Laboratory and Jet Propulsion Laboratory in the next ten days.

Association for Computing Machinery Convention: The ACM Convention, to be held in Los Angeles beginning September 5, will have exhibits for the first time this year. We plan to have the PDP-1 which is being given to MIT on display there. This will be flown out and back.

We also hope to have an announcement about the availability of ALGOL for the PDP-1. BBN is working on this for us this summer. We want to have at least preliminary literature or handbooks ready. BBN's work will include considerable documentation from which this can be generated. We have reprinted the original ALGOL-60 specifications from the proceedings of the ACM, and these are available for internal distribution from John Koudella.

PDP-1 Users Group: Our user group is beginning to be more active in documentation. An early fall meeting will be scheduled. John Koudella is our main representative to this.

R. Mills

Today we are signing a new lease with Maynard Industries, Inc., for our 75,000 sq. ft. for a period of five years. As a result, Maynard Industries has agreed to tear down Buildings 15-19, where the wool is now stored, for additional parking.

If anyone has a friend who has an interest in accounting, we need an accounting clerk. Please have them call Bob Lassen.

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R. Mills (cont'd)

My congratulations to all of you who worked on the inventory. Our preliminary figures give evidence of a job well done.

G. Bell

Input-Output for PDP-1C-1 (ITT)	25%
PDP-1C-2 (ITT)	25%
PDP-1 Sales	50%

The DEC donation of a PDP-1 to MIT Electrical Engineering Department consists of a basic PDP-1 with a loan of a high-speed multiply/divide module.

The computer will be placed in Building 26 next to the TX-O Computer. Eventually, the two machines will be connected. Several typewriters will be employed to allow multiple users.

MIT tentatively plans to purchase a drum system for the PDP-1. I feel we can count on MIT doing some rather interesting things with the machine.

J. Fadiman

Memory Tester checkout	20%
Core Tester Design and checkout	50%
Memory Tester and Core Tester Sales and Proposals	20%
PDP-1 Memory Exerciser	10%

During the past two weeks the following work has been accomplished:

Core Testers: The Automatic Core Tester 2102F was fully checked out and shipped to R.C.A. Needham on July 10. This was four days ahead of the scheduled shipping date. I will go down to R.C.A. to install it with the Ramsey Handler next week. Several design changes have been made on the 2102G for Philco Corporation because of the required purchase specifications. This involves one different testing program, and using all high speed units so as to achieve one megacycle operation, and several other minor changes. All mounting panels and front panels have been completed for this machine, and the interwiring is nearing completion now. The Automatic Core Tester 2105 for General Ceramics has been completed and all initial checkout has been completed. I will complete the final checkout today and the beginning of next week. The Semi-automatic Core Tester 2108A was shipped to General Ceramics on July 5. I will install both machines for General Ceramics when they come back from vacation on Monday, July 24.

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J. Fadiman (cont'd)

Memory Testers: All wiring and initial checkout has been completed on the Memory Tester 1516B for Phillips. All the logic has been checked out, and I am now waiting for current drivers to do the final checkout work. We have received an order for the 1516C for Ampex International Operations. All drawings have been completed and signed. The mounting panel wiring is in production, and many of the front panels have already been fabricated. Delivery date of this machine is September 19.

Other Special Systems: All of the design work has been completed on the Memory Exerciser 2210 for testing out the DEC PDP-1 Memory Systems. Block diagrams, wiring diagrams, and front panel drawings have been completed. Front panels are now being fabricated in the shop. The mounting panel wiring will be released to production on Monday. Block diagram work is being done for the three Buffer Memories, and the printing equipment has been ordered. The first stack is due here August 7.

New Orders: We have received an order for the 1516C from Ampex International Operations, price $55,850. We have also received an order from them for a Semi-automatic Core Tester 2108B, price $9,600. Delivery Date: September 19. We have also received an order from Ampex Computer Products Company for a Semi-automatic Core Tester 2108C, price $9,100. Delivery date: August 9. We expect an order almost immediately for a Memory Tester 1516D from Ampex Computer Products Company. The price for this would be $53,150. I have made a proposal to the Burroughs Corp. for a Memory Tester 1514 or 1516. The chances of receiving this order are about 60%, and the price is between $44,000 and $54,000 depending on exact specifications. I have also made a proposal to Ampex Computer Products Company for a Memory Exerciser. The chances of getting this contract are about 80%, and the price is in the order of $42,000. I am also awaiting an order from R.C.A. Needham for one Memory Tester 1514 or 1516. Chances of making this sale are about 80%, price about $52,000. I also have a proposal out to R.C.A. Needham for a Memory Exerciser. Chances of receiving this order are about 60%, and the price is in the order of $37,000. I have also made a proposal to Mr. Gereld Smith of Daystrom Instruments Inc. for a Memory Exerciser Type 2209, which will be almost identical to the Memory Exerciser 1513 which we delivered to Daystrom a long time ago. The chances of receiving this order are about 80%, price $20,000. A proposal will go out next week to Ferroxcube Corp. for a Memory Tester 1514 or 1516.

I have been working with Mr. Cyrus Burton on a detailed operating and maintenance manual for our Automatic Core Teste . He runs the company Cyburtek, which writes manual as a business. On July 13, we gave him a purchase order for the manual for the Automatic Core Testers. The completed manual will be delivered in about six weeks from that date.

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H. Crouse

Significant savings were effected with a blanket purchase of 2N1427 (MA-80) Transistors to Sprague. Previously $3.28 now priced at $2.65 each.

Delivery of the first RCA memory stack has been delayed until July 26th. Cause of delay has been attributed to a sub-contractor's failure to deliver hardware.

T.M.I. will deliver their first stack on August 7th, one week later than our requested delivery date. Their vacation schedule will interrupt production.

R. Lassen

Because of our rapidly increasing personnel requirements, we have been conducting extensive interviews for Draftsmen, Apprentice Machinists, Electrical Engineers, Computer Check-Out Technicians, Assembly and Clerical people. Responses to our employment ads have been reasonably good, and we are pleased to announce the following additions to our growing team:

Bill Farr and Al Falco, two Junior Electrical Engineers, will join our engineering force on July 17.

Roland Gosselin, an enthusiastic young apprentice machinist, will be a welcome addition to the machine shop on July 24.

Pending a physical exam, Tom Houston will soon join our Drafting Department. Tom has had several years of diversified drafting experience.

Pending physical exams, Leo Gossel and Dave Pirkney will join our Computer Section as Computer Check-Out Technicians. Both of these men have a good technical background and computer check-out experience.

Sandra McDowell, Dorothy Pugsley and Bill Natale will soon join our assembly group, if they, too, check out physically.

Our search will continue through ads for another Apprentice Machinist, Executive Secretaries, an Accounting Clerk, assembly and clerical people. We anticipate another busy week which we hope will prove to be fruitful.

Personnel Forecasts and Plans of Operation are currently being submitted by each department head. These forecasts, substantiated by a plan of operation, based upon a project sales forecast for the next year, will serve as a personnel planning and cost planning guide.

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R. Lassen (cont'd)

As with most young companies, new situations arise which make it necessary to establish a precedent, policy or procedure. Such was the case recently, with regard to a Night Premium and vacation procedures. In cases where there is no know policy or procedure, or if the policy or procedure is questionable or controversial in nature, we urge that such cases be reported to the Personnel Department.

D. White

Preparation for sales trip to Ohio, including applications work with B. Stevenson and E. deCastro.	45%
Quality Control problem with circuits	33%
Working on a fast slicing circuit	11%
Overseeing some of Prof. Edwards work on Digital to Analog conversion and spending time with Al Swift on the Sense Amplifier	11%

Dick Whipple and I went to IBM with the 1517 a few weeks ago. Dick will probably be covering most of the details. I'm sure glad I don't work for IBM. Talk about your red tape!

While at IBM, I talked with Harry Lord regarding logic and sense systems. The logic is on order. The sense system I had to investigate further. However, Harry was in more of a rush than I realized. He's already ordered from someone else.

The 1980 Read-Write switch and 1981 Sense switch for the 1517 worked reasonably well. There are still some unknowns in the circuits, however, as shown by troubles in Quality Control. 1980's are the biggest headache, since the circuit is harder to test, and I'm not yet convinced that some of our tests are very conclusive. One of the problems in using this switch is in the system. The bias panel, which introduces current at the memory stack to buck out leakage from the switches, can be adjusted so that the switches are partially turned on. The best answer is, of course, to reduce switch leakage

I visited NASA in Cleveland and Western Electric in Columbus last week. NASA is very happy with our modules. They've bought about $50,000 worth of gear and their only complaint thus far is one 6603. More troubles will probably show up when they get their system completely in operation. These fellows know exactly what they are

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D. White (cont'd)

doing. The people at Western Electric, on the other hand, are feeling their way. They are building their own core tester, using some of our logic.

Several inquiries have been made regarding the conformance of our modules to various military specifications. I'm checking into this matter. There are two ways in which military acceptability can be certified. The first, which is not feasible for us, is by source inspection. This requires a separate stock of inspected raw materials and a government inspector breathing down our necks. The second method is by certificate of compliance, a notarized document stating that the items shipped comply with the applicable specification. Exceptions can be included, if necessary. One of the provisions in these specifications which must be thoroughly investigated, is the operation of our modules under shock and vibration.

L. Prentice

General Engineering	50%
Computer Cabinet	20%
Computer Development	20%
Educational Building Blocks	10%

A meeting was held July 8, with Lippincott & Margulies Industrial Stylists for IT&T. Attending the meeting was Jack Atwood and myself, Larry Scott, and Robert Smith of Lippincott & Margulies. Changes in the standard frame suggested by them mainly had to do with the doors and details of hanging the doors. They presented drawings of a proposed console cabinet to be mounted on an end frame, somewhat similar to the one that we proposed, and this was a main topic of discussion. Proposals were discussed in relation to mounting the typewriter and a drawer combination also making provisions for paper storage in the rear of the typewriter. We proposed that they cut down the over-hanging section above the console to a minimum in order to house the flourescent fixture that they picked for illumination. The telephone call to them on July 11 reveals that they are now in the pasteboard mock-up stage and have found still further changes that are necessary. Discussed also were the final color scheme for IT&T first model which is now in production on the floor. This they promised to discuss with Leo Murphy, and we should have a reply within a few days. They promised to complete their work and furnish us design control drawings on the production for the remaining cabinets of IT&T Number 1. Every effort is being made to integrate all changes related to the cabinetry and console so that all of these may be released for unlimited production in the near future.

Response to the last ad for apprentice machinists was quite gratifying. We had three possible applicants, one of whom we hope to hire. He should be coming to work July 24.

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J. Atwood

Direct Mail - Some 4000 additions to the mailing list have been sent to Administration, Inc., for keypunching. This completes the job of transferring to tab cards the names of all those who responded to our mailing list "clean-up" and "mop-up" mailings. After C-E-I-R finished the magnetic tape of the first 5000 names, all the cards will be merged in the proper order, and we will once again have a master list to work with. At that time, we will make a complete print-out of the list which can be microfilmed.

Labels have been prepared for the complete roster of the ACM and for attendees at the last Magnetics Conference. These will be used for special mailings on computers and memory test systems. Also in the works are mailings in connection with the opening of the New York and Washington offices, and with the EMEA show in Washington, the last of the month.

Trade Shows - The newest 10-foot booth is being up-dated for the EMEA show, and a 4-foot, free-standing display unit, which will be used to show the Classroom Modules, is on order. Under consideration is a compact, self-contained display for such up-coming shows as the Canadian IRE and the NEC.

Our show schedule for the balance of the year is:

EMEA (Electronic Maintenance Engineering Association) Symposium on FAA Air Traffic Control Facilities, Mayflower, Washington	July 24-26
WESCON, Cow Palace, San Francisco	August 22-25
ACM, Statler-Hilton, Los Angeles	Sept. 6-8
Canadian IRE, Exhibition Park, Toronto	October 2-4
NEC, International Amphitheater, Chicago	October 9-11
CMMM (Conference on Magnetism and Magnetic Materials), Westward Ho, Phoenix	November 13-16
NEREM, Commonwealth Armory, Boston	November 14-16
EJCC, Sheraton Park, Washington	December 12-14

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J. Atwood (cont'd)

Product Literature - In process are Training Module and Classroom Module catalogs, new 4000 Series catalog, diagram sheet on new 4000 Series units, Memory Test Systems folder, new PDP manual, module integration rules sheet, Burst Generator 2303 bulletin, and several others. A preliminary product bulletin on Training Module Type 3602 has been added to the literature on this line, and a description of ALGOL 60 reprinted from COMMUNICATIONS OF THE ACM is now available.

Technical Publications - Manuals on Memory Testers Type 1514 and 1516 are being written in a form similar to the 1517 manual. A manual on the Semiautomatic Memory Core Tester 2108 is being readied for the press. Condensed schematics are being produced on a 10-a-day schedule which should cover all units listed in the short form catalog by July 27. We will then fill in with schematics on all the newer units. This same type of schematic is now being printed on the back of each test data sheet, so the customer gets a schematic with every unit he buys.

A high priority project is to provide the University of Denver with the raw material for instruction sheets which they will prepare on the units they are buying. This material must be ready by August 1, at the latest.

Specialities - Gray fanfold tape for the computer with our identification imprinted in blue has been ordered and is due in shortly. Also in the works is specially imprinted pin-feed paper for the input-output typewriters. In addition, we have printed PDP programming forms, which are available from John Koudela. In the planning stage are a plastic pin locator for use in wiring and checking pin connections and logic stamps representing the more commonly used modules to facilitate the making of logic diagrams.

Public Relations - A number of items are being prepared in connection with the move into Building 4. A new map folder showing how to find (1) Maynard, (2) Digital and (3) specific departments, has been printed. We are also turning out some three dozen signs which will help people find their way into and around our various buildings. A new telephone directory, which is ready to be issued when the move takes place, also gives the new mail stations for persons and departments. Also being printed is a map showing all parking areas open to Digital employees.

Our employment advertising seems to be drawing well, and we have turned up a number of likely candidates for specialized jobs. A new employment application form is about ready to print. It is much longer and more detailed than the existing form, and it should give us a much better picture of the candidates, particularly those with extensive educational or professional experience. A plan for an employee publication has been submitted for consideration. With our present facilities, we should be able to do a very creditable job on this type of project.

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J. Atwood (cont'd)

The BEACON "Industrial Progress Edition" mailing to employees' homes appears to have been appreciated by our people and their families. We have also had a nice feedback on the mailing of team photos to each member of our Assabet Valley Little League entry.

Publicity - Publicity releases are being prepared on the district offices, the re-styling of the PDP-1, and the new floor space in Buildings 3 and 4. In the process we are developing a publicity questionnaire which we hope will help us to gather useful information on new personnel on an organized basis, so that we can get more releases flowing on this aspect of our business.

Two publicity developments of note both concern PDP. Van Dyck Associates is preparing a feature for INDUSTRIAL DESIGN magazine on the development of the PDP-1. And, Mr. Champion of Kalah fame has returned from the Mediterranean with very interesting information on the origins of the game. We hope to work this into a story on Kalah and PDP-1 which will interest LIFE or the likes.

Industrial Design - The most interesting development in this area was the proposal submitted by Lippincott & Margulies for the production models of the ITT computers. L & M has L-shaped the console end of the computer, leaving the control panel in the same location as we have it on the MIT computer, but extending the work top to the left to accommodate the input-output typewriter. The design also features a cook stove-type hood over the extended work top, which we attempted to have them minimize.

The color scheme for the MIT computer is to be blue-gray (grayer than the sample blue tweed) and sand (a very quiet tan), except that the graphics on the control panel will remain white. We seem to have a good lead on a way of matching the colors of the typewriter to those of the computer itself, so this could turn out to be quite a handsome package. A new tape catcher has been designed for the reader, and we are checking the possibility of suspending the typewriter on a metal or fiberglass collar below the level of the work top by means of shock-absorbing supports.

Other projects include the design of a circuit builder kit, with the necessary accessories, and of a more useful plastic holder for filing fanfolded tapes than the types presently available on the market. The new Lab Module packages, which are due in any day, are another step forward in our new-look packaging program. Also on the fire are plans for redecorating the main lobby and for setting up the meeting room on the fourth floor of Building 4.

Graphic Arts - In-house photography of systems is progressing nicely, although we do need to set up a regular area for this work on the systems floor. We are also getting some good shots with the new single-lens reflex. By the end of August, we expect to

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J. Atwood (cont'd)

have a new process camera which will handle work up to 12 x 15 and will permit much greater latitude in the use of halftone screens.

The amount of presswork continues to climb, but we are managing to stay with it by cutting makeready time. The new photocopy machine is equipped for offset plate-making so we can now use this when the arc light rig is tied up or when use of the arc light would interfere with phototypesetting or other work going on in the studio. And we have a new stapler which permits us to take advantage of the booklet-printing capabilities of our 11 x 17 press. Two other aids to faster preparation of copy for the press are a new IBM tab card imprinting guide form and a special Arttype sheet now being manufactured for us which contains all our common logic diagram elements in a form which makes it extremely simple to make (and alter) the diagrams used in much of our printed matter.

Forms - A new permanent memorandum form and instructions for its use have been issued, and two special PDP forms, a requisition and a logic change notice, are being produced for Ed Harwood. The new business cards are being imprinted with the names and addresses of various individuals, and they should be ready momentarily. We are still trying to pin down the design of the new letterhead and envelope, the product bulletin form, and the application note form. This should come fast now.

A. Blumenthal

Checkout of ITT Computer, Interviewing job applicants, Introduction of new personnel to logic diagrams and Design of forms for records of checkout proceedings.	90%
BBN Service - Repair of two Soroban typewriters, communicating with manufacturer on problems.	10%

S. Butman

Testing Ferranti's Magnetostriction Delay Line	25%
Design of Tester for Input-Output Equipment (punch, typewriter, tape reader, visual display)	75%

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J. Koudella

Basic Magnetic Tape Write-Up	40%
Programming Manual	10%
PDP Specifications	20%
Sales Calls	30%

F. Edwards

PDP-1 Production Test Equipment	20%
Analog to Digital Converters	80%

R. Whipple

Analog to Digital Converter	50%
2007-1 Buffer Memory (Ft. Monmouth)	50%

E. deCastro

Personal Contacts and Sales Calls	100%

D. Wardimon

Working on Crystal Oscillators, including environmental tests for all customer orders	40%
Preparing new chart for component selection for Crystal Oscillators	10%
Changing the 4407 Circuit	40%
Repairing the Counter used for frequency measurements	10%

D. Chin

Modified Display	100%

D. Tringale

Checking out Automatic Core Tester	100%

J. Clemens

Working on high-speed bridge circuit for display deflection	100%

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A. Swift

Engineering Stock Room	20%
Supervision of 5 MC Building Blocks	10%
Supervision of Compatible Low Speed B.B.	10%
Schedules for Engineering Models EN 1011	10%
EN 1010	10%
Construction and application of test equipment	
Memory Tester	10%
Signal Converters	10%
Research on present equipment of the Signal Converter	10%
Future Design of the Memory Tester	10%

R. Savelle

Paper Tape Punch	8.75%
Display	56.3%
Special System Sales	27.7%
Typewriter	1.25%
Paper Tape Reader	6%

B. Stephenson

General Sales	100%

H. Bornstein

Checkout of PDP-1C-2 (ITT)	65%
Modification of PDP-1C (ITT)	35%

J. MacKeen

Leave of Absence	100%

J. Cudmore

Vacation	100%

R. Doane

Vacation	100%

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J. Brown

Tape Control 52 and two tape units Model 50's	100%

Work on the Tape Control 52 and the two Tape Units Model 50's is progressing with reasonable success. The IBM format has been written and read, and all control functions are operating satisfactorily. Mean time to error still appears to be less than desirable, but improvements are being made. The prototype to ITT will contain the scatter write and read function. The two bottle necks of the tape work are the lack of mechanical parts, such as the swing gates, and expected time of tie-in with the PDP.

E. Harwood

Supervising work and preparing cabling schedules for PDP-1C-2	20%
Supervising work and preparing schedules for PDP-1C-5	10%
Working on PDP-1C-6, including scheduling, wiring diagrams, modifications and checking work done in production	10%
Computer Development, including assembling all the drawings for production, meetings with Ben, Gordon and Bob on methods to be used.	20%
General supervision of people in the area	30%
Interviewing technicians and applicants for jobs	10%

ITT Machine - This machine has been in checkout approximately two weeks, and we have been trying to get a large part of the wiring done in between the checkout periods. This wiring has consisted of tying in the marginal check panel, finishing off some of the odds and ends of the jump field, high speed channel system, wiring the AC power control panel and finishing off the sequence break system and outgoing and incoming line units. We also have been preparing cables so we can plug in the new console when it becomes available. A large part of the time that I have spent on this machine has been in preparing cabling schedules and wiring diagrams so the machine can be produced more efficiently

MIT Machine - All of the inter-panel wiring on this machine has been done. This machine also has all of the extra plugs that will be required to plug the main frame into the console. This also includes the plug for the high-speed channel option and the plug for the high-speed multiply and divide option. At the present time, we are just about ready to plug the modules in and connect up all the power supplies so that checkout on this machine can

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E. Harwood (cont'd)

start in a few days. Except for waiting for the console, this machine is on schedule.

CRC Machine - This machine is currently being wired up on the third floor in the new cradle that has been made to wire the machines together. This will be the first machine that is to be completely wired by the production people. In line with this, Jack Smith has a complete set of wiring diagrams and also a complete set of cable schedules to go along with this machine. By the time this one is wired, we should have a much better idea of how good these cable schedules and wiring diagrams are and whether some will have to be re-designed for production use. Also on the CRC machine, we are rewiring the 1k memory plugs in order to make it compatible with the standard plugs that we put on all the machines.

R. Boisvert

Test procedure and design tester for 1542 Module	11.2%
Test procedure and design tester for 1539 Module	11.2%
Test procedure and design tester for 4514 Module	11.2%
Test procedure and design tester for 1549 Module	11.2%
Cable Schedule Transport to Power Dist. Assy.	1.4%
Cable Schedule Power Dist. Assy. to Logic	2.8%
Circuit and wiring diagram local tape control panel	2.8%
Power Dist. Assy. wiring	4.2%
Power Dist. Assy. wiring diagram	5.2%
Test procedure production Module 1542	2.8%
General trouble shooting on control tester Pwr. Dist.	2.8%
Class on Magnetic Tape Unit	5.6%
General familiarization Tape Unit	5.6%
Familiarization in detail of Tape Unit	18.4%

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R. Hughes

Analyzing 2N2048 Philco Transistor	.7%
Talking with Transistor Salesman about Diodes	1.4%
Analyzing XC 100 Sprague Transistor	.7%
Analyzing 1N3208 Diodes for use in regular power supplies	.7%
Thinking about transistors for 10 megacycle line	.7%
Testing new transformers for new current driver power supply	.7%
Thinking about physical layout of current drivers	1.4%
Talking with Sprague Transistor salesman about price of MA 80 transistor	1.4%
Thinking about new area problems (benches were too close together)	1.4%
Analysis of Texas Instruments equivalent of Philco 2N599 transistor (it doesn't saturate as well)	.12%
Analysis of Texas Instruments bilateral NPN transistor (it looks very good)	.12%
Analysis of Philco T2299 double diffused NPN Silicon Mesa Transistor	.12%
Analysis of Fairchild 2n1978 double diffused NPN Silicon Mesa Power Transistor	.12%
Fixing customer complaint (our 801 Relay units weren't working because we were using 6V. relays instead of 12V. relays)	1.4%
Work on Current Driver models	44.8%
Cleaning Office	11.2%
Bringing all circuit schematics up-to-date (little by little)	1.4%
Making a study of scope use (Do we need more scopes?)	.35%
Analysis of pulse transformer problems in Test Dept.	1.4%
Supervision of Engineering personnel	2.1%
New design work on blocking oscillator pulse amplifier	2.1%
Study of solder (would the use of a 50% Sn 45% Pb 5% In solder help us get better joints due to better wettability with the In added?)	.35%
Technical discussions with other engineers	4.2%
Writing Bi-Weekly Report	.46%
Analyzing the past Bi-Weekly period for this report	1.15%
Looking up transistors for K. Olsen	.35%
Coffee Breaks	2.8%