dec BIWEEKLY REPORT

COPY NUMBER 2

DATE July 20, 1962

S. Olsen

On Friday, July 6, Jay Forrester and I met with Dr. Storer, Douglas McGregor, Jim Stoddard and Steve Gray of Sylvania Electric, Waltham. Mr. Gray and Mr. Stoddard are the two engineers working with our equipment and Mr. Gray was the more opinionated of the two. The three major points brought up were: accessory equipment, price and delivery.

On accessory equipment, they would like to see us supply a full line of accessories, but in lieu of this they would appreciate a list of possible suppliers to ease their problem of hunting them up. They thought our Indicator Lamp Drivers were too expensive. They went out and bought a $4.35 Lamp and Driver from Transistor Electronics Corporation. They said that Dialco also supplies them.

Equipment that they would like to see us supply:

1. Operational amplifier that would operate at 5 megacycles.
2. A faster intensity amplifier. They felt that ours was too slow and had to build one themselves.
3. A linear sweep generator.
4. Switches for high density control panel.
5. -3 volt tap on our 743 power supply.
6. Higher voltage power supplies.
7. Also mentioned they wanted covers for the equipment, not realizing that we supply these.

On delivery they felt that 8 weeks was too long and that our promised deliveries were pessimistic and in general the delivery performance was better than the delivery promise. Delivery is very important to them.

They knew they could depend on the product quality but they mentioned a big difference in price between the high frequency and low frequency lines. They know the difference in the transistor prices and don't think the module difference should be this high. They feel that they would rather stick to the higher frequency line completely but because of the big price difference, they have been forced with the dilemma of mixing speeds to justify the price.

They think the applications book could be clearer, not much information on drive for the low speed line. They also said they

DF633 DIGITAL EQUIPMENT CORPORATION · MAYNARD, MASSACHUSETTS

dec BIWEEKLY REPORT

COPY NUMBER

DATE July 20, 1962

S. Olsen (cont'd)

would like to have a solenoid driver to drive 90 v.

I asked what they thought the best way would be for us to announce the equipment and they said that they thought an ad in Electronic Design would be the best bet and mailing list would be second.

They mentioned that they returned a 4209 a year ago for repair and that it had never been returned to them.

They would also like more explicit information on the dangers of burning out units. They felt that we shouldn't have placed the burden on them in requiring them to make up a list of spare units. They feel that with every large order we should write up a recommended list of spares as a free service.

They feel our discount policy is very sticky and hard to implement.

They also felt that an inquiring visitor to do free field service would be a very definite asset.

Unless the price and delivery situation changes, they claim they are going to go with their logic boards. They are very pleased with our consulting services and happy that we have such a complete line.

K. Fitzgerald

EN 1000	50%
JN 100-00	50%

In my last biweekly, I mentioned that I was working on a memo spelling out the methods and procedures for shipping of systems, computers, etc. Since the distribution of that memo, the LRL system was shipped using these methods and procedures as much as possible and everything went off without a hitch. This was probably the largest and most complex system we have shipped to date, with the total number of actual cases exceeding twenty. This whole system was actually crated and waiting for the mover when he arrived. There were no last minute details to be chased after, or ironed out, which caused the moving people any delay. It seems reasonable to expect that we should be able to do this with all of

dec BIWEEKLY REPORT

COPY NUMBER

DATE July 20, 1962

K. Fitzgerald (cont'd)

our future shipments.

The floor plan layout for the new carpenter shop and crating area has been completed and work orders for their construction have been issued. We have located a large platform-type floor scale with a capacity of 1,000 pounds which will be advantageous for weighing different components and systems, and eliminate the tedious task of weighing individual components and adding up totals and then making a final estimate on system weights. This scale was located in the attic of Building 4 and is the property of Maynard Industries, but they are willing to allow us to use it, provided we do not damage the scale or structurally weaken the building when we install it.

The sheet metal shop for the past two weeks has had to ask for a little more lead time because of vacations entering into the picture. Much time in the past week and a half has been spent on working out the bugs of the redesign and rework of display 30-A shrouds. We are presently understaffed in the sheet metal shop by approximately 3 people.

Our "Di Acro" layout machine has arrived and has been set up. This should help to insure the accuracy of our work and, therefore, give us a finer finished product.

In the machine shop, the machine which was designed and built for cutting off and attaching to masking tape the 22 wires used in the module plugs has been delivered to the production department. The shop is presently working on another large order for memory stack hardware, more display 30-A display casting assemblies, repair and overhaul of our power endplate dies used in the sheet metal shop; and they are building a machine to bend the waste wire from the wire-taping machine into a small "U" shape to be used as connectors on the printed circuit boards. Again this shop is being hampered by a lack of personnel and there are two personnel requisitions waiting to be filled for that area now.

We also have an application for a carpenter's helper which we expect to fill very shortly. Our present carpenter has spent most of his time for the past six months doing crating and skid building, while the real carpenter work has been done by outside

K. Fitzgerald (cont'd)

carpenters or cabinet shops. With the addition of a carpenter's helper, we hope to be able to do more of our own partition building and table top manufacture here in the plant.

K. Doering

EN 1072	30%
EN 1073	30%
EN 1000	40%

The design of the reader-punch combination PDP-4 is finished, and the first model is on its way.

The new table for the PDP-4 is designed and being installed on the first production model.

EN-1000

For our production line set-up, we have received the two ten-ton punch presses. These are to punch the two locating holes and the 22 wire holes in the printed circuit boards. The delivery for the two dies to do these jobs is overdue but shall be completed at least by the end of next week. In the meantime, we replaced the mechanical foot switches of the presses by hand operated double switches. We also received the 22-ton punch press which shall break out the boards. Here we replaced the hand switch by a foot switch because the girl has to use both hands for moving the 13 7/16 x 18 1/2 multiboard underneath the die. We get 8 boards from every multiboard. The die for this job has been tried out successfully and is finally being installed after a slight locating pin modification.

EN-1072

Paint specifications are completed, the color sample plates are being made up. Other standards completed include: AWS standard welding symbols, dimensions from datum lines, minimum bend radii, bend allowances, silk screening and chemical conversion coating. Tables for our standard screws and fasteners are being worked out.

Inspection procedures and titration test instructions for our chromicoat tanks have been worked out.

K. Doering (cont'd)

EN-1073

The mechanical inspection department has been working now for almost 4 months. I am very happy to say that it has received full cooperation of all people involved.

The rejection rate of parts either manufactured or finished in our own plant has been kept at approximately 1.5%, which is very good. Our main concern is our vendors. Some of them, mainly in the finishing business, (coating, plating, painting) have rejection rates far above average (18%). Not all of these vendors can easily be replaced by others. Therefore, we have built up a very close information exchange system with these people where we draw their attention to features or dimensions we are especially concerned with. This system has also helped us in the past to detect quite a few rejection causes. Rejection rates could be dropped. We could work more on prevention than on trouble-shooting. There is still a lot to be done for improvement of our vendors' quality performance.

The chromicoating business is giving us some headaches, because we try to use a protective coating as a finish. Chromicoat, Iridite #14-2 or Alodine 1200S are no finishes. The ideal solution would be "gold anodize", an electrolytic process where color range and shade can be controlled much better. This would raise the cost per one PDP-1 by approximately $15.00 to $30.00. The main disadvantage of this process is that we cannot do it in our plant right now, and that we are dependent on our vendors, especially with delivery. It also requires more operator skill. We are looking now into prices for anodizing units which could at least take care of small lots being under time pressure.

J. Cudmore

1201 FF - Automatic Switching Time Measurements	95%
Miscellaneous	5%

The problem that plagued this tester was sync. jitter. This has been overcome by using delay lines to generate all test and sync signals. The scope programming now has a few bugs in it. I am

J. Cudmore (cont'd)

confident that this will be remedied by correcting some wiring errors.

The sixteen time measurements should be accomplished in about six to eight seconds. The machine will be operating by Tuesday, the 24th.

G. Bell

PDP-4 General Status

Arthur Hall is going to work with me on PDP-4, helping phase it into Production, and control its documentation. I want to begin working more actively in marketing.

Cyburtek has nearly completed the PDP-4 maintenance manual. Bob Buyer is working on the PDP-4 equivalent to the F-45 manual. Two hundred copies of the F-45 rough draft are available, and we welcome criticism. In F-45, we describe the machine, how input-output equipment is connected, and the options (their description, timing, and program considerations). The present options include:

Paper Tape Punch
Printer/Keyboard
Display (Type 30A and new Type 30D)
Card Reader 40-200 (Burroughs)
Card Punch 41-523
Anelex Printer Type 62
Magnetic Tape Control Type 54

Prototype - PDP-4

The Burroughs Card Reader is connected and though operative has not been used a great deal. The Anelex Line Printer has only 30 - 4700 modules and as such prints only 30 of the 120 lines. The prototype has operated 500 hours (about 100 in checkout) and has incurred these failures:

1. Noise in punch - affected registers, corrected by several capacitors

G. Bell (cont'd)

2. Two design errors in paper tape reader and Program Interrupt

3. Paint disappearance on console

4. Photodiode assembly in Rheem paper tape reader shorted

The magnetic tape control has suffered from neglect, but seems to operate now.

I recommend the Teletype BRPE Punch and the 28 Printer-Keyboard.

BBN Drum

The drum is almost operative. I'm helping Ted Johnson and Bill Kelleher finish the checkout on the BBN computer.

Drafting

Unless there are any objections, all new wiring diagram designs done in drafting will have terminating resistors placed on all pulse lines.

R. Doane

VHF Modules	60%
72 Current Calibrator	15%
Miscellaneous	25%

The second drafts of literature on the new current calibrator and the VHF flip-flop and logic module are in progress. A new layout for the flip-flop is done, so that a presentable model of both the flip-flop and the logic module can be taken to WESCON. Marginal tests of the flip-flop indicate $\pm$ 5 volt margins can be obtained for either 10 or 15 nanosecond pulses (almost no effect from changing the width), so 10 nanoseconds will be used for its greater potential for increased frequency in the future.

Specifications of the new Current Calibrator include limit of error of $\pm$ 0.08% $\pm$ 0.2 millivolts at 23°C, when calibration is done in a Special System using a Sola regulating transformer, and

R. Doane (cont'd)

± 0.28% ± 0.2 mv for unregulated line (105 to 125 volts). This two-reference calibrator will have far fewer parts than the old one-reference calibrator, and its calibration procedure will be simple: one control per reference, a vernier Fluke pot, plus a temperature test to guarantee a coefficient less than 50 ppm/°C. This contrasts with several adjustments, mutually interacting, that make calibration of the 71 a tedious and time consuming job. The simplification results from using a single zener diode instead of two, by taking advantage of the regulating transformer used in our systems.

J. Fadiman

During the past two weeks the Systems Department has shipped both the Memory Tester 1516G and the Automatic Core Tester 2113D, to Hitachi in Tokyo, Japan (Totsuka Plant). I will be giving a demonstration of these two systems at the Imperial Hotel in Tokyo to all interested people in the area on July 31 and August 1. After that I will install these two systems at the Totsuka Plant. We have also shipped the Typewriter Buffer System and the first two Memory Buffers, Type 2010, for the Navy in Dam Neck, Virginia. The Automatic Core Tester, Model 2102F, for Hitachi Central Research Labs in Tokyo, Japan has been finished and fully checked out. This will be shipped over to Japan on Wednesday, and installed by me when I am over there.

New Business

Design work is continuing in full force on the Memory Tester 1520 for I.B.M., Owego. Much of the logic and packaging has already been completed. We are shipping to Ampex Computer Products Co. another Semi-Automatic Core Tester, Model 2108E. This will go out next week. I expect that Ampex will order two more of these machines in the next two months. We are in the process of designing a new Memory Tester, Model 1521, which will contain additional current drivers to provide faster rise time, will utilize the new read-write switches with the silicon control rectifiers, and will be externally programmable by means of a plug board. Dick Whipple has been talking with several companies including Indiana General, Lockheed, Ampex, and Ferroxcube, concerning this new type of Memory Tester and there seems to be a need for it. We will probably go ahead with the design and construction of such a machine. We

J. Fadiman (cont'd)

are expecting momentarily from I.B.M., Owego for a programmable Semi-Automatic Core Tester, Model 2114. The price is in the neighborhood of $42,000. We are building another Automatic Core Tester, Model 2113G, for Electronic Memories, Inc. in Los Angeles, California.

It looks as if there is still a good market potential in this country as well as an increasing market potential in Japan and Europe for our standard systems such as the 2113, 2108 and 1516. In addition, we are doing new development work with a more flexible type of core tester and memory tester as well as a faster type of tester which we hope we will be able to utilize a new high speed current driver which the people in Dick Best's section will be developing.

Judith Ebner

The following books have been added to the Library.

"Applications and Industry, 1961" by American Institute of Electrical Engineers

"Automatic Data Processing for Federal Executives" - Stauber, Ralph, B., editor

This volume represents a stage in the development of a series of Seminars on Data Processing for Federal Executives designed to provide guidance to top level Federal Executives to assist them in evaluating the place of Automatic Data Processing in the work of their respective agencies.

"Control in Electroplating" - organized by the Institute of Metal Finishing

"Control in Electroplating" is a collection of papers presented at a one day symposium, organized by the London branch of the Institute of Metal Finishing held in London November, 1958. Topics covered are:

1. The Chemical Control of Plating Electrolytes.
2. The Control of Electrodeposition Processes by Examination of the Deposits.
3. Trouble-Shooting in the Plating Shop.
4. Requirements and Inspection of Metallic Finishes.

dec BIWEEKLY REPORT

COPY NUMBER

DATE July 20, 1962

Judith Ebner (cont'd)

"Communication and Electronics, 1961" by American Institute of Electrical Engineers

"Electronics Drafting" by Kuller, Karl K.
"Electronics Drafting" begins with a discussion of the significance of symbols and their application to drafting. It provides illustrations of actual components and explains the mechanics of drawing their symbolic equivalents. It illustrates clearly and describes in detail the tools of the draftsman. Instruction is given in the basic concepts and techniques of the delineation which distinguish the diagram of professional quality. Detailed methods of simplifying complex circuitry are explained and illustrated.

"Handbook of Semiconductor Electronics" (second edition)
Hunter, Lloyd P. - editor
In this second edition you will find full coverage of such pertinent, recent advances as Zener diodes, Esaki tunnel diodes, variable capacitance diodes, alloy transistors, drift transistors, and thyrotron transistors. Two completely new sections covering microwave semiconductor applications and the design of power supplies and power converters using semiconductor devices have been added to the circuit section.

"IRE Dictionary" by The Institute of Radio Engineers, Inc.
This dictionary brings together, under one cover, all the definitions and symbols which were contained in the 37 separate IRE standards dealing with electronics terminology and symbology and that were still in force in December, 1959. The first part of the dictionary provides an alphabetical list of technical terms and their IRE standard definitions. The second part comprises reprints of five IRE standards dealing with letter and graphical symbols.

"Machine-Independent Computer Programming" by Halstead, Maurice, H.
This text is based upon the lecture notes developed by the author while teaching an evening course, described as "Neliac, a Dialect of Agol," for the University of California Extension. "Machine-Independent Computer Programming" is designed to teach the student how to "write to" computers in the Neliac language and then to teach him how to teach a

dec BIWEEKLY REPORT

COPY NUMBER

DATE July 20, 1962

Judith Ebner (cont'd)

computer to read Neliac if it does not already know.

"The Management of Time" by McCay, James T.
This book sets forth a practical method for overcoming time pressures today and preparing for the much greater time demands of the coming decade. The methodology is mainly drawn from the work of Albert Korzybski, as presented in his book, "Science to Sanity". The Appendix gives a background reading list of the books by scientifically orientated authors.

"Paint Finishing in Industry" by Harvey, A.A.B.
Dealing with every facet of paint application in the factory on to metal and wood, it includes sections on surface preparation and pretreatments, stoving, sanding, polishing, lining, cellulose regulations, masks and even transfer techniques, flock finishing and silk screen printing with which many paint materials and solvents is concerned. Paint testing is covered in detail and such information concerning paint materials and solvents is given as will be helpful to users of industrial organic finishes. A chapter is devoted to paint shop troubles and service complaints while separate sections deal specifically with the finishing of motor bodies, refrigerators, machinery, castings and wood.

"Power Apparatus and Systems" (Volume 80, Part III - 1961) by American Institute of Electrical Engineers

"Proposal and Inquiry Writing" by Mandel-Caldwell
Early in the century the United States Army ran a newspaper advertisement broadcasting a request for proposal bids on the production of a military aircraft having the following specifications: ability to travel in the air for one hour, travel at 40 miles per hour, carry one passenger, and land undamaged. Bidders were required to put up a bond to certify financial responsibility. This book was the beginning of Method Inquiry and Proposal Writing. This book takes the reader through the logical stages of the initial Inquiry, Proposal preparation and the Contract. At each stage it discusses and illustrates a variety of techniques and essential theory.

Judith Ebner (cont'd)

"Square-Loop Ferrite Circuitry Storage and Logic Techniques" by Quartly, C. J.

The author describes in a concise and simple manner the principles of operation of coincident drive stores and the more elaborate systems which have been proposed to increase speed of operation. Though primarily intended for matrix stores, square-loop ferrite cores have found other uses in computers and other digital equipment and brief descriptions are given here.

"The Surface Treatment and Finishing of Aluminum and its Alloys" (2nd Edition) by Wernick, S. and Pinner, R.

Corrosion and protection of aluminum and its alloys, mechanical surface treatments and finish electrolytic and chemical polishing processes, chemical cleaning and anodic etching, chemical conversion coatings, anodizing of aluminum, physical and chemical properties of anodic coatings, electrodeposition on aluminum, organic finishing, vitreous enamelling and metal spraying, are some of the items covered by this book.

R. Winslow

These semiconductors have been tested since the last biweekly.

TYPE	MANUFACTURER	NO. TESTED	% REJECTS
GA-212	Texas Instrument	6000	0.83%
MA 89	Sprague	1000	6.4%
MD 95	Philco	7965	25.8%
MD 114	Sprague	542	16.9%
2N457A	Texas Instrument	20	0%
2N598	Philco	50	0%
2N1065	Gen. Instrument	5000	1.0%
2N1146A	Clevite	200	1.5%
2N1184	RCA	1000	3.9%
2N1184B	RCA	28	17.9%
2N1595	Transitron	200	1.5%
2N2099	Sprague	500	2.6%
4JX1C741	Gen. Electric	12000	0.98%
D-001-1	Clevite	3129	2.5%

R. Winslow (cont'd)

TYPE	MANUFACTURER	NO. TESTED	% REJECTS
D-007-1	Nat'l. Transistor	285	1.4%
1N270	Clevite	600	1.2%
1N469	Hoffman	100	0%
1N748	Texas Instrument	1	0%
1N750	Transitron	200	0%
1N758A	Texas Instrument	31	0%
1N1998	U.S. Semcor	100	2.0%
1N2970B	I.T.T.	85	0%
1N3316B	Dickson	100	28.0%

J. Atwood

Trade Shows - The latest August-December trade show schedule is attached to the back of the Report. We have added four - the IFIP show in Munich, ISA show in New York, Western Training Conference in San Francisco, and Northeast Commerce and Industry show in Boston. We have dropped two from consideration - the Space Symposium and the Rocket Society show. We have signed up for four 1963 shows - the Electric Engineering show, IRE show and Design Engineering show (all in New York), and the Southwest IRE show in Dallas. We will not go back to the Winter Conference on Military Electronics or the Airways Engineering show next year. We have been assigned a double booth at NEREM, but Stu Gibson is still not sure of the location.

Promotional Literature - The present Short Form Catalog and the separate catalogs on the various module series will be phased out. They will be replaced with a general purpose brochure which introduces our company and our product lines. All detailed technical information will be contained in the new Module Catalog. The Logic Handbook will not be reissued as a separate publication, at least for the time being. The information it contains will be incorporated in the introductory section of the new Module Catalog. Incidentally, some 3000 unbound copies of the present Module Catalog are being case bound (hard covers) to permit more general use of this much-in-demand item.

The revised Training Module Catalog will be printed, but the quantity will be very limited. There will also be a new sheet on the Classroom Modules, but it, too, will be for limited distribution.

dec BIWEEKLY REPORT

COPY NUMBER

DATE July 20, 1962

J. Atwood (cont'd)

The revised PDP-4 brochure is about ready to print, and the new Systems brochure is shaping up rapidly. These will be followed shortly by individual sales pieces on each of the standard items of PDP peripheral gear and a brochure on the Digital Logic Kit.

Product bulletins are being printed on four new modules. These will be trimmed to fit into the pocket at the back of the Module Catalog. Also at the printer's are standard product bulletin and application note forms which have the same format as the catalog pages. These will enable us to introduce new products and applications in proper fashion between catalog printings.

Technical Publications - Business is booming in the tech pubs field. Off the typewriters, drawing boards and presses in recent weeks have come the Typewriter Buffer 2308 manual, Core Tester 2113D manual, preliminary PDP-1 maintenance manual, preliminary PDP-4 programming manual, preliminary revised PDP-1 manual, and preliminary MACRO operations manual. In process are the final PDP-2 maintenance manual, preliminary PDP-4 maintenance manual, the MAINDEC 10 write-up, and the Memory Tester 1516F and 1516G manuals. Both the PDP-1 manual and the PDP-4 programming manual should be ready to send out for printing in a matter of days.

Other - The Employee Handbook has had its first copy review and is due for final approval shortly. Meanwhile we are pushing ahead with the artwork, so that this badly needed publication can be rushed to completion. The handbook will be supplemented by a supervisor's version which will cover some of the policy problems which only come up occasionally or which need not become generally known.

1962 TRADE SHOW SCHEDULE

August-December

Show	Abbr.	Dates	City	Place
Western Electronic Show & Conference	(WESCON)	8/21-24	Los Angeles	Arena
IFIP-INTERDATA 62		8/27-9/1	Munich	
Association for Computing Machinery	(ACM)	9/4-7	Syracuse	War Memorial
Northeast Commerce & Industry Exposition	(NCIE)	10/1-5	Boston	Comm. Armory
National Electronics Conference	(NEC)	10/8-10	Chicago	McCormick Place
Western Training Conference	(WTC)	10/10-12	San Francisco	St. Francis Hotel
North Carolina IRE Symposium	(NCIRE)	10/12-13	Greensboro	Coliseum
Instrument Society of America	(ISA)	10/15-18	New York	Coliseum
Conference on Magnetism & Magnetic Materials	(CMMM)	11/12-15	Pittsburgh	Penn-Sheraton
Northeast Regional Electronics Meeting	(NEREM)	11/5-7	Boston	Comm. Armory
Fall Joint Computer Conference	(FJCC)	12/4-6	Philadelphia	Sheraton

dec BIWEEKLY REPORT

COPY NUMBER 2

DATE July 6, 1962

S. Olsen

Two weeks ago I made a rather pleasant sales trip through Canada and received a warm welcome at Chalk River, the Tele-Communications Branch at Ottawa, and the National Research Council at Ottawa.

Chalk River has a computer on order now and has many more interesting applications for both modules and additional computers. The people in general are very receptive and we should be able to do quite a bit of business with them, Diefenbaker allowing.

The people in the Tele-Communications Branch in Ottawa have been using our modules for a few years now and are quite happy and still enthusiastic. They intend to continue ordering modules and also a PDP-1 or PDP-4 for the Prince Albert Radar Station in Saskatchewan (we will only send healthy men to install and maintain it).

At the National Research Council we presently have a bid in for a PDP-1 to be used in conjunction with their wind-tunnel calculations and general computing use. They presently have a Bendix G-15 for general computation use. The computer is to be attached to an EA Analog Computer.

Next week I plan a trip covering: Elgin National Watch Co., Elgin, Illinois; Bendix Corporation, Mishawaka, Indiana; Kearns and Law Engineering Corporation, Detroit, Michigan; and Cornell Aeronautical Laboratory, Buffalo, New York.

N. Mazzarese

Duplex Systems will become quite fashionable for the remainder of this year in ADX-Land. ADX-6 and 7 will be a dual system, as will ADX-3 and 8. The latest word from ITT is that they presently plan to duplex ADX-2 and 9 as well. The status of computers in the house is as follows:

ADX-6

Central processor and tape controls are in checkout.
One tape unit is checked out.
One tape unit is in checkout.
Missing three memories.
Machine is on schedule. Will be completed 8/15/62.

DF633 DIGITAL EQUIPMENT CORPORATION · MAYNARD, MASSACHUSETTS

dec BIWEEKLY REPORT

COPY NUMBER

DATE July 6, 1962
Page 2

N. Mazzarese (cont'd)

ADX-7

Central processor goes into checkout July 6.
Two tape units go into checkout July 6.
Tape control ready for checkout July 12.
Cabinet is complete.
Power supplies are wired.
Electronics are in wiring checkout.
Machine is on schedule. Will be completed 9/15/62.

ADX-3

Central processor is wired and wrung out except for console end.
Machine is one week ahead of schedule.
Will be completed 10/8/62.

ADX-8

Central processor being wired.
All central processor subassemblies complete, but not wired in.
Machine is on schedule. Will be completed 11/15/62.

A trip was made to Massachusetts State Police, Boston, Mass. to discuss their data-communication and processing problems. They presently maintain manual files on 270,000 individuals which must be accessed by about 100 incoming TTY lines. They are eager about the possibility of automating this system; in fact, their eagerness is exceeded only by their poverty. We shall maintain contacts with this prospect, for they could be good in the future.

A. Blumenthal

EN 1069 100%

On Friday, June 29, a group from M.I.T.'s Nuclear Science Lab. came down for acceptance tests on their PDP-1. The procedure lasted a couple of hours and consisted of running our regular checkout and utility programs.

The only hitch occurring was an occasional reader failure at certain rates of rapid stop-start operations. This trouble has occurred occasionally in the latest readers as a result of a design change, on the part of Digitronics, in the sprocket hole amplifiers. This has reduced the hysteresis of the amplifier, making it very sensitive

dec BIWEEKLY REPORT

COPY NUMBER

DATE July 6, 1962

A. Blumenthal (cont'd)

to jiggling of the tape. A change has been worked out which increases the hysteresis by a factor of 4, still a relatively small portion of the total signal, but as great as it can be without introducing problems of timing and tolerance to photodiode drift. A little more investigation will be made before the change is finalized.

To make it fit this budget more comfortably the M.I.T. machine was accepted sans their 2 extra memory modules which will be accepted at some later date. This turned out to be convenient for us, also, because they have not yet been installed. It will be a week or two before the memory and mag. tape work are completed.

The DEC machine went into checkout on Friday, July 6, after an extended delay due to lack of modules. Checkout would have begun about a month ago were it not for this fact.

A comprehensive rehash of all PDP-1 cable schedules is under way, getting them onto the new forms and clarifying the information. It was hoped that a standard way of handling these could be devised but there seems to be too many exceptional cases to enable this.

R. Doane

VHF	80%
Current/Voltage Calibrator 72	10%
Test Equipment Committee	5%
Misc.	5%

The first of two sections of the VHF test system is wired, and the modules to operate it have been built and tested. Tests of the system have just begun, and so far five stages of binary counter have operated at low rep-rates, driven by push-button pulser and by standard 10Mc clock. Results of tests of the flip-flops and logic module at 30Mc are very encouraging, while the delay unit at present is limited to an upper frequency of 25Mc and an output pulse width of 8 nanoseconds (target is >30 Mc and 10 nanoseconds) when used as a clock.

Even though no decision to announce the VHF line for sale has

dec BIWEEKLY REPORT

COPY NUMBER

DATE July 6, 1962

R. Doane (cont'd)

been reached, I made a trip to the Johns Hopkins Applied Physics Lab June 29, to make informal trial arrangements with our good module customers there. Jim Burley made the arrangements, and we talked with six or eight people. After using them in the test system for some time and after the necessary red tape is unrolled we expect to give these people five or possibly six modules for their evaluation.

The 72 Calibrator is to have two references instead of one, and each will provide either a positive or a negative voltage reference or a ground reference line, selected by a 3 position switch. A small box to mount directly on the oscilloscope will contain the signal selector switch and the mercury chopper that commutates between the reference and the selected input signal. The first model of the 'scope box is nearly complete, and the principal parts for the first model of the main unit have been ordered. The references will be set by decade potentiometers instead of by ten-twin helipots, allowing both improved accuracy and easier calibration procedure. Three concentric dials will make settings faster too, perhaps. Avoidance of socket-mounted choppers should eliminate a prime source of the damage in shipment now frequent in the 71 calibrators.

J. Ebner

The following books have been added to the Library:

"Approximations for Digital Computers" by Cecil Hastings Jr.
This monograph deals with the subject of best approximation in the sense of Chebyshev as applied to the problem of making univariate functional data available to the high-speed digital computing machine. The investigation is of numerical and empirical nature. Part I serves as an introduction to the collection of approximations given in Part II.

"Dictionary for Accountants" (Second Edition) by Eric L. Kohler
Over 2500 up-to-date accounting terms, alphabetized and cross-referenced, defined and analyzed in everyday language.

"Electromagnetics" (Second Edition) by Robert M. Whitmer
A detailed analysis of the relations among electric and mag-

dec BIWEEKLY REPORT

COPY NUMBER

DATE July 6, 1962

J. Ebner (cont'd)

netic field quantities leading through Maxwell's equations to wave propagation, boundary value problems and guided waves.

"Electronic Drafting" by George Shiers

Written expressly to interpret industrial drafting practices for the beginner, this book introduces the various drafting techniques and types of drawing used in the design and construction of electronic equipment. A close relationship is maintained between graphical methods, basic electronic principles, and construction practices. Engineering standards and terminology, in addition to practical techniques, have been emphasized.

"Engineering Secretary's Complete Handbook" by Eleanor S. Laird

An up-to-date presentation of the engineering secretary's job. Arranged for instant use, this handbook covers many possible routines in an engineering office.

"Executive Control - The Catalyst" by William T. Jerome III

"The author's aim is to show that executive control can and should be a creative force in business - a catalytic agent that will release a firm's unrealized potential. He accomplishes this aim by developing a simple yet powerful idea: executive control is, or should be, a systematic effort to evaluate actual performance in the light of clearly defined overall objectives. This evaluative process serves as the basis for allocation of resources and for corrective action."

"Extractions of Signals From Noise" by L. A. Wainstein and V. D. Zubalzov

Translated from the Russian this volume explores the statistical theory of optimum filters and receivers for extracting signals from a background of random noise. Part I contains a detailed treatment of the Wiener-Kolmogorov theory of filtering and prediction of stationary random processes

dec BIWEEKLY REPORT

COPY NUMBER

DATE July 6, 1962
Page 6

J. Ebner (cont'd)

and sequences. Optimum filters for the detection of signals of known form are also considered. Part II develops the basic ideas of the theory of optimum receivers, from a modern statistical decision theory point of view. These ideas are then applied to a variety of concrete problems. Thus, a detailed study is made of the detection of signal trains both coherent and incoherent, in a radar context which includes the cases of moving and scintillating targets. A chapter is devoted to the problem of measuring signal parameters in the presence of noise. Part III contains auxiliary material meant to facilitate the reading of Parts I and II.

"A Guide to Modern Management Methods" by Perrin Stryker and the Editors of Fortune

"Here is a revelating close-up of executive development, a technique that has taught would-be executives many hard lessons in recent years. The hardest lessons are described in the first three chapters of this book: the need for emotional reeducation; the uses and dangers of formal training programs; and, most difficult of all, the job of trying to improve the mental powers of managers whose mistakes may cause industry's greatest losses. Two chapters are devoted to the controversial techniques of Organization Planning and Planning and Control. The conversion of many top managements at O.P. and P. & C. and the difficulties they encountered are reported objectively and in detail."

"Introduction to Electronics" by Walter H. Evans

The keynote of this book is "creativity" - the essence of engineering. Employing the classical approach, the author states a number of objectives with methods recommended to accomplish all of them. Creativity in the electronic field is stimulated by considering several types of design problems at the end of each chapter. Analysis of a broad group of electronic circuits is presented in an interesting manner. Several electronic amplifying devices are integrated to prevent an unwarranted preference by the reader for any group in applications. A brief explanation of vaccuum diodes, gaseous diodes, solid state diodes, transistors, tunnel

J. Ebner (cont'd)
diodes, vacuum triodes, photoelectric cells, and many others, is provided.

"Marketing Research" by John P. Alevizos
"The necessary preliminary insight into the mechanics of marketing research is provided. The role of marketing research in marketing management, the methods by which it provides management with the necessary data to develop markets, products, and distribution methods, and the organization of a marketing research department are discussed in full. Also included is a step-by-step procedure for defining a problem and undertaking a research program to solve it. Perhaps the most valuable part of this project is the augmentation of these discussions by 73 case studies designed to convey to the reader and student of marketing research an appreciation of the problems involved in the conduct of a research study. These cases are documented, actual case histories, chosen to enable the reader to expand and refine the knowledge he has gained in his study of the material herein presented."

"Medical Electronics" by Edward J. Bukstein
In Medical Electronics the author has brought together information from this new and growing branch of electronics previously scattered in a wide variety of medical and technical journals. This new book is addressed primarily to the level of the electronic technician. Suggestions for additional reading are provided.

"Problems in Marketing" by Malcolm P. McNair; Milton P. Brown; David Leighton Sr.; Wilbur B. England
This volume represents the latest in a series of marketing case books, prepared by members of the Harvard Faculty, which began in 1920 with the publication of "Marketing Problems" by Professor Melvin T. Copeland. A large proportion of the cases in this book are new. Of the total 79 cases, 10 are reproductions or revisions of cases which appeared in the predecessor volume, "Problems in Marketing", by Malcolm P. Mc Nair and Harry L. Hansen. Two cases, G. B. Roe, Inc., and Domino Oil Company, which have been published in "Problems in Business Administration"by Thomas C. Raymond, are reproduced

dec BIWEEKLY REPORT

COPY NUMBER

DATE July 6, 1962
Page 8

J. Ebner (cont'd)

here with his permission. The other cases, with two exceptions, have not previously been published.

"Switching Circuits For Engineering" by Mitchell P. Marcus
A clear, concise treatment of the design and simplification of combinational and sequential switching circuits, presented so that the theory can be applied.

"Top Management Handbook" by H. B. Maynard (editor)
This handbook treats the task of managing as an art and a science. It identifies a number of principles and practices which have been used successfully by practical managers. It contains an exposition written by sixty different authors, all of whom are top managers themselves, of what it is they do while they are managing. Finally, this hand book will be of interest in some of its parts, if not in its entirety, to the many seriousminded people who are concerned with the current social, economic, and idealogical problems that so beset the world.

"Communicating Facts and Ideas in Business" by Leland Brown
"Communicating Facts and Ideas in Business explores the relationship of creative, logical, and critical thinking to the problem-solving nature of business communication, but also to present to the reader a broad, general foundation on which to build and to help him develop his ability to apply the tools of communication to any situation."

B. Stephenson

At a recent sales meeting, we discussed the fact that much time is spent duplicating work that has already been done, because of lack of awareness of the fact that it had been done. We agreed to try to distribute copies of technical letters and memos to those who might be interested, and particularly to our field offices since they have the most difficult time keeping in touch.

In accordance with this, I have been gathering things together and writing informal notes to go with them. For anyone else who may be interested, they include the following:

DF633 DIGITAL EQUIPMENT CORPORATION · MAYNARD, MASSACHUSETTS

dec BIWEEKLY REPORT

COPY NUMBER

DATE July 6, 1962

B. Stephenson (cont'd)

Product Notes

Type 4204 is a dual buffered flip-flop which can be used in counting operations. Each flip-flop has a variety of direct and gated set inputs and the 2 flip-flops have a common clear. The unit sells for $108.00.

The type 1161 is a BCD Decoder (8421) which provides DEC standard levels for driving logic. Outputs are inverters with no clamped load resistors. The selected line is at ground and other lines are open circuited. (No price yet)

The type 1570 is a slicer flip-flop used to compare output pulses from memory elements such as ferrite cores (amplified by times 10 amplifier 1550 or 1554) with the calibrated DC reference level. The price is $237.00.

The type 1690 contains 4 inverting bus drivers for driving heavily loaded output lines. Rise and fall times are one microsecond. The unit sells for $103.00.

Type 1691 contains 4 inverting bus drivers which produce output levels of 0 and -10 volts. Output current is approximately ±10 milliamps and output rise and fall times are approximately 1.5 microseconds. (No price yet)

Application Notes

"DEC Modules". This is a short sales blurb outlining the advantages of DEC modules, particularly in regard to reliability, flexibility, ease of use, and economy.

"Operational Digital Techniques" or "Pulse Rate Techniques" explains how Digital modules can be used to build up functional units which perform operations on pulse trains in the same manner as analog components perform operations on input voltage signals.

"Serial Multiplier" describes how a low speed, low cost serial multiplier can be constructed with DEC 4000 series unbuffered flip-flops.

dec BIWEEKLY REPORT

COPY NUMBER

DATE July 6, 1962
Page 10

B. Stephenson (cont'd)

"Binary-BCD Conversion" is a collection of memos on methods for performing Binary-BCD conversion and reflected code to a normal code conversion. A typical price for such a system - 20 binary bits can be converted to BCD in 100 milliseconds for about $2,000 or in 40 microseconds for roughly $20,000.

"Trouble Shooting 500 KC DEC Modules" is an article prepared by Don White for a customer who wanted some field test set ups. This describes basically what equipment is needed to check out 500 KC modules and particular areas where trouble should be checked.

"Square Root Finder" describes the method of building a special purpose square root finder by subtracting successive odd integers.

"Wiring Hints" is a copy of our present article on wiring a DEC mounting panels with some additions for driving 10 megacycle circuitry. I hope that with some assistance from the systems and computer group we will be able to rewrite this and give more detail than is presently included.

"Binary Coded Decimal Codes and Binary Coded Decimal Logic" describes the useful features of various codes and how arithmetic operations can be performed in various codes, principally excess 3.

"Preferred Metric Prefixes and Symbols", thanks to Jim Cudmore, is a list of IRE preferences, including capitilization of same.

"Analog - Digital" A lot of our business recently has been including an increasing number of Analog-Digital conversion systems. As well as the units which we sell to module customers, we've also been using a lot in our systems and computer groups for things such as Pepre, the 32 channel D-A for MIT, the PDP-4 for Foxboro, and the PDP-1 systems with display. An order which we just received from NASA this week asked for an Analog-Digital Interconnecting equipment which will include 32 channels of D-A and 32 channels of A-D. This will be used to interconnect a Pace analog computer and the PDP-1 which they will be ordering shortly.

At present our old A-D Converter brochures is out of print and we

B. Stephenson (cont'd)

hesitate to print a new one with so much work going on; it would be out of date before it even got off the presses. I am in the process right now of trying to write a memo to our Sales engineers and anyone else who would be interested, on summarizing what is being done and what we've found out and how things stand, In our new module area, Bob Savell has recently designed a new circuit which can be used for smoothing the output on D-A. John Grabowski is working on a ramp generator for use with A-D conversion and Al Falco is working on improving our present 1547.

Bob Jahncke has been setting up and checking out some of the various things that we described in our old brochure. I attempted the same memo to summarize what he has found in areas such as 1's complement and bipolar conversion, system accuracy, and reference power supplies. We also discovered an error in the equation for the continuous converter. The peak-peak voltage which is used in the equation should be the peak voltage.

In the Successive Approximation converter in the old brochure we found several difficulties. The typical method outlined there used positive capacitor diode gates which have too long a set up time for this application. Also, the time for set up which should be allowed is not necessarily the same for all steps and the conversion time could probably be speeded up considerably if this were varied. The biggest problem, however, is in the reaction of the difference amplifier at very low frequencies. This would come into play principally if the successive approximation converter was being used only at intermittent intervals and would sit idle for long times in between.

Adjustment of the ladder networks is something of a problem which we've been ignoring. I think we should seriously consider building into our own systems a sufficient amount of equipment to allow the adjustment to be easily and <u>correctly</u> performed and we should also encourage our customers to do likewise. This could be done quite simply with a maximum of 2 flip-flops, a few inverters, and a panel of switches.

<u>Other Converters</u>

Bob Jahncke and I went over to Raytheon to see their AD-10A, 10

dec BIWEEKLY REPORT

COPY NUMBER

DATE July 6, 1962
Page 12

B. Stephenson (cont'd)

bit, 2.5 musec A to D converter and their 1 M multiplexer unit (which we have used in some bids recently) We did not see any operating units, but we talked to the engineers and were quite impressed.

D. Adams

Here is a list of the components tested since the last biweekly.

TYPE	MANUFACTURER	LOT SIZE	REJECTS
MA89	Philco	1000	15.4%
MA90	Philco	4000	5.93%
MD93	Philco	1400	18.1%
MD94	Philco	3986	31.6%
MD109	Philco	95	17.9%
MD114	Sprague	657	12.0%
2N398A	R.C.A.	1700	7.6%
2N674	Philco	1095	31.0%
2N711A	T. I.	1500	0.13%
2N1184B	R.C.A.	142	3.5%
2N1204	Philco	500	12.8%
2N1308	T. I.	600	3.7%
2N1310	Gen. Instrument	1500	0.66%
T1796	Philco	250	1.6%
4JX1C741	Gen. Electric	102	0%
D-001-1	Clevite	92214	1.9%
D-003-1	Clevite	2524	2.8%
D-003-1	Transitron	165	1.8%
D-662-1	Clevite	25781	1.35%
D-664-1	T. I.	9598	1.99%
1N748	T. I.	100	2.0%
1N758A	T. I.	69	8.7%
1N758A	Transitron	139	0%
1N1217	Westinghouse	3500	22.5%
1N1220	Westinghouse	11	0%
1N2970B	I.T.T.	65	4.6%

dec BIWEEKLY REPORT

COPY NUMBER

DATE July 6, 1962

S. W. Miller

1027	50%
1062	40%
2232	10%

The redesign of the punch chad and tape catcher has reached the model stage. The capacity of the chad box has been enlarged, and a tape guide added which gives every indication of successfully folding tape. This will represent a vast improvement on this particular portion of the PDP-1.

The modification of the Phillips Memory tester has been made and will be shipped to Holland in the immediate future.

The first Memory Buffer 2010 has been shipped. All cabling problems have been ironed out and marked improvements on succeeding machines will be evident.

The mechanical problems which have been plaguing the 30A Display for almost two years are being investigated. Additional difficulties have arisen, because for the first time many parts are being made correctly, and an attempt at interchangability of parts is being made.

The cabinet for the IBM card punch control has been completed. Wiring is being completed and there have been no problems.

Although the PDP-4 is in production, a great deal of design and redesign remains to insure its success. An unwieldy straight table is ergonomically bad as well as poor looking. Lack of a reader, until very recently, has slowed down design work on in-out equipment. There is as yet nothing available as to production figures. This means a satisfactory design is much more difficult to achieve. The result is likely to be a hand crafted machine, which possibly might become a high production model, creating an unwieldy situation.

A lack of understanding as well as a lack of communication has

S. W. Miller

not helped speed up final solutions on the product. The creation of a Good Product Planning Program would be the most likely answer. In this way the individuals responsible for and involved in various projects would be kept informed. As it stands, nobody has the right to inject ideas without control or thought as to the final effect on the end product. Good product planning is the only route to better products.

K. Larsen WCO

This "Bi-Weekly Report" actually covers approximately six weeks, the period of time since my visit to Maynard.

There has been a great deal of activity in bidding of data handling and data control systems that could use a PDP-1. Several companies (including Pachard Bell) are bidding a PDP-1 in a "Midas-type Satellite" check-out system for Lockheed called SCORE (Satellite Computer Operated Readiness Equipment). Other systems being bid with PDP-1's include the wind tunnel data system for J.P.L., the Apollo space craft checkout systems by North American for N.A.S.A., the Saturn S II booster check-out system by North American for N.A.S.A. and the NERVA Atomic reactor propulsion engine test system by Aero-Jet General for N.A.S.A. In addition a flight simulator for the Apollo project, a system for North American (name unknown) and a system for Huntsville (also name unknown) are possibilities for PDP-1's.

The North American systems for N.A.S.A. will also include a substantial quantity of modules for the control and interface requirements of the systems.

It has been quite hectic trying to answer every question that comes up. The back-up from Maynard has been greatly appreciated, but more complete documentation would help us significantly and avoid delays and duplication of effort.

I hated to see Decal dropped as a soft ware package. I want to pass on comments on Decal made by people here.

dec BIWEEKLY REPORT

COPY NUMBER

DATE July 6, 1962

K. Larsen WCO (cont'd)

Bill Fletcher of B.B.N. uses Decal constantly and his opinion is that Decal is an "underdeveloped, but extremely good programming system."

Ron Coleman of Beckman Systems said that the soft ware (Decal) provided by D.E.C. is the best that he had ever worked with. (His experience includes IBM 1401 and CDC-160A.) Because so many people here ask about Fortran availability, Ted and I approached him for his comments and suggestions and his answer was that he could train any programmer to use the Decal system in three days because he wouldn't have to explain the many exceptions to the rule that are inherent in the Fortran System, and on that basis we should make the customers aware of Decal's advantages over Fortran. His feeling was that Decal was a good selling point for the PDP.

The interest in memory test equipment has been increasing lately. I have been talking with people at National Cash Register about test systems for thin films and thin film memories. I think the technique that they are using is an improved version of the "Glass Rod" system. Autonetics intends to set up complete facilities to do 100% automatic testing of purchased ferrite cores, memory array testing, and memory system check-out. General Electric at Phoenix received their automatic core tester two weeks ago and the possibilities of selling them a 1516 type memory tester looks good. Electronic Memories Inc. ordered a 2113 Automatic Core tester. Hughes Aircraft ordered a 2108 semi-automatic core tester for their Space Systems group. Bendix and Burroughs-Electrodata are both working on high speed computer memories using thin film storages. Broadbent Labs (ex American Systems) are producing thin film shift registers. (Their tester uses D.E.C. current drivers with 3C logic.)

International Computer Corporation was purchased by Ampex on July 2nd. I.C.C. was started by Witold Modlinski, the ex-Chief Engineer at Telemeter Magnetics Core Plant, and it looked as if he was going to be a competitor in the memory tester area, but I doubt if Ampex will have him continue this effort. I think they have much for him to do now that he has returned.

dec BIWEEKLY REPORT

COPY NUMBER

DATE July 6, 1962

R. Lassen

Recently we held a very satisfying meeting with Maynard Sandler, Dick Best, Bob Hughes, Roland Boivert, Gordon Bell and George Gerelds to discuss the advancement of Test Technicians from Production to Engineering. Three men were advanced and the names of three additional men were brought up for advancement in the near future. We are all enthusiastic about promoting from within and a periodic "meeting of the minds" seems to be the most effective way to do this.

We have completed our hourly wage structure by conducting a survey of drafting rates and job descriptions. We now have a good wage guide for all of our "hourly" and "weekly" jobs which will be useful during our annual review and to establish proper rates for new employees.

Our next project is to evaluate our junior level administrative group with respect to their exempt or non-exempt status as prescribed by the Wage and Hour Act. I feel we are gradually working toward a more consistant wage administration.

The girls have been helping to catalog reference material including labor laws in order to provide a readily available source of personnel information.

We have had a fairly large volume of job applicants and are continuing to expand our recruiting activities. However, generally the calibre of recent applicants has been very poor, particularly in the clerical and administrative areas. I plan to spend more time in attempting to attract and recruit above average applicants. Barbara will do the same.

I am currently reviewing the rough draft of our new employee handbook which Jack Atwood distributed recently to members of the Personnel Committee. I plan to present my suggested changes to the committee at our next meeting.

The following is a list of our current openings which have been approved in writing by Ken Olsen. Please review this list to see if it coincides with your individual personnel requirements. We do not have authorization to hire for any other job other than

dec BIWEEKLY REPORT

COPY NUMBER

DATE July 6, 1962
Page 17

R. Lassen (cont'd)

those listed below:

1	Carpenter	L. Prentice
1	Secretary	A. Blumenthal
1	Secretary	R. Melanson
1	Clerk-typist	R. Melanson
1	Secretary	G. Bell
1	Accounts Payable Clerk	B. Dill
1	Secretary	M. Sandler
1	Secretary	K. Olsen
1	Secretary	S. Olsen
1	IBM Operator	B. Dill
1	Buyer Trainee	H. Crouse
1	Wireman	R. Boisvert
1	App. Machinist	L. Prentice
1	Experienced Machinist	L. Prentice
1	Experienced Sheet Metal Worker	L. Prentice
2	Sheet Metal Trainees	L. Prentice
1	Draftsman (detail)	R. Melanson
3	Experienced Electrical Draftsmen	R. Melanson
1	Experienced Mechanical Draftsman	R. Melanson
1	Tool Crib Attendant	L. Prentice
1	Junior Accountant	R. Mills

Note:
If a person leaves your department and you wish to hire a replacement, please submit the usual request for personnel. This will help us to keep track of all our personnel needs.

dec BIWEEKLY REPORT

COPY NUMBER 2

DATE June 22, 1962

N. Mazzarese

In order to provide better service to ITT as a customer, the "ADX Systems" department has been organized.

Organization-wise, this department will report to Sales and will be responsible to Stan Olsen.

Functionally, for the present, ADX Systems will handle design, production, sales and liason on all ITT computers.

The staff is comprised of: Nick Mazzarese, Manager; Bob Maxcy, Administrative Assistant; Sally Hoagland, secretary. The technical staff members are Ed Harwood, Bob Reed, Don Murphy, Leo Gossel (on loan to R. Savell), Jack Williams and Tom Psilekaris.

Projects

1. ADX-4 was accepted by ITT on May 31st and shipped to Paramus on June 1st.

2. ADX-2 is running a little behind, due to late deliveries of extra memories and tape. It is expected that acceptance tests will be run no later than July 31st. The fact that we have a single shift, one man crew (Don Murphy), able though it is, has not helped this situation.

3. ADX-6 has started checkout on time with a one and one-half man crew - one each Tom Psilekaris and one-half each Bob Reed. The machine was delivered to checkout with reader, punch, typewriter, and a memory - thank you Jack Smith. It even had a few modules in it! This is the best condition we have received a machine in so far. About 100 more modules and we'll really be on the air.

4. Line Unit Tester - A Line Unit Tester is due for delivery on June 22. The unit is presently being wired and should be delivered no later than two weeks late.

5. A new purchase order for twelve machines will be placed by ITT this month. Of this quantity, one computer order is already on its way (ADX-9) and two more are verbally definite: ADX-10 and ADX-11.

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 22, 1962

R. Cajolet

1031	60%
2289	20%
1026	20%

Several projects have been completed since our last report.

Small cabinets for the four memory buffers are now complete mechanically and have been handed over for wiring and assembly. Because of the limited space, there is a cabling problem, but this will be taken care of very shortly.

The new casting for the 30A Display is now ready. The prototype has been checked. A few minor changes have been made on the pattern and 12 castings have been ordered. The casting will cut down on assembly time and therefore help production rate. It will also give us a better product.

Some design changes have been made on the cabinet for the PDP-4 to enhance its appearance.

Proposals are now being drawn for housing the peripheral equipment of the PDP-4. These will be presented soon.

Because of the many changes and additions in the Mag Tape cabinet, the assembly drawings for this cabinet are being redrawn. The purpose is to simplify and clarify the assembly drawings and to include the new changes, that is, the door stop, and new latches.

The problem of over-heating in this cabinet has just come up, with the onslaught of summer weather. The addition of an exhaust fan to solve this problem is being studied.

The work continues in setting up company standards and specifications for mechanical work. The latest additions to this list are specifications on paint, and some forms of fabrication.

Because of the complaints of the operation of the paper tape punch we have been involved in reworking the punch. The re-work consists of improvements in the tape catcher to facilitate folding the tape as it feeds out of the punch and relocation of the chad

R. Cajolet (cont'd)

box, allowing the chad to fall directly into the box eliminating the chance of clogging the punch. This will also allow the use of a larger chad box. Most of the redesign for the punch is finished and we will shortly have a model in operation.

The PDP-1 is to have a new logo to identify it as a PDP-1 and a product of Digital Equipment Corporation. A sample logo will be mounted soon for final approval.

Judith Ebner

The following books have been added to the Library.

"Advances in Electronic Circuit Packaging" - Vol. 1 - by Gerald A. Walker (also Vol. 2)

Proceedings of the Second International Electronic Circuit Packaging Symposium, held August 16-18, 1961. Sponsored by the University of Colorado and Electrical Design News. The 24 technical papers contained in this volume are all written by engineers and designers from leading electronics companies, and comprise a complete and up-to-date study of electronic circuit packaging. The areas covered extend from the microscopic to the macroscopic, with particular emphasis on packaging materials, packaging for outer space vehicles, underground and underwater packaging, high impact packaging, the problems of mobile equipment, interconnections in packaging, and packaging economies. The purpose of this Symposium was to examine as many facets of the subject of electronic circuit packaging as possible. In emphasizing technique, this volume will be of practical value to the electrical, electronic, mechanical, and chemical engineer involved in any phase of circuit packaging.

"Anatomy of Automation" by George H. and Paul S. Amber

Intended as a basic foundation in the principles and philosophy of automation, this book starts out with commonly known facts concerning primary industrial practices and builds up to fully automatic systems. The functional aspects of automation take precedence over equipment design details. The two main elements of useful work, energy and information, are discussed thoroughly. By following the simple, logical framework

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 22, 1962
Page 4

Judith Ebner (cont'd)

developed in the text, the reader learns what levels of automation involve the mechanization of energy and what levels involve the mechanization of information. The role of self-correcting feedback control and computer control in automation is carefully analyzed.

"Best's Safety-Maintenance Directory" (combined with The Manual of Modern Safety Techniques) - 9th Edition - by Alfred M. Best Co., Inc.
The Manual articles provide guidance in setting up various types of safety and maintenance programs and reference data for some of the more common problems that may be encountered. The product Directory contains concise information covering thousands of recognized safety, maintenance, first aid, sanitation, hygiene and fire protective products and equipment.

"Business Management Handbook" by J. K. Lasser
A practical guide for the businessman covering various aspects of business in general; including taxes, insurance, financial analysis research, etc. Contributed by individuals who have, over the years, developed a high ability in their selected areas of specialization.

"Chambers's Technical Dictionary" (Third Edition Revised with Supplement) by C. F. Tweney and L. E. C. Hughes
The aim of this dictionary is to give, in the light of present knowledge and opinion, definitions of terms that are of importance in pure and applied science, in all branches of engineering and construction, and in the larger manufacturing industries and skilled trades. It is a dictionary of technical terms, written by specialists, partly for other specialists but more particularly for the technically minded man-in-the-street and for students and interested workers of all kinds and ages; indeed, for all who wish to understand what scientists and engineers have to say to each other.

"Coding Theorems of Information Theory" by J. Wolfowitz
This monograph describes and proves most of the known existence theorems of information theory. It begins f rom first principles and requires no prior knowledge of information theory. Precise definitions are given, and proofs are clear and

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 22, 1962

Judith Ebner (cont'd)

rigorous. The reader is brought to a point where he can embark on research of his own. Among channels discussed are; the discrete memoryless channel, compound channels, channels with feed back, channels with stochastically determined states, channels with memory, semicontinuous and continuous channels. The monograph is designed to be read by anyone with a modest amount of mathematical maturity. It will be of interest to mathematicians, electrical engineers, mathematical statisticians, and other members of the scientific community concerned with this rapidly evolving discipline.

"Designing for People" by Henry Dreyfuss

In this book Henry Dreyfuss tells how he has approached and carried out his work during the past 25 years. He reveals what he and his partners have learned about the average American, what research they do, what he's discovered about the level of public taste, what he thinks of today's automobiles. And he describes the step-by-step procedure involved in an important design assignment. He answers questions - the ones most frequently asked by people unfamiliar with industrial design.

The book (jacket, binding, end papers, typography and page layouts) is designed by the author. He drew the marginal sketches, too.

"Dining Out in Any Language" by Myra Waldo

The Round-the-World-Menu Translator - Everything you need to know to order breakfast, lunch, or dinner in any restaurant anywhere is here in the concise dictionary of foreign menu terms translated into English.

"Electronic Engineering Principles" (3rd edition) by John D. Ryder

This book maintains a viewpoint of electronics as one science, not two diverse areas based on the vacuum tube and the transistor. It emphasizes the two basic devices which achieve similar results, and in many applications they may be viewed and discussed jointly as ideal linear generators or inertialess switches. As soon as the reader understands the physical differences between the tube and transistor, he is free to replace them with their ideal counterparts and concentrate on studying the properties of the circuits associated with these

Judith Ebner (cont'd)

ideal elements. After covering the physical aspects of vacuum and solid-state devices coverage is limited to those processes and circuits fundamental to Class A and B operation at nominal frequencies. This defined area of coverage, plus the completeness and clarity of the author's analysis, make this an ideal introductory book.

"Electronic Equipment Design and Construction" by Geoffrey W. A. Dummer, Cledo, Brunetti, Low K. Lee

This practical manual provides recommended techniques and basic working data necessary for constructing electronic equipment - from the initial stages of design through to testing the finished product. It furnishes you with essential information for designing equipment that will withstand the severe environments to be encountered in operation anywhere on earth, in the atmosphere, and in space.

"England" edited by L. Russell Muirhead

A travel guide covering data on passport and customs regulations; currency and postal rates; hotel accommodations and prices; lists of restaurants, theatres; methods of transport; suggestions for sight seeing trips, tours; and a generous equipment of maps; etc.

"France" prepared by Holiday Magazine

A travel guide covering money; tipping; transportation; shopping; hotels and restaurants; major points of interest; sightseeing; museums; night life; language; etc.

"France 1961" edited by Eugene Fodor

A travel guide of France covering how to plan your trip; when to go; where to go; festivals; highlights of France; how to go; what it will cost; what to take; passports, visas; customs; money; hotels and restaurants; transportation; points of interest; etc.

"Jet Age Guide to Europe 1961" edited by Eugene Fodor

Coverage of all Europe, including the independent tourist countries of Cyprus and Malta. A guide to Eastern Europe, including information on visiting family and friends in Communist countries. Selection of Europe's hotels and

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 22, 1962

Judith Ebner (cont'd)

restaurants according to price. Guide to European gastronomy. European shopping guide compiled by resident buyers. Comprehensive guide to museums, monuments, cultural events, European shows and night life. Presentation of people and customs of 34 countries. Forty-three city plans and map of Europe.

"The Low Countries - Holland, Belgium, Luxembourg" prepared by Holiday Magazine

A travel guide covering when to go; how to get there; getting around in the Low Countries; weather and clothing; money; hotels; food and drink; maps, etc.

"The Management of Time" by James T. McCay

This book sets forth a practical method for overcoming time pressures today and preparing for the much greater time demands of the coming decade. The methodology is mainly drawn from the work of Albert Korzybski, as presented in his book, "Science to Sanity". The Appendix gives a background reading list of books by scientifically orientated authors.

"New Horizons USA" published by Pan American World Airways System

For the reader's convenience the U.S. has been arbitrarily divided into seven sections: Northeast, Southeast, North Central, South Central, Northwest and Southwest and a new section to include Alaska, Hawaii, Puerto Rico and the Virgin Islands. Following brief descriptions of the states within each division, there are comprehensive sections on the leading cities. Each city begins with five introductory categories describing the weather, location and history, characteristics, population, size and how to get there. These five sections constitute the introduction to each city. The material which follows is divided into categories, beginning with accommodations and ending with sources of additional information.

"Paris" edited by L. Russell Muirhead

A guide book covering historical background; literary associations; famous buildings and cultural landmarks; passport and customs regulations; lists of hotels; restaurants, theatres; museums and art galleries; maps; etc.

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 22, 1962

Judith Ebner (cont'd)

"Paris" prepared by Holiday Magazine
A travel guide covering transportation; telephones; money and tipping; where to stay; dining; shopping; sightseeing; historical background; nearby tours; etc.

"Scandinavia" prepared by Holiday Magazine
A travel guide covering when to go; how to get there; customs; transportation; money and tipping; climate and clothing; food and drink; some do's and don'ts; etc.

"Short Guide to London" edited by L. Russell Muirhead
Contains useful information about hotels, restaurants, and amusements, as well as the underground railways, bus services and postal rates; and it has 3 maps, 28 plans, and a full general index.

"Travel Tips for France" published by Trans World Airlines
Most of the specific information is devoted to Paris, with general information on the various regions of France. Briefly covers history and geography, weather, language, money and prices, transportation, holidays and events, customs regulations, hotels, restaurants, theatres and night clubs, shopping, sightseeing, etc.

D. Denniston, NYO

The following is a summary of some of the more important activities in the New York Area during the last two weeks:

CUSTOMERS

Western Electric - Allentown, Pa. - There is great interest here in a Ferrite Sheet Tester. I believe they approached us with this problem several years ago and we did not bid because of the intricate test fixture required. Rese has built the two they now have. This location, I might mention, has been responsible for orders totaling around $50K in the last few months.

Bell Tel. Labs - Holmdel, N.J. - The move to Holmdel is now in full swing and our first purchase order from this location has been received.

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 22, 1962

D. Denniston, NYO (cont'd)

PROSPECTS:

Radio Receptor Co., Inc. - I have had a rather unpleasant visit with some of the people in Hicksville, L.I. recently. This was my first visit here and I must say that I have never met a group quite as belligerent and rude as these people were. They are working on a government contract and about the only thing they were in agreement on was that our modules were far too expensive for them to use, regardless of quality, reliability and proven performance.

Hazeltine Corporation - I met some of the people in Plainview, L.I. They have several applications in mind and seemed very interested in DEC equipment. They were very impressed with the capabilities and quality of our modules.

International Electric Corporation - There is interest here in a data system for maintenance of sage.

Federal Scientific Corporation - I am also preparing an estimate for a serial to parallel conversion system of these people in New York City.

REMARKS:

I would like to mention that the NYO has had three rather unhappy experiences with the shipping of Model 71 Current Calibrators in the last two weeks. At least one of these three was quite badly damaged, and the customer felt it was a result of insufficient packing. All three of these units were sent parcel post. The worst damage resulted when Special Handling was included.

D. Adams

These units have been tested since the last biweekly.

SEMICONDUCTORS	MANUFACTURER	UNITS TESTED	PERCENT REJECTS
FSP-24	Fairchild	43	0
MA-80	Philco	10,000	0.54%
MA-89	Sprague	1,000	8.9%
MA-90	"	4,000	6.2%

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 22, 1962

D. Adams (cont'd)

SEMICONDUCTORS	MANUFACTURER	UNITS TESTED	PERCENT REJECTS
MD-93	Sprague	1,097	8.7%
MD-94	"	2,260	14.3%
MD-114	Philco	10,244	3.85%
MD-114	Sprague	3,248	6.0%
2N598	Philco	50	4.0%
2N1184B	RCA	80	5.0%
2N1204	Philco	1,500	13.8%
2N1218	Sylvania	200	1.0%
2N1305	Gen. Electric	20,000	1.3%
2N1494	Philco	241	6.2%
2N1613	Fairchild	30	0
4JxlC741	Gen. Electric	3,000	0.9%
D001-1	Clevite	67,381	3.5%
D003-1	"	12,301	1.0%
D003-1	Transitron	800	8.7%
D662-1	Clevite	31,663	1.11%
D664-1	T.I.	11,000	0.39%
IN429	Hoffman	235	0
IN748	T.I.	100	1.0%
IN758A	"	300	10.3%
IN3208	Motorola	1,000	1.5%
IN3209	"	100	0

A. Blumenthal

The MIT machine went into checkout on June 7 with only a partial complement of modules and the high speed channel and mag. tape options not yet installed. Memory was also not installed. The documented part of the checkout procedures was completed on June 13.

About 35 wiring errors were found in the process, few of which were caused by drawing errors. Memory checkout took 3 days due to power supply troubles and an unexpected change in core characteristics in Ampex stocks. At present the central processor is fully operational except for the punch which was sent back to quality control due to mechanical trouble.

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 22, 1962

A. Blumenthal (cont'd)

Considering the fact that a new technician did a good part of the work and only one shift was used, things have gone quite well. The second shift has been used for option installations.

Marginal checking is now in progress and the display system will be tied in within a day or two.

One problem in maintaining a smooth flow of events is that of getting modules for the machines. Efforts to create a smoothly operating back order system have not yet been fruitful.

Some preliminary design on the options for Atomic Energy of Canada's machine is nearly complete and a price quote will be made shortly.

The quote for United Aircraft will be revised due to a change in the nature of their options.

R. Mills

Following is list of capital items for month of May, 1962:

Vendor	Description	Amount
Barry Hyman	Big Joe Lifter	$ 1,504.00
Tektronix	Oscilloscope & Pre Amps	12,220.00
Larco	Delpark Filter	927.63
Cutter, Wood & Sanderson	Whitney Power Punches	1,225.00
Lewis E. Tracey	Shelves and Posts	684.43
Davidson Corp.	Offset Duplicator	2,455.00
Tektronix	Oscilloscope, Plug In, Probes	10,540.00
		$29,556.06

J. Fadiman

The Systems Division has been working hard on new developments in the memory tester field. We have received the order from I.B.M. in Owego for Memory Tester, Model 1520, which is an elaborate system with very flexible plug board programming. We have also talked with people from Ferroxcube and they are interested in a similar memory tester on a somewhat reduced scale. Today another

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 22, 1962
Page 12

J. Fadiman (cont'd)

engineer from I.B.M. in Owego was here to discuss our proposal for an Automatic Core Tester, Model 2114. This is an elaborate core tester with ten current drivers and very flexible programming by means of a plug board. Chances of making this sale are about 90%. We have received an order from E.M.I. for one of our standard Automatic Core Testers, Model 2113, which has already been started. I am going down to visit Bell Laboratories in Allentown, Pa. concerning future logical word with our sense system for both the Bell Labs in Allentown, and Bell Labs in Hawthorne, Illinois. Yesterday Mr. Roger Cady of Minneapolis-Honeywell was here to discuss the possibility of our building an Automatic Core Tester for them. Chances of this sale are about 70%.

The Automatic Core Testers, 2113B and 2113D, have been completed. "B" has been completely checked out and the "D" will be completely checked out in one week. Under construction, are the 2113F for Hitachi Central Labs and 2113G for E.M.I. Under construction also, are the four Memory Buffer systems for the Navy in Dam Neck. The first of these systems should go out within one week. Final checkout is being completed on the typewriter buffer system by Bob Beckman and this is being shipped immediately.

All logical drawings and wiring drawings have been completed by Ed De Castro for the interface equipment for Foxboro. These are going into wiring today. Checkout has been nearly completed by Dick Tringale on the PEPR system for MIT and it is expected that they will accept this system sometime next week here at our plant in Maynard. There will still be a few changes that will have to be made and put in in our plant during the first week of July.

G. Bell

I would like to urge people with clerical type problems, which may be solved by the PDP-4, to discuss these with Dit Morse. The installation presently has a card reader and magnetic tapes, and will soon have a high-speed line printer.

We have been discussing a computer application for PDP-4 with MIT which will buffer up to 200 typewriters into the IBM 7090. The PDP-4 would act as a 7090 Data Channel. (With the cost of 200.X,

G. Bell (cont'd)

it would probably be better for MIT to use a PDP-1.)

Two years ago, we discussed doing mailing addressing requiring a magnetic tape system, card reader, and a fast line printer. At that time we hadn't quite finished the development problems for reader, tape and printer, plus the PDP-1 was just too big to do that sort of calculating. The PDP-4 with a 1024 word memory would do a task such as this at least as fast as an IBM 1401 system, but at significantly less cost. It would probably be worth developing a low cost, line printer for the above low cost system. We must demonstrate the PDP-4 by solving some of the DEC internal computing problems.

A memo of pros and cons is available concerning on line typewriters which might be used on PDP-4 in place of the Teletype 28.

Current projects include the prototype system, the computers for Foxboro/Nabisco, Corning, and DEC (for module testing).

K. Fitzgerald

EN 1000	50%
JN 100-00	50%

This report is covering a six-week span, the first four weeks of which most of my time was spent on general administrative and engineering problems concerned with the sheetmetal, machine, and cabinet assembly shops. The last two-week period I have spent quite a bit of time on shipping different systems and computers, and many problems have been discovered. Therefore, I have been working with Bob Beckman on a formal procedure to be followed for getting systems and computers ready for shipment. We expect to have some formal proposals distributed to all interested persons within the next week or week and one-half. This proposal will outline such things as who is responsible for cleaning up all of the last minute details which have always been left to the last one or two days, when these details will be cleaned up, and how. Also, we expect to outline standard shipping procedures as far as standard crates and boxes are concerned. The time necessary before clean-up and shipping of a machine will naturally be

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 22, 1962

K. Fitzgerald (cont'd)

dependant on the size and complexity of the machine, but some standards to handle this will also be established.

We have placed an order with Donnelly Mfg. Company for five more ITT console ends to be delivered by September 1, 1962.

The machine shop has finished a special templet drilling machine for making aluminum templets for drilling our circuits boards in the Nawide machine, a new semi-automatic handle-bending machine, and is presently working on the first real production run of the new Display Type 30A's utilizing the casting which was designed and engineered by Scott Miller and Loren Prentice. They are also working on a rush order of 12 more memory plane housings, of which most of them have already been designated for stack manufacturers.

For the past ten-week period the cabinet shop has handled an average of 15 cabinets per week. That is, having the cabinets painted, assembled, and delivered to the designated assembly area. All end panels and doors for these cabinets have been assembled also, then put into storage until they are called for, for final acceptance test. While doing this, they have also installed all the ITT console ends, installed all the readers and punches in the PDP's and assembled four Display 30's. The cabinet shop has also had to pitch in on every system that has been shipped in the past ten-week period which has always managed to tie them up for at least eight hours just to ship a system.

It was quite unfortunate recently that we had a fairly bad accident in the Mag Tape check-out area, where a single-bay Mag Tape unit tipped over on one of the mag tape personnel. After investigating the accident, recommendations were made to keep this from happening again and I noticed that some of the recommendations have been followed out. This company is getting to the size now where things of this nature are more apt to happen unless all supervisor are extremely careful in recognizing and eliminating potential safety hazards. A good stiff look should be taken at all of our operations at this time to be sure that all personnel are protected from potential safety hazards, cautioned about these, and made aware that there are many seemingly harmless objects that are potential safety hazards.

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 22, 1962

K. Fitzgerald (Cont'd)

The sheetmetal shop under its new foreman has been performing very well. We are currently saturated with work for the next six to eight weeks. The only jobs that we can take in for delivery in less than six to eight weeks at this time will have to be real emergency type jobs. Production and special systems have got us saturated. We have requisitions in for two more machine operator type people in the sheetmetal shop which should help to speed up our operation a little bit since our new set-up of layout and first piece inspection, along with our method of handling our production, has meant that some of our better type people have had to do the more menial tasks of plain old machine operators. During the past ten-week period the shop has handled approximately 450 different jobs, with lot sizes averaging approximately 50 pieces per job. This is a tremendous amount of material, turned out in a fairly short period of time; however, this could not be accomplished if we did not have the adequate lead time which we have been very fortunate in getting recently. However, we would naturally appreciate as much lead time as we can get as it makes our scheduling that much easier. What I mean is, don't set dates that you think are adequate for the shops. Set dates that you really need and then if we can deliver early we will but if not we will be able to better schedule the work to your needs by date.

dec BIWEEKLY REPORT

COPY NUMBER 2

DATE June 8, 1962

D. Denniston, NYO

The following is a brief summary of some of the activities of the larger and/or new customers in the NYO area.

BELL TELEPHONE LABORATORIES, INC.

Whippany

Along with the now routine test set building in the Electronic Switching Section (which consumes a good percentage of the total of modules sold to Whippany), there are also several systems in the initial phases, one of which is centered around an 80 bit shift register to be used as an output device for a 7090.

Murray Hill

As in Whippany, testing equipment is consuming a large number of modules, except that most of these systems are being constructed for memory device experiments. Several groups are only in the early stages of their work and the strong indication is that there will be bigger and more sophisticated systems in the near future.

New York City

There should be additional orders from this location within a few months. One new order is being processed at this time. Their initial system constructed with our modules is well under way and the group there seems pleased with their results.

BROOKHAVEN NATIONAL LABS - Upton, L.I., New York

The people here continue to complain about delivery problems, but less bitterly than a few months ago. They also continue to place orders.

INDIANA GENERAL CORPORATION - Keasbey, New Jersey

Recent indications are that there is "keen interest" in a semi-automatic core tester. We sent them a quote for a 2109 last year. They have funds set aside for such a machine and now would like another quote.

I.B.M. - Thomas Watson Labs - Yorktown Heights, New York

Activity has picked up again here, with a fairly recent order for 10 mc equipment. They are anxiously awaiting our VHF line.

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 8, 1962

Judith Ebner

The following books have been added to the Library.

"Analogue Computation" by R. W. Williams

Analogue Computation is intended to serve as an introduction to the subject and little knowledge is assumed in the reader beyond a grasp of light current engineering. The mathematics does not demand more than simple algebra and calculus.

"Automatic Data-Processing Systems: Principles and Procedures" by R. H. Gregory and R. L. Van Horn

This book deals with business-data processing. It is introductory, requiring no previous knowledge of electronic computing systems. Computer programming and systems analysis are covered in detail. More important, a blending of theoretical and practical approaches to data processing explains why, as well as what, and how. Some new concepts in management information are developed and management tools and techniques are included.

"Automatic Feedback Control System Synthesis" by John G. Truxal

This book represents an attempt to organize and unify the background material in the following five fields: (1) The designer must have a working familiarity with the Laplace transform which goes beyond the simple formal relationships between the time and frequency functions. (2) The designer must be familiar with the fundamental concepts of feedback theory. (3) If the servo engineer is to appreciate fully the advantages inherent in the use of the Laplace transform, he must be able to synthesize appropriate compensation networks. (4) The designer must be familiar with the statistical methods of design if he is to cope with the problems associated with realistic signal inputs. (5) The designer must be acquainted with the basic techniques available for considering non-linear systems. Emphasis is on the development of the basic theory, although an attempt is made to illustrate the discussion with examples of practical significance.

"Computers and How They Work" by James D. Fahnestock

A completely understandable and comprehensive study of Electronic Computers that describes in clear, precise terms the basic principles behind computers, their manufacture and how they are operated and maintained at a high level of efficiency.

"Cost and Budget Analysis" by John Dearden

This book is concerned with the financial information that management needs for making short-term operating decisions. Specifically, the book covers cost accounting, cost analysis, and budgetary control. It does not cover capital investment analysis, long-term profit planning, or decentralized profit control techniques, because they relate to long-run operating decisions.

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 8, 1962

Judith Ebner (cont'd)

"Creative Management" by N.R.F. Maier and J. J. Hayes

This book is addressed to that segment of the American public interested in modern problems and pressures in organizational settings. It is concerned with creativity and conformity, with productivity and morale, and with the forces of change in organizations. It probes the nature of authority, the real relationship between authority and responsibility, and the meaning of leadership.

"Dynamic Optimization and Control" by Walerian Kipiniak

Dynamic Optimization & Control develops a general control theory for dynamic systems of immediate interest to electrical, mechanical, and chemical engineers and to operations research analysts. The author demonstrates the computation of solutions for such practical problems as vehicle stabilization, trajectory control, chemical process control, and inventory control. He also explains how spatial analog computers can be applied as optimizing controllers.

"Electronic Analog Computers" by Granno A. and Theresa M. Korn

A practical and comprehensive treatment of d-c analog computers, used as differential analyzers, equation solver simulators, and control system components. How to set up problems for analog computation is shown and examples are given of practical applications, including set-up procedure, in typical problems of applied mathematics and engineering design. The book also shows how to design analog computers, covering circuit theory, components, and complete systems.

"Executive Skills" by Bellows, Gilson and Odiorne

Among the Features of Executive Skills: Human relations teamwork methods based on research in group dynamics. Extensive use of case illustrations, forms, and procedures. Detailed treatment of interviewing, counselling, and communications skills. Comprehensive self-appraisal chart in the appendix. Executive skills needed in the 60's predicted from facts on hand.

"Foundations of Information Theory" by Amiel Feinstein

A concise but rigorous exposition of the fundamentals of the mathematical theory of information.

"A Guide to Fortran Programming" by Daniel D. McCracken

This book is written for the person who wants to get a rapid grasp of the use of a computer in the solution of problems in science and engineering. The application of a computer to such problems is greatly simplified by the use of Fortran or a similar compiler because it is not necessary to learn the details of computer operation.

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 8, 1962
Page 6

Judith Ebner (cont'd)

"Introduction to Electronics" by Robert J. Hughes and Peter Pipe
A "Teaching Machine" book introducing the layman to electronics.

"Iterative Arrays of Logical Circuits" by Frederick C. Hennie
This book examines the behavior of one and two dimensional iterative networks. It is written for persons working in the communications sciences, and is especially pertinent to the areas of information processing, switching theory, and computer design.

"Management and the Computer" by Martin Greenberger
Compiled from a lecture series held in the spring of 1961 as part of MIT's Centennial year. Contents as follows: (1) Scientists and Decision Making (2) Managerial Decision Making (3) Simulation of Human Thinking (4) A Library for 2000 A.D. (5) The Computer in the University (6) Time-Sharing Computer Systems (7) A New Concept in Programming (8) What Computers Should be Doing

"Microwave Measurements" by Edward L. Ginzton
This book is concerned with the basic forms of electrical measurements encountered in the microwave region of the electromagnetic spectrum. The topics discussed provide a background for all common microwave measurements as well as for more specialized applications.

"Modern Packaging Encyclopedia '62 by Modern Packaging Magazine
The issue is divided into five editorial divisions and one directory division as follows: (1) Package Planning, Methods and Materials (2) Packages (3) Machinery (4) Merchandising (5) Shipping and Protective Packaging (6) Buyers' Directory

"Transform Method in Linear System Analysis" by John A. Aseltine
This book is about the application of integral transforms to the analysis of physical systems which can be described by linear differential equations. It is an engineering book, and most of the mathematics it contains is presented from the engineer's rather relaxed point of view regarding rigor.

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 8, 1962

Judith Ebner (cont'd)

"Transmission of Information (A Statistical Theory of Communications)" by Robert M. Fano

The book is specifically directed to graduate students and engineers interested in electrical communications. It emphasizes the points of view and methods of analysis which are likely to prove most useful to them in their future work.

"20,000 Words" compiled by Louis A. Leslie

A dictionary of essential words for businessmen, stenographers, students, editors, proofreaders, etc. The words are spelled, accented and divided.

R. Savell

2065	50%
2101	50%

The last two weeks have been spent cleaning up loose ends on the Lawrence Radiation Laboratory computer system and getting ready to run acceptance tests. The tests were started last Saturday, but were suspended on Monday due to problems with the Potter tapes transports that are designed to read Remington Rand tapes. They were removing oxide from the tape in large quantities. Potter engineers have been here one and one-half days and feel they have the problem solved. Tests will resume, hopefully, today. The tests will occupy two full ten-hour days and are quite thorough.

The first two Precision Displays, Type 31, are complete except for alignment. We have found that the mechanism for adjusting the focus coil and deflection yoke needs some improvements on the next model, otherwise operation is quite satisfactory.

R. Lassen

We have a full agenda for next week's Personnel Committee meeting. I feel that we have worked out several worthwhile proposals. However, it is better to wait until after the meeting before discussing them.

Our employee relations program needs more constant attention especially as we continue to grow; therefore, I plan to spend as

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 22, 1962

R. Cajolet (cont'd)

box, allowing the chad to fall directly into the box eliminating the chance of clogging the punch. This will also allow the use of a larger chad box. Most of the redesign for the punch is finished and we will shortly have a model in operation.

The PDP-1 is to have a new logo to identify it as a PDP-1 and a product of Digital Equipment Corporation. A sample logo will be mounted soon for final approval.

Judith Ebner

The following books have been added to the Library.

"Advances in Electronic Circuit Packaging" - Vol. 1 - by Gerald A. Walker (also Vol. 2)

Proceedings of the Second International Electronic Circuit Packaging Symposium, held August 16-18, 1961. Sponsored by the University of Colorado and Electrical Design News. The 24 technical papers contained in this volume are all written by engineers and designers from leading electronics companies, and comprise a complete and up-to-date study of electronic circuit packaging. The areas covered extend from the microscopic to the macroscopic, with particular emphasis on packaging materials, packaging for outer space vehicles, underground and underwater packaging, high impact packaging, the problems of mobile equipment, interconnections in packaging, and packaging economies. The purpose of this Symposium was to examine as many facets of the subject of electronic circuit packaging as possible. In emphasizing technique, this volume will be of practical value to the electrical, electronic, mechanical, and chemical engineer involved in any phase of circuit packaging.

"Anatomy of Automation" by George H. and Paul S. Amber

Intended as a basic foundation in the principles and philosophy of automation, this book starts out with commonly known facts concerning primary industrial practices and builds up to fully automatic systems. The functional aspects of automation take precedence over equipment design details. The two main elements of useful work, energy and information, are discussed thoroughly. By following the simple, logical framework

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 22, 1962

Judith Ebner (cont'd)

developed in the text, the reader learns what levels of automation involve the mechanization of energy and what levels involve the mechanization of information. The role of self-correcting feedback control and computer control in automation is carefully analyzed.

"Best's Safety-Maintenance Directory" (combined with The Manual of Modern Safety Techniques) - 9th Edition - by Alfred M. Best Co., Inc.
The Manual articles provide guidance in setting up various types of safety and maintenance programs and reference data for some of the more common problems that may be encountered. The product Directory contains concise information covering thousands of recognized safety, maintenance, first aid, sanitation, hygiene and fire protective products and equipment.

"Business Management Handbook" by J. K. Lasser
A practical guide for the businessman covering various aspects of business in general; including taxes, insurance, financial analysis research, etc. Contributed by individuals who have, over the years, developed a high ability in their selected areas of specialization.

"Chambers's Technical Dictionary" (Third Edition Revised with Supplement) by C. F. Tweney and L. E. C. Hughes
The aim of this dictionary is to give, in the light of present knowledge and opinion, definitions of terms that are of importance in pure and applied science, in all branches of engineering and construction, and in the larger manufacturing industries and skilled trades. It is a dictionary of technical terms, written by specialists, partly for other specialists but more particularly for the technically minded man-in-the-street and for students and interested workers of all kinds and ages; indeed, for all who wish to understand what scientists and engineers have to say to each other.

"Coding Theorems of Information Theory" by J. Wolfowitz
This monograph describes and proves most of the known existence theorems of information theory. It begins f rom first principles and requires no prior knowledge of information theory. Precise definitions are given, and proofs are clear and

Judith Ebner (cont'd)

rigorous. The reader is brought to a point where he can embark on research of his own. Among channels discussed are; the discrete memoryless channel, compound channels, channels with feed back, channels with stochastically determined states, channels with memory, semicontinuous and continuous channels. The monograph is designed to be read by anyone with a modest amount of mathematical maturity. It will be of interest to mathematicians, electrical engineers, mathematical statisticians, and other members of the scientific community concerned with this rapidly evolving discipline.

"Designing for People" by Henry Dreyfuss

In this book Henry Dreyfuss tells how he has approached and carried out his work during the past 25 years. He reveals what he and his partners have learned about the average American, what research they do, what he's discovered about the level of public taste, what he thinks of today's automobiles. And he describes the step-by-step procedure involved in an important design assignment. He answers questions - the ones most frequently asked by people unfamiliar with industrial design.

The book (jacket, binding, end papers, typography and page layouts) is designed by the author. He drew the marginal sketches, too.

"Dining Out in Any Language" by Myra Waldo

The Round-the-World-Menu Translator - Everything you need to know to order breakfast, lunch, or dinner in any restaurant anywhere is here in the concise dictionary of foreign menu terms translated into English.

"Electronic Engineering Principles" (3rd edition) by John D. Ryder

This book maintains a viewpoint of electronics as one science, not two diverse areas based on the vacuum tube and the transistor. It emphasizes the two basic devices which achieve similar results, and in many applications they may be viewed and discussed jointly as ideal linear generators or inertialess switches. As soon as the reader understands the physical differences between the tube and transistor, he is free to replace them with their ideal counterparts and concentrate on studying the properties of the circuits associated with these

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 22, 1962

Judith Ebner (cont'd)

ideal elements. After covering the physical aspects of vacuum and solid-state devices coverage is limited to those processes and circuits fundamental to Class A and B operation at nominal frequencies. This defined area of coverage, plus the completeness and clarity of the author's analysis, make this an ideal introductory book.

"Electronic Equipment Design and Construction" by Geoffrey W. A. Dummer, Cledo, Brunetti, Low K. Lee

This practical manual provides recommended techniques and basic working data necessary for constructing electronic equipment - from the initial stages of design through to testing the finished product. It furnishes you with essential information for designing equipment that will withstand the severe environments to be encountered in operation anywhere on earth, in the atmosphere, and in space.

"England" edited by L. Russell Muirhead

A travel guide covering data on passport and customs regulations; currency and postal rates; hotel accommodations and prices; lists of restaurants, theatres; methods of transport; suggestions for sight seeing trips, tours; and a generous equipment of maps; etc.

"France" prepared by Holiday Magazine

A travel guide covering money; tipping; transportation; shopping; hotels and restaurants; major points of interest; sightseeing; museums; night life; language; etc.

"France 1961" edited by Eugene Fodor

A travel guide of France covering how to plan your trip; when to go; where to go; festivals; highlights of France; how to go; what it will cost; what to take; passports, visas; customs; money; hotels and restaurants; transportation; points of interest; etc.

"Jet Age Guide to Europe 1961" edited by Eugene Fodor

Coverage of all Europe, including the independent tourist countries of Cyprus and Malta. A guide to Eastern Europe, including information on visiting family and friends in Communist countries. Selection of Europe's hotels and

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 22, 1962

Judith Ebner (cont'd)

restaurants according to price. Guide to European gastronomy. European shopping guide compiled by resident buyers. Comprehensive guide to museums, monuments, cultural events, European shows and night life. Presentation of people and customs of 34 countries. Forty-three city plans and map of Europe.

"The Low Countries - Holland, Belgium, Luxembourg" prepared by Holiday Magazine

A travel guide covering when to go; how to get there; getting around in the Low Countries; weather and clothing; money; hotels; food and drink; maps, etc.

"The Management of Time" by James T. McCay

This book sets forth a practical method for overcoming time pressures today and preparing for the much greater time demands of the coming decade. The methodology is mainly drawn from the work of Albert Korzybski, as presented in his book, "Science to Sanity". The Appendix gives a background reading list of books by scientifically orientated authors.

"New Horizons USA" published by Pan American World Airways System

For the reader's convenience the U.S. has been arbitrarily divided into seven sections: Northeast, Southeast, North Central, South Central, Northwest and Southwest and a new section to include Alaska, Hawaii, Puerto Rico and the Virgin Islands. Following brief descriptions of the states within each division, there are comprehensive sections on the leading cities. Each city begins with five introductory categories describing the weather, location and history, characteristics, population, size and how to get there. These five sections constitute the introduction to each city. The material which follows is divided into categories, beginning with accommodations and ending with sources of additional information.

"Paris" edited by L. Russell Muirhead

A guide book covering historical background; literary associations; famous buildings and cultural landmarks; passport and customs regulations; lists of hotels; restaurants, theatres; museums and art galleries; maps; etc.

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 22, 1962
Page 8

Judith Ebner (cont'd)

"Paris" prepared by Holiday Magazine
A travel guide covering transportation; telephones; money and tipping; where to stay; dining; shopping; sightseeing; historical background; nearby tours; etc.

"Scandinavia" prepared by Holiday Magazine
A travel guide covering when to go; how to get there; customs; transportation; money and tipping; climate and clothing; food and drink; some do's and don'ts; etc.

"Short Guide to London" edited by L. Russell Muirhead
Contains useful information about hotels, restaurants, and amusements, as well as the underground railways, bus services and postal rates; and it has 3 maps, 28 plans, and a full general index.

"Travel Tips for France" published by Trans World Airlines
Most of the specific information is devoted to Paris, with general information on the various regions of France. Briefly covers history and geography, weather, language, money and prices, transportation, holidays and events, customs regulations, hotels, restaurants, theatres and night clubs, shopping, sightseeing, etc.

D. Denniston, NYO

The following is a summary of some of the more important activities in the New York Area during the last two weeks:

CUSTOMERS

Western Electric - Allentown, Pa. - There is great interest here in a Ferrite Sheet Tester. I believe they approached us with this problem several years ago and we did not bid because of the intricate test fixture required. Rese has built the two they now have. This location, I might mention, has been responsible for orders totaling around $50K in the last few months.

Bell Tel. Labs - Holmdel, N.J. - The move to Holmdel is now in full swing and our first purchase order from this location has been received.

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 8, 1962

D. Denniston, NYO (cont'd)

WESTERN ELECTRIC COMPANY, INC.

Allentown

Now that our Current Drivers have been in use here for some time, we have also seen some orders for modules recently. I intend to visit Allentown very soon.

Princeton

Our drivers are presently being used in a research program, along with a Rese Word Generator. Indications are that there will be a greater interest in modules in the near future. A fairly large new Lab is in the process of going up there.

FORT MONMOUTH, New Jersey

Data Processing School

One of our Memory-Buffers held a place of prominence in the Armed Forces Day Exhibit several weeks ago. According to the instructors, there was extreme interest. They had several "cute" programs for the machine. I might mention that they have added the Teletype machine with a tape reader as an I/O device.

Radar School

The instructors have not shown as high a degree of competency as those in the Data Processing School. However, several are now attending evening classes at the Data Processing School. This may help some. There is a bit of a local "political" problem concerning these two schools.

R.C.A. - David Sarnoff Labs - Princeton, New Jersey

We received only a few orders in the last few months. One of my problems has been trying to learn who is using our equipment here. No one will say. At the present time I am only acquainted with one user and I would like to know if anyone knows any of our customers at this R.C.A. location.

PRINCETON UNIVERSITY, Princeton, New Jersey

We have had around six small orders for 4000 series modules from the Palmer Physics Labs, after having been recommended to them by Brookhaven Labs. So far, everything seems to be going together well with the only complaint being delivery (naturally).

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 8, 1962

D. Denniston, NYO (cont'd)

GRUMMAN AIRCRAFT, Bethpage, L.I., New York

We have recently received an order from Grumman, which is our first since I have been with DEC. My thanks to Jack O'Connell for giving a hand here while I was in Chicago.

I think it might also be interesting to note that interest in the PDP-1 is picking up considerably. We have been in contact with a good number of people whose interest in the PDP is more than just passing.

R. Doane

VHF Modules	80%
Miscellaneous	10%
Test Equipment Committee	10%

All 3 etched wiring layouts are now completed. The ten flip-flop modules for Step 1 of the VHF test system and for loan to APL are being constructed, and the multivibrator is ready for screening. A tester for each type of module has been built.

The three layouts required about 1 week each. The latest standards for conductor width etc. were followed, and the layouts for the multivibrator and logic board were redone from scratch.

The logic diagram for Step 1 with pin connections and physical locations is partly on paper, which shows progress about 2 1/2 weeks behind the VHF schedule. Fred Shirley, a summer employee who is a Senior next year at MIT, has been helping since June 4 and has already built two testers. I expect with his help to be able to gain back some time.

J. Cudmore

Automatic Module Testing	85%
Test Data Sheets, QC	15%

The second Mark I A.M.T. has been released to test. This tester has the same logic as the first Mark I, but the meter relays have been replaced with a precision voltage comparator. The limits for the test being made are set in by 10 turn Helipots. This system has the advantage of greater potential flexibility and greater speed. The meter relay version is slow since there is a finite settling time for the meters.

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 8, 1962

Judith Ebner

The following books have been added to the Library.

"Analogue Computation" by R. W. Williams

Analogue Computation is intended to serve as an introduction to the subject and little knowledge is assumed in the reader beyond a grasp of light current engineering. The mathematics does not demand more than simple algebra and calculus.

"Automatic Data-Processing Systems: Principles and Procedures" by R. H. Gregory and R. L. Van Horn

This book deals with business-data processing. It is introductory, requiring no previous knowledge of electronic computing systems. Computer programming and systems analysis are covered in detail. More important, a blending of theoretical and practical approaches to data processing explains why, as well as what, and how. Some new concepts in management information are developed and management tools and techniques are included.

"Automatic Feedback Control System Synthesis" by John G. Truxal

This book represents an attempt to organize and unify the background material in the following five fields: (1) The designer must have a working familiarity with the Laplace transform which goes beyond the simple formal relationships between the time and frequency functions. (2) The designer must be familiar with the fundamental concepts of feedback theory. (3) If the servo engineer is to appreciate fully the advantages inherent in the use of the Laplace transform, he must be able to synthesize appropriate compensation networks. (4) The designer must be familiar with the statistical methods of design if he is to cope with the problems associated with realistic signal inputs. (5) The designer must be acquainted with the basic techniques available for considering non-linear systems. Emphasis is on the development of the basic theory, although an attempt is made to illustrate the discussion with examples of practical significance.

"Computers and How They Work" by James D. Fahnestock

A completely understandable and comprehensive study of Electronic Computers that describes in clear, precise terms the basic principles behind computers, their manufacture and how they are operated and maintained at a high level of efficiency.

"Cost and Budget Analysis" by John Dearden

This book is concerned with the financial information that management needs for making short-term operating decisions. Specifically, the book covers cost accounting, cost analysis, and budgetary control. It does not cover capital investment analysis, long-term profit planning, or decentralized profit control techniques, because they relate to long-run operating decisions.

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 8, 1962

Judith Ebner (cont'd)

"Creative Management" by N.R.F. Maier and J. J. Hayes

This book is addressed to that segment of the American public interested in modern problems and pressures in organizational settings. It is concerned with creativity and conformity, with productivity and morale, and with the forces of change in organizations. It probes the nature of authority, the real relationship between authority and responsibility, and the meaning of leadership.

"Dynamic Optimization and Control" by Walerian Kipiniak

Dynamic Optimization & Control develops a general control theory for dynamic systems of immediate interest to electrical, mechanical, and chemical engineers and to operations research analysts. The author demonstrates the computation of solutions for such practical problems as vehicle stabilization, trajectory control, chemical process control, and inventory control. He also explains how spatial analog computers can be applied as optimizing controllers.

"Electronic Analog Computers" by Granno A. and Theresa M. Korn

A practical and comprehensive treatment of d-c analog computers, used as differential analyzers, equation solver simulators, and control system components. How to set up problems for analog computation is shown and examples are given of practical applications, including set-up procedure, in typical problems of applied mathematics and engineering design. The book also shows how to design analog computers, covering circuit theory, components, and complete systems.

"Executive Skills" by Bellows, Gilson and Odiorne

Among the Features of Executive Skills: Human relations teamwork methods based on research in group dynamics. Extensive use of case illustrations, forms, and procedures. Detailed treatment of interviewing, counselling, and communications skills. Comprehensive self-appraisal chart in the appendix. Executive skills needed in the 60's predicted from facts on hand.

"Foundations of Information Theory" by Amiel Feinstein

A concise but rigorous exposition of the fundamentals of the mathematical theory of information.

"A Guide to Fortran Programming" by Daniel D. McCracken

This book is written for the person who wants to get a rapid grasp of the use of a computer in the solution of problems in science and engineering. The application of a computer to such problems is greatly simplified by the use of Fortran or a similar compiler because it is not necessary to learn the details of computer operation.

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 8, 1962

Judith Ebner (cont'd)

"Introduction to Electronics" by Robert J. Hughes and Peter Pipe
A "Teaching Machine" book introducing the layman to electronics.

"Iterative Arrays of Logical Circuits" by Frederick C. Hennie
This book examines the behavior of one and two dimensional iterative networks. It is written for persons working in the communications sciences, and is especially pertinent to the areas of information processing, switching theory, and computer design.

"Management and the Computer" by Martin Greenberger
Compiled from a lecture series held in the spring of 1961 as part of MIT's Centennial year. Contents as follows: (1) Scientists and Decision Making (2) Managerial Decision Making (3) Simulation of Human Thinking (4) A Library for 2000 A.D. (5) The Computer in the University (6) Time-Sharing Computer Systems (7) A New Concept in Programming (8) What Computers Should be Doing

"Microwave Measurements" by Edward L. Ginzton
This book is concerned with the basic forms of electrical measurements encountered in the microwave region of the electromagnetic spectrum. The topics discussed provide a background for all common microwave measurements as well as for more specialized applications.

"Modern Packaging Encyclopedia '62 by Modern Packaging Magazine
The issue is divided into five editorial divisions and one directory division as follows: (1) Package Planning, Methods and Materials (2) Packages (3) Machinery (4) Merchandising (5) Shipping and Protective Packaging (6) Buyers' Directory

"Transform Method in Linear System Analysis" by John A. Aseltine
This book is about the application of integral transforms to the analysis of physical systems which can be described by linear differential equations. It is an engineering book, and most of the mathematics it contains is presented from the engineer's rather relaxed point of view regarding rigor.

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 8, 1962

Judith Ebner (cont'd)

"Transmission of Information (A Statistical Theory of Communications)" by Robert M. Fano

The book is specifically directed to graduate students and engineers interested in electrical communications. It emphasizes the points of view and methods of analysis which are likely to prove most useful to them in their future work.

"20,000 Words" compiled by Louis A. Leslie

A dictionary of essential words for businessmen, stenographers, students, editors, proofreaders, etc. The words are spelled, accented and divided.

R. Savell

2065	50%
2101	50%

The last two weeks have been spent cleaning up loose ends on the Lawrence Radiation Laboratory computer system and getting ready to run acceptance tests. The tests were started last Saturday, but were suspended on Monday due to problems with the Potter tapes transports that are designed to read Remington Rand tapes. They were removing oxide from the tape in large quantities. Potter engineers have been here one and one-half days and feel they have the problem solved. Tests will resume, hopefully, today. The tests will occupy two full ten-hour days and are quite thorough.

The first two Precision Displays, Type 31, are complete except for alignment. We have found that the mechanism for adjusting the focus coil and deflection yoke needs some improvements on the next model, otherwise operation is quite satisfactory.

R. Lassen

We have a full agenda for next week's Personnel Committee meeting. I feel that we have worked out several worthwhile proposals. However, it is better to wait until after the meeting before discussing them.

Our employee relations program <u>needs more constant attention</u> especially as we continue to grow; therefore, I plan to spend as

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 8, 1962

R. Lassen (cont'd)

much time as I possibly can working on projects which will help to fill some of the gaps in this area. Good employee relations are also a major responsibility of all department heads and supervisors particularly with respect to personal recognition, good training methods, proper supervision, communication and counselling.

We must realize that DEC is no longer the closely knit informal group of 2 to 3 years ago. We are now a steadily growing company of some 420 people, each of whom are striving for individual recognition and personal satisfaction. This all adds up to an increasing number of complex problems, none of which can be overlooked.

Recently we made a survey of employee terminations for a one year period. Although many terminations were justifiable and in many cases beyond our control, there were distinct indications that personal recognition, particularly promotion from within, is our greatest single problem. We are obligated to recognize people who are eligible for advancement. This is a definite responsibility of each department head even if it means that he'll lose his best man. Perhaps we should now form a Personnel Relations Committee with responsibility for reviewing all phases of employee relations - making appropriate recommendations to the Personnel Committee.

The girls have been going straight out processing the records of the large number of summer employees who have started reporting for duty. This appears to be pretty well under control except for "production line" inductions over the next few weeks.

We are gradually working out some better office procedure to eliminate much of our "seat of the pants" operation. Each of the girls has been assigned more definite responsibilities with an emphasis on getting things done by "system" rather than "memory." We still have some weak spots which I hope to reinforce soon. The addition of Jo Reilly has been a tremendous help in this respect.

Listed below is a list of open personnel requisitions which have been approved by Ken Olsen.

1 Jr. Accountant - (R.Mills)
1 App. Machinist - (L.Prentice)

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 8, 1962

R. Lassen (cont'd)

1 Machinist - (L.Prentice)
1 Sheet Metal (experienced) - (L.Prentice)
2 Sheet Metal (Trainees) - (L.Prentice)
4 Technicians - (G.Bell)
6 Secretaries (replacements) Sales, Engineering, Purchasing Drafting
1 Secretary (G.Bell)
2 Accounts Payable Clerks - (R.Mills)
1 Clerk-Typist (Drafting)

We are also keeping our eyes open for several other openings. However, the above list includes only those for which we have management approval to recruit and hire.

R. Mangsen

Automatic Module Testing

About the middle of May, 1962, automatic module testing was introduced to the Production Test Area. We now have some data on the increase in production, due to the Mark I Automatic Module Tester and the Tektronix Read-Out Scope.

The Mothers' Shift is the primary user of the Mark I and the Read-Out Scope. The month of May shows the production of this group at 3,500 modules. To break this down to two groups, we have 14 working days without the Mark I and 8 working days with the Mark I. They compare as follows:

14 Working Days without Mark I	8 Working Days with Mark I
1800 Modules Tested	1700 Modules Tested

This shows a 67% increase in module test production.

Now to compare the same type modules tested in both ways manually and semi-automatically. 40 - 1103's tested manually would take an average of 4 to 5 hrs. To test the same amount semi-automatically would take an average of 2 1/2 hrs. Some others are as follows:

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 8, 1962
Page 10

R. Mangsen (cont'd)

Manually		Semi-Automatically	
4113	6 - 8 hrs.	4113	3 - 3½ hrs.
1110	6 - 8 hrs.	1110	2½ - 3 hrs.
1105	3 - 3½ hrs.	1105	1 3/4 hrs.

The slowest part of the job now is the data sheets. Data sheets take 1 to 1½ hrs. to write up. There are some units that can be completely tested in less time than it takes to make out the data sheets. This problem is being worked on.

As of June 7th, we can test the following modules semi-automatically.

Mark I	567 Read-Out Scope	
1103	1103	This takes two passes
1104	1104	
1105	1105	
1110	1110	
1111	1111	
1113	1113	
1114		
1115		
4102		
4104	4104	
4105	4105	
4106	4106	
4110	4110	
4111	4111	
4112	4112	
4113	4113	
4114		
4115		
4125		
4129		
6105	6105	
6106	6106	

Also inverters in the following units:

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 8, 1962

R. Mangsen (cont'd)

Mark I	567
1201	1201
1607	1607
4201	4201
4603	4603
6202	6202
6603	6603

As of June 7th, we have introduced our second Mark I in the test area.

D. Adams

The following semiconductors have been tested since the last biweekly.

Semiconductors	Manufacturer	Units Tested	Percent Rejects
GA-212	Texas Instrument	4000	3.1%
MA-80	Philco	20151	0.48%
MA-89	Sprague	1926	5.4%
MA-90	"	12774	3.5%
MD-93	"	2826	3.6%
MD-94	"	820	11.2%
MD-95	"	6352	24.2%
MD-114	Philco	18711	2.05%
MD-114	Sprague	5664	7.2%
2N167	General Electric	200	0.5%
2N398A	Motorola	300	8.7%
2N598	Philco	100	7.0%
2N674	"	1000	20.0%
2N744	Texas Instrument	63	1.6%
2N1184	RCA	10	20.0%
2N1304	Texas Instrument	1000	2.9%
2N1305	" "	22000	0.54%
2N1494	Philco	59	16.9%
2N1495	"	200	1.0%
2N1600	Transitron	50	8.0%
2N1613	Fairchild	15	0
2N1719	Texas Instrument	650	1.5%
2N1721	" "	65	3.1%

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 8, 1962

D. Adams (cont'd)

Semiconductors	Manufacturer	Units Tested	Percent Rejects
D-001-1	Clevite	214248	1.48%
D-001-1	Transitron	145	0
D-003-1	Clevite	2175	0.97%
D-003-1	Transitron	617	25.5%
D-662-1	Clevite	68043	1.18%
D-664-1	Texas Instrument	25000	19.8%
D-664-1	Cont. Devices	1000	0.2%
IN429	Hoffman	133	24.7%
IN750	Texas Instrument	100	0
IN750A	Transitron	200	0
IN758A	Texas Instrument	100	0
IN1217	General Electric	5000	1.3%
IN1217	Westinghouse	1820	12.9%
IN1220	"	1000	1.1%
IN1875	U.S.Semcor	99	0
IN3209	Motorola	50	0
IN3316B	Dickson	66	1.5%
1/4M6.8AZ5	Motorola	200	0

M. Sandler

Inventory Class Codes

Our current fiscal year ends on June 30, 1962. We plan to group our inventories into more definitive classifications to the end that we may more readily attain better control of those inventories.

Our inventories at this time are:

Raw Material - Modules, Systems, Computers
Work-In-Process - Modules (Job Numbers)
Work-In-Process - Systems and Computers (Engineering Numbers)
Finished Goods - Modules only

Below listed are the classifications and code numbers under which we will group our inventory items as of July 1, 1962:

dec BIWEEKLY REPORT

COPY NUMBER

DATE June 8, 1962

M. Sandler (cont'd)

RAW MATERIAL	CODE NO.	DESCRIPTION
Modules	1710	Capacitors
	1711	Diode
	1712	Mechanical Components (Connectors, Lamps, etc.)
	1713	Resistors (Potentiometers, etc.)
	1714	Board and Panel Stock
	1715	Transistors
	1716	Transformers
	1717	Sheet Metal Stock
	1718	Miscellaneous
Systems & Computers	1730	Peripheral Equipment (Readers, Punches, Typewriters)
	1731	Magnetic Tape Equipment (Potters, etc.)
	1732	Printer's Equipment
	1733	Display Equipment
	1734	Mechanical Components
	1735	Cabinets
	1736	Miscellaneous

W-I-P	CODE NO.	DESCRIPTION
Modules	1750	Etched Boards
	1751	Phenolic Panels
	1752	Transformers
	1753	Fabricated Metal (Chassis, etc.)
	1754	Sub-Assemblies
Computers & Systems	1770	Sub-Assemblies (Wired)
	1771	Magnetic Tape
	1772	Display
	1773	Memory Stacks
	1774	Fabricated Metals

Production Control Office is now coding all inventory cards with the appropriate class code number and our inventory will be processed in these groupings.

dec BIWEEKLY REPORT

COPY NUMBER 2

DATE May 25, 1962

R. Beckman

First, I'd like to discuss the drastic changes that have taken place in the past few weeks in what used to be the auditorium area. This is our new computer room and the changes are not yet complete. The intention is to provide for maximum utilization of the prototype computer and to provide adequate facilities for customers and potential customers using the computer.

The four offices along the end wall of the space are reserved for customers. One of these offices is occupied at the present time. Two offices and a workshop have been constructed against the outside wall of the space. The workshop and one office will be devoted to operation and maintenance of the prototype and to field maintenance for other computers. Present plans are to make the second office against the outside wall a floater-type space for those people who will be using the computer, but have working space elsewhere in the building.

Plans for the computer itself include the addition of a Type 30 Display, Type 50 and Type 51 Mag Tape, and Card Reader equipment. Wherever possible the computer will be made electronically identical to the PDP-1C.

In addition to the new computer room, the Customer Relations section has been busy on several other projects. In addition to the "information package" that we have been shipping with each computer, we are now responsible for the "odds and ends"---everything from spare typewriter ribbons to touch-up paint to computer chairs.

The fourth PDP-1 Maintenance Class is now in session. The response to this course continues to be good and we are continuing our efforts to improve the course content. The next PDP-1 class is scheduled for 18 June and we plan to include a section on Mag Tape for that session. The first one week PDP-4 class is now scheduled for 11 June, although as yet we have no students for it.

Customer Relations is now responsible for all field maintenance work. Jack Shields and Bill Newell are still carrying the brunt of the actual work, but their prime responsibility now is the training of the new personnel so that they will be able to take over as soon as possible.

T. Johnson, WCO

Time is readily consumed these days in handling the added details that go with extended module deliveries and present PDP customers. The recent computer conference and the new catalog have provided new stimuli and I look forward to the results of the distribution of the catalog. And in this land of space and missiles, we can always expect some end-of-the-year spending.

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 25, 1962

T. Johnson, WCO (cont'd)

We have talked to quite a number of people recently concerning PDP-1. Most of these people are systems contractors, including competitors, who are bidding our computer into their systems. These people include: Lockheed - Sunnyvale, Philco - Palo Alto, Electronic Engineering (Eeco), Packard-Bell, Consolidated Systems Corp. and Beckman. More recently, we have talked with Informatics, Inc., Ralph Parsons Electronics and Hallamore Electronics. Other computer interests, at present, are Ames Research (NASA) and our friends at JPL.

Informatics, Inc. is a new programming and systems group, a subsidiary of Erwin Tomash's (Telemeter Magnetics) new company, Data Products Corp. (a spin-off from Telex, Inc.). They might require a PDP-1 or PDP-4 to test their Telex disc file. They are also going to bid on a space capsule test system for JPL.

Ames Research might go to a PDP-1 for simulation of their on-board Apollo (Man to the Moon) computers. I felt a little eerie helping an Ames engineer lay out the control panel. (A moment of silence for Scott Carpenter.)

JPL will be getting another machine for control and processing of two wind-tunnel test systems.

Speculation runs high on the future of SDS (Scientific Data Systems). The consensus is that Max Palevsky is overreaching and overpromoting. They did get the JPL Digital Recording System contract, which will incorporate one of their machines.

I expect Data Products Corp. to be a future computer manufacturer in this area.

We will be getting a small order from the U.S. Naval Postgraduate School in Monterey. Datamec, a new mag. tape manufacturer, has placed a small order to build a tape tester. We might still get a chance to supply Edwards AFB with modules for their computer after they have seen the light and put out some reasonable specs. The Apollo prime contractor, North American, is evaluating both modules and the PDP-1. This contract represents the outstanding sales potential of the day. Douglas AC is also in the wind for a large order of modules and a possible PDP-1 or PDP-4 to replace and expand the role of a G-15 in an analog-digital simulation system.

With the Livermore installation coming in, we will be pressed to organize ourselves and get some selling in.

Call your attention to Hydar, EAI's analog-digital system. Also the May Datamation article on computers in use in schools. I hope that the Maynard staff met the new addition to this operation, Gene Henton, who will be mostly concerned with routine maintenance

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 25, 1962

T. Johnson, WCO (cont'd)

and on-call servicing of the computers and memory systems, of which we are accumulating a fair amount out here in Smogville and the Wild West. (I refer to Smogville in case some should think we have it too nice out here.)

J. Cudmore

Automatic Module Testing	75%
Mag. Tape Sense Amp.	20%
QC, Test Data Sheets	5%

An AC automatic module tester has been built and is in operation. The cycling part of the machine is made up from 500 kc logic. There are three controls on the machine, a Start button, a Continue button and a switch which selects the total number of tests to be made. The 567 scopes are not being externally programmed yet. This means that for a unit that requires two types of tests (e.g. rise and fall TTT) two passes must be made. A new test has been added to inverters. The fall TTT of the input wave form is being measured. This test has been added since a large number of inverters have had the wrong size over drive capacitor. This new test has located about twenty wrong value capacitors already.

The Mag. Tape Sense Amp. 1536 has undergone a change to increase its gain range to permit the use of Mylar-sandwiched tape.

The "Spec" books are gradually getting filled and revisions or new sheets will be sent to the holders of the books as they are generated.

J. Fadiman

This report covers the period for the last three and one-half weeks. The first 2 1/2 weeks was spent in Europe. The first job was to install the Automatic Core Tester, Model 2113C, at Standard Elektrik Lorenz in Stuttgart, Germany. Installation required a full six days, as the Germans are very meticulous about seeing that their equipment meets all of the required specifications. Furthermore, SEL uses an Automatic Core Handler which they built themselves, and which requires a considerable amount of work in order to operate properly. The only difficulty with the machine was encountered because the Power Supply 1562 had too great a temperature coefficient; we are replacing this with a different unit. Furthermore, the drift in amplitude of the current drivers was noticed, which we later traced to the coarse amplitude potentiometer. In general, however, the installation was satisfactory and I feel that SEL will be very happy with our equipment.

I next visited the Siemens plant in Munich, Germany. They are interested in the purchase of both an Automatic Memory Tester and an Automatic Core Tester, and they are probably

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 25, 1962

J. Fadiman (cont'd)

our next mostly likely customer in Europe. The main drawbacks are that our price in Europe is high and also that we do not have a servicing center there. However, I think that we have a good chance of making two sales to Siemens.

The next place I visited was Philips Electric Co. in Eindhoven, Holland. They have done a considerable amount of work on our Memory Tester 1516B, and it is now operating considerably better than when we had delivered it. (This is one of the few cases where a customer working on a machine has improved it.) The only remaining problem is the drift in the current drivers, which we are solving, by replacing the amplitude control potentiometers with those of a smaller value. I also spent a considerable amount of time discussing Memory Exercisers with the two engineers responsible for the memory development work at Philips. I think there is a good chance of our selling them a Memory Exerciser in about 6 months from now.

My next visit was to Stemag in Siegburg, Germany. I visited with Mr. Günter Hüwe. They are interested in purchasing a Ramsey Handler, Model CH60, and sometime thereafter an Automatic Core Tester 2113. I expect that this sale will come about in about 6 months. Sometime in the more distant future they might be interested in the Automatic Memory Plane Tester, but at the moment their volume of business does not warrant the purchase of such an expensive piece of test equipment.

During the past week, several systems were shipped out. The Memory Plane Tester 1516G, which is going to go to Hitachi in Japan on July 1, was shipped to RCA in Needham as a loan. The Automatic Core Tester 2113E was shipped out to General Electric Co. in Phoenix, Arizona. A small sense system was assembled and shipped to the Bell Telephone Lab. in Allentown, Pa. The Analog-to-Digital Converter was also shipped out in the past two weeks to MIT. Final checkout is proceeding on the PEPR system for MIT and this should be shipped out about the middle of June. The Scanner for the University of Illinois is finally about ready and will be shipped within one week.

Work is proceeding satisfactorily on the other special systems under construction at the present time, namely, the Typewriter Buffer System, the Automatic Core Tester 2113B for stock and the Core Tester 2113D for Hitachi. In addition, we have received an order for another Automatic Core Tester 2113F for Hitachi Central Laboratories and all parts, plug-in units etc. have been ordered for this machine. Work has also been started on the next Memory Plane Tester, Model 1516H, for General Electric in Syracuse. Negotiations are still underway concerning the Memory Tester 1520 for IBM in Owego, but Dick Whipple is arranging the final details of this today and everything should be settled by the end of this week.

As people may have heard, the Systems Group is moving its offices up to the middle of Building 3. This move is expected to take place by June 1.

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 25, 1962

H. Crouse

Our recent capital equipment acquisitions are as follows:

2	#129 Whitney-Jensen Power Punch Presses (Loren Prentice)	$ 625.00/ea.
1	Contronics Semi-Automatic Diode Tester (Richard Best)	5000.00
2	Precision voltage comparators (Robert Hughes)	580.00/ea.
1	#49687 Dupl-O-Scope (Loren Prentice)	340.00
1	NRGM Automatic Eyeleting Machine (Cy Kendrick)	1030.00
1	Smith-Corona Electric Typewriter (Judy Ebner)	263.50
1	Dejur-Grundig Transcriber (Velma Grasseler)	234.13
1	Spray Etch Machine, Model 700 (Jack Smith)	3485.00
1	Dumont Oscilloscope #766 (Dave Denniston)	545.00
1	76-02 Dual Trace Plug-in Unit (Dave Denniston)	475.00
1	74-03 Time Base Plug-in Unit (Dave Denniston)	345.00

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 25, 1962

Judith Ebner

The following books have been added to the Library.

"Adventures in Algebra" by Norman A. Crowder and Grace C. Martin
This is a "Teaching Machine" type of book. The Library now has two copies. All DEC personnel who have read the book are very excited over the method. Comments are somewhat as follows: "Why hasn't someone told me about this method before? This is really exciting - you couldn't possibly read this book and not learn basic Algebra!"

"The Arithmetic of Computers" by Norman A. Crowder
Another "Teaching Machine" book.

"Thinking Machines" by Irving Adler
A layman's introduction to logic, Boolean Algebra, and Computers.

"Boolean Algebra and its Application" by J. E. Whitesitt
This book offers an introductory treatment of Boolean Algebra designed for the reader with a limited formal mathematical background. Written for a one-semester course for students of mathematics and engineering concerned with computer design, control systems, or electronic circuitry.

"Engineered Castings" by Glenn J. Cook
Covers the field in breadth rather than on just a few topics in depth. Suggestions are given as to sources of information for those whose needs call for more exhaustive technical treatment of specific subjects. How castings are used, how castings are made, how to design castings, how to select cast material specifications, and how to buy castings are all covered.

"Progressive Dies" by Daniel B. Dallas
Following is the author's definition of a progressive die: "A progressive die is a press tool containing a series of mathematically related stages which perform a sequence of discrete operations upon an advancing panel. As a supplement to this definition, it can be said that progressive dies represent industry's first approach to automation. Automation is, of course, an abused and overworked word--a cliché applied indiscriminately to any and all semi-automatic manufacturing processes. Nevertheless, the reality of its existence in progressive dies is undeniable."

"Writing for Engineering and Science" by Tyler G. Hicks
Provides a basic and comprehensive coverage of the field of modern technical writing. It covers all the major forms of technical writing used today -- reports, articles, papers, manuals, and specifications.

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 25, 1962

R. Doane

VHF Modules	85%
Miscellaneous	15%

Extensive experiments with printed delay lines proved their feasibility for use on VHF flip-flops and delay modules. The flip-flop has been layed out using the information obtained to provide the two 10 nanosecond, 50 ohm lines required. Double-sided clad boards are used, but the need for exact registration is avoided, since the location of a stripline with respect to its ground plane is not critical in lateral directions. Basic limiting factor is the location of plug-end connections to the two surfaces; ± 1/16" tolerance between sides is required at the plug-end - ± 1/8" has been allowed at the handle end of the double-length board, and more can be arranged if necessary.

The delay and logic modules are being layed out presently. The layouts are taking much more time than anticipated in the VHF schedule, and as a result I expect to be behind schedule 2 weeks by the first of June.

A. Blumenthal

EN-2174 (ADX-5)	60%
Miscellaneous	40%

ADX-5

This machine was shipped to ITT in Paramus, N. J. on Saturday, May 19. The shipping date was originally set for May 15, but the four-day delay did not cause any problems from ITT's standpoint. Acceptance tests, consisting of programs prepared by ITT, were run on Thursday, May 17, and ran satisfactorily except for a minor bug in the Mag. Tape system. This was corrected at Paramus rather than delay the shipping of the machine. After correcting several minor problems caused by broken wires, bad packages, and wiring errors, the acceptance tests were rerun without further problems and installation was completed on Wednesday, May 23.

A meeting was held with Bob Beckman to schedule the phasing over of computer field service to the Customer Relations Department. The following steps were agreed upon:

(1) On Monday, May 21, Bill Newell would be transferred to Bob's group and would terminate all his duties and obligations connected with computer production and test.

(2) Jack Shields would be loaned to Bob for a three-month period beginning May 21, to assist in familiarizing Bob's men with the PDP-1's in the field.

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 25, 1962

A. Blumenthal (cont'd)

(3) I will supply Bob with a list of personnel contacts at each of the computer sites and Bob would draft a letter to them explaining the functions of the new department.

(4) By June 1, I will have compiled all the existing service data in a manner that will make it useful for formulating a service contract. All records will then be turned over to Bob.

A rehash of all PDP-1 cable schedules is under way in order to make them more usable to production, test, and service personnel. Four new forms have been proposed in discussions held with Norm Perryman.

L. Prentice

General Engineering 100%

My time for the past two weeks, aside from Administration, has been devoted to the study of tooling for sheet metal and dies for the production of printed circuit boards. Orders have been placed with Burgess Bros. in Norwood for production of three dies, one to blank 12 holes, one to blank the outlines and one to punch 22 holes all in our standard system plug-in boards. These dies should be available in about four weeks. Drawings are complete on the cut-off and piercing die for S.P.I.U. handles and 3 vendors have been asked to quote on this: Burgess Bros., Duval Experimental Machine Co. in Dracut, Mass. and Jonal Precision Co. in North Woburn. A top quality die set has been ordered for this operation, as it is expected to be in almost continuous use. This new die should be available to us in approximately 5 weeks. We have on hand somewhere between 21,000 and 27,000 handles at the present time. Of course, some of these are in transit and some are at vendors, but I believe the handle situation is now in the best condition for several months. The first line unit Printer (Anelex) is nearly complete and ready for shipment. This is a culmination of a project started sometime last December. Design changes have been completed on the Mag. Tape door and have been turned over to Drafting for the proper revisions. The two display 31's that we have are operative, but we believe a more satisfactory design can be done on these units and they hope to have time before any more are built, to complete a redesign of the adjustment for the focus coil.

J. Burley, DCO

Activities for the past two weeks of the DCO accounts include the following:

National Institute of Health, Washington, D.C.: Dr. Thompkins hasn't ordered the modules to build the Link Computer but should in the next three or four days.

Applied Physics Lab: Nothing new to report except that they are very quiet.

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 25, 1962

J. Burley, DCO(cont'd)

Westinghouse Air Arm Div., Baltimore: They are progressing on their system design using our equipment. Received a report that their requirement may end up being as much as three times as large as reported earlier ($50K reported.) Still no news on the OGO contract - the real big one. Our position appears to get stronger by the day here.

Diamond Ordnance Fuze Labs, Washington, D.C.: A new application for our gear here. Our past unfortunate experience of working on their problems only to be under bid at the last minute should not repeat itself. The interested parties at DOFL are aware of this incident and will take steps to see that it doesn't happen again. They much prefer to use our equipment. There are now three specific requirements here that could use considerable equipment. Two of the three would be for the 4000 Series, with the other our 10 mc line.

Western Electric, Winston-Salem: The whole No. Carolina W.E. complex is supposed to "phase out most of the military work and concentrate on industrial contracts to establish a better industrial-to-military contract ratio." This is to take place starting July 1 and could be as they state it - or it could be stated this way due to the shaky situation of Nike-Zeus. At any rate the W.E. people are taking hard looks at industrial business and are interested in digital logic and its possible uses. The Test Planning Group here is particularly interested.

Western Electric, Burlington: This already six-figure customer has another requirement for approximately $20K coming up soon. They have good talent here and can make good use of our equipment given the opportunity. Has the potential of another APL. This group feels this $20K is just the start of some solid activity.

Bell Tel. Labs, Winston-Salem: Three systems totalling some $8K is imminent. This group could be very active in the future. Strong believers in our equipment. The fellows up at Whippany let the word spread fast of the successes of theirs using our equipment. Makes it easy for the rest of us.

Philco, Lansdale: Small requirement here for an optical scan control system. Not big now - don't know the real potential, though they say the product could become commercial indicating fairly large requirement.

U.S. Army ERDL, Ft. Belvoir: Working with Basic Research Group on extremely accurate (plus-minus .001 degree F) temperature controller. Don't know potential yet. Doubtful that it would be large.

Walter Reed Hospital, Washington, D.C.: We lost out here to Tech-Serv. Price was the only consideration and this was recommended by a representative of D.O.F.L., of all people. (D.O.F.L. is the outfit that resents using equipment other than DEC.) There

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 25, 1962

J. Burley, DCO (cont'd)

should be some interesting developments here since these are psychology people and not E.E.'s that will use the gear and maintain it. They also bought some Wang equipment. Interesting.

U.S. Public Health Service, Washington, D.C.: They are about to set up a digital lab and will equip it with our equipment. This should be a nice account.

Comments:

A week-plus fighting a bad cold pretty well slowed me down this Bi-Weekly period. However, with any luck at all should be caught up by the first snow (in Miami, that is).

Am more and more convinced that those annoying little leads we get by the basketful are a real gold mine of business if we could just find an efficient method of eliminating the nogoodniks. Anyone have any ideas?

Here's a good one: Hewlett-Packard told Westinghouse that the reason they use such an unreasonable code (4221, not complementary) in their printers is that Berkley Instruments claims to have patented the 1248 bcd code. H-P was reportedly very serious when saying this. (Should we patent the 1-10-10000 code and sue the Treasury Dept?)

R. Lassen

I'm pleased to report that we have recently added three bright young men to supplement our administrative needs. Bob Maxcy will graduate from Babson soon and will report to work on a full time basis as an assistant to Nick Mazzarese. He's been receiving some orientation on a part time schedule after classes. Bill Farnum, a product of Harvard and the Navy, will soon provide Jim Myers with some welcome assistance. Tom Whalen will join Maynard Sandler's Production Control Group on May 28. Tom graduated from B.C. in '59 and has just completed 3 years as a line officer with the Army.

Our IRE recruiting finally paid off with the addition of Emile Chevrier from Canada. He's an electrical engineer and will begin his career with DEC in the Circuit Design Group.

We currently have three engineering offers outstanding; two for the Computer Group and one for Sales. Steve Lambert and I made another trip to Wentworth in hopes of finding additional technicians. Six men were invited to the plant; however, no decisions have been made. Two additional Technician Trainees were selected from a group of Worcester Industrial Tech people - one for George Gerelds and one for Roland Boisvert.

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 25, 1962

R. Lassen (cont'd)

Barbara has been able to locate 3 Junior Secretary/Clerk-Typists and one Cost Accounting Clerk. In spite of this, our secretarial problems keep mounting. All recruiting sources are being used, but response has not been overwhelming.

In spite of our new hiring rate and fairly prominent advertising, our continuous search for assembly girls is still a problem. We are adding 2 or 3 every week but this has been offset by recent terminations. I have been in contact with other companies in the area and find they are having the same problem.

Identification badges have been handed out together with a memo to each employee describing the basic procedure for distributing badges to permanent employees, contract workers, visitors and temporary situations. We will, of course, cooperate in every way possible with respect to visitors and contract workers who visit us regularly and who are physically located away from Building 12. Please remind your supervisors that if an employee has not been issued a badge or if he forgets his badge, he is to obtain one at the Personnel Office immediately.

Vacation schedule forms were distributed to the following people:

K. Olsen
H. Anderson
J. Atwood
R. Best
M. Sandler
B. Gurley
R. Melanson
H. Crouse
J. Fadiman
L. Prentice
S. Olsen
R. Mills

We have asked them to prepare their vacation schedules with their supervisors and group leaders and submit them to Accounting by June 1. If you report to any one of the above mentioned people and they have not met with you, please remind them to do so.

Our summer employment schedule is almost completed. Principal areas of emphasis will be Assembly (male and female), Engineering and Maintenance. Barbara Charnock has handled a great deal of this project and I'm sure she'll be glad to have it completed. Next year I think we should all make an effort to project our needs sooner and more definitely since undoubtedly our summer replacement problems will be even greater.

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 25, 1962

J. Atwood

Sales Promotion

Two new shows on the docket: IFIP INTERDATA 62 in Munich, August 27 thru September 1, and ISA (Instrument Society of America) at the Coliseum in New York, October 15 thru 18. The Munich show will be handled by an agent (worse luck!), but the ISA event is all ours. Also we have tentative dates for the North Carolina IRE Section Meeting in Greensboro - either October 12 and 13 or October 26 and 27, depending on the local football schedule.

Reprints currently in the works include the PDP-4 folder (F-41A), the PDP-1 manual (F-15C), and the Short Form Catalog (A-702B). The supply of Logic Handbooks is disappearing fast, and we will soon have to face up to the problem of what to print next as an expansion of or replacement for this worthy document. Colonial Press in Clinton, pocket book printers extraordinary, feel that we can easily make this into a regulation pocket book by adding some 40 or so pages of text. Sounds interesting!

Still up in the air are the Training Module catalog, which is being checked and rechecked by Applications, and the Classroom Module catalog, which has never been. Decisions on the marketing effort to be expended on both these lines are needed in order to determine what form the catalogs should take.

Jim Burley has inquired about prospecting mailings to be made in advance of sales trips. We feel these can be invaluable in paving the way for profitable and productive canvassing, and we are fully set up to handle these on whatever basis of selection - geographic, industrial, professional, or indicated interest - seems most likely to fit the bill. Give us three weeks lead time before the trip starts.

Preparations are underway for the next bulk mailing. As expected, the catalog mailing has revealed a large number of address changes which are being incorporated in the mailing list. This editing process will be facilitated greatly when our key punch is delivered and we are able to work directly on the cards ourselves.

Public Relations

The house organ is being revived, the next issue being slated for June delivery. The larger we get and the more remote top management gets from the men and women on the line, the more important it becomes to keep open a channel of communication. One of our strengths has always been an informed and interested work force. This would be a poor time to drop the ball.

One thing to remember, however, is that the house organ is at best only a poor substitute for face-to-face contacts. It can never take the place of the smile, the nod and the kind

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 25, 1962

J. Atwood (cont'd)

word. There seems to be a growing tendency for some of us to become too preoccupied with our own affairs to take any notice of the people around us in the plant and in the office. This can hurt us badly, particularly with those who have been aboard for several years, who remember when we all worked side-by-side to get the orders out, and on whom we depend to indoctrinate new employees in "our way of doing things."

Two other publications currently in process are a new plant folder, designed for distribution to visitors and for recruiting applications, and a new version of the employee handbook. We feel the latter will be a vast improvement over the original version and will help to solve many of the day-to-day problems involving the obligations and benefits of a job at Digital.

Two special projects should come up for consideration as soon as we feel we have our housekeeping reasonably well in hand. The first is a series of individual tours for editors of area newspapers and news editors of radio stations in the vicinity. These folks can give our recruitment efforts a major lift by providing favorable coverage of our expansion program. The second project to be faced is another public open house. Last fall's effort, while quite successful, was so limited that it left many would-be attendees disappointed that they could not get in a visit during the hours we set. In addition, we have so much more to show this time that even those who attended before would enjoy another go-round.

Technical Publications

Latest word on the PDP-1 Maintenance Manual is that final copy is due around June 20. Present plans are for us to reproduce this in our own shop. By spreading the copy among those who have been enjoying the benefits of IBM Executive typing, we should be able to transcribe the corrected draft in record time. Meanwhile we are rounding up the necessary photographs, diagrams and layout sheets so they will be ready when the time comes.

Bob Buyer's PDP-4 Manual (F-45) will probably be handled the same as the PDP-1 Manual (F-15). Since this is both a sales piece and an instruction manual, it deserves proper packaging. The PDP-4 Maintenance Manual, on the other hand, can be an in-house job.

Nothing more on the Workmanship and Quality Control Manuals so far. Are these still alive?

Industrial Design

The new lobby in Building 12 should be pretty well completed this week. Aside from a new floor, some new furniture and some appropriate wall decorations, there is little left to do. Judging by visitor comments, the new look is making a reasonably favorable impression for us.

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 25, 1962

J. Atwood (cont'd)

Our perennial problem of letterhead and business card design has been turned over to one more supplier for a look-see. As has been the case with many another organization, this matter of finding just the right design to present us as we would like to be presented has been a tough one to solve. We and others have come close, but not close enough.

In this connection, it seems to me that we should not be satisfied with our present PDP-4 design. Granted it is an economy job and we have tried to cut corners wherever possible, it is not up to our usual standards, even for peripheral gear. Surely there are ways and means of adding substantially to the appearance without adding substantially to the cost. That many of these machines may go into industrial installations is not sufficient reason for us, as a company, to fall into the "plain pipe rack" category.

Departmental Operations

The new press is in and is being installed in the new press room in Building 3. This should be a big help in getting out test data sheets, interoffice memoranda and other 8 1/2 by 11 inch jobs. It should also help to take some of the present unwarranted burden off the Xerox copier. As soon as the press is operating properly, we will probably put a limit on the number of copies to be made on the Xerox without special approval. We will also get in some preprinted paper masters for the offset duplicators which will help the girls in positioning the text for memos and manuals when they type the masters.

As the work load gets heavier, our procedures tend by necessity to become more strictly defined. Schedules have to be maintained in order to avoid jam-ups in the photo lab or the press room or the mailing section. If we seem a little demanding at times, it is only because there is less and less opportunity for last-minute work to get through the mill in time. If we seem too demanding, however, let me know. With the cost center deal still on the horizon, I don't want to lose any customers.

One thing we are trying to avoid is having people interrupted too many times during the day. It is not uncommon for a customer to call half a dozen people, from the girl who is trying to type the copy to the man who is trying to print the job, to see how his particular project is progressing. This not only slows down his project but delays everything else we are doing as well. if you have a question about a job in process, please call Helene Shebak or Jackie Micklay in our "production control office." It is their job to get your answer for you.

General Comment

The need for better information flow between operating departments seems to get more acute with every passing day. Certainly there is plenty of evidence that I am not the only guy

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 25, 1962

J. Atwood (cont'd)

around here who is flying by the seat of his pants a good share of the time. And since we don't spend much of the work day on our seats, this is hardly an enlightened method of navigation.

I certainly would not recommend a return to the Friday afternoon sessions of a couple of years back. We are a little too large, and Friday afternoons are a little too valuable.

I do think that we would all benefit greatly if the department heads were called together at least once a month but preferably every Monday morning for a brief review of current developments and a discussion of matters requiring interdepartmental coordination and cooperation. It could then be our responsibility to pass along to our individual groups the information they need to do their jobs to the best interest of the company.

Some fairly successful outfits have found out (some of them the hard way) that an informed employee is a more helpful, more productive, more loyal employee.

K. Larsen, WCO

I spent last week at Maynard picking up some new ideas and the latest information on PDP's. Thanks to everyone for helping to make my trip successful.

On my return trip, I stopped at Denver and talked to the people at Stearns-Roger Manufacturing. They are looking at a CDC-160-A now for their engineering department. Their work involves PERT and Critical Path program techniques. They expressed some interest in Itek's drafting machine system.

I have been working with Bob Weise of Electronic Memories, Inc. to improve testing of their wide-temperature cores. Apparently additional program repeats are necessary to stabilize the core's operating range before testing. Two variable width strobes have also been added to their tester as part of this experiment.

Gene Henton (of W.C.O.) will return from Maynard approximately June 1st. If you haven't already met him, I hope that you will make a point to do so. He is attending the PDP-1 maintenance class and will be contacting many of you for maintenance ideas and programs. When he returns to Los Angeles he will be doing the computer maintenance in this area, and any help that you can give him will be appreciated.

Ron Coleman of Beckman Systems has been giving a number of demonstrations of his curve-fitting program. His program tries to fit a curve with one straight line, one quadratic, two quadratics and four straight lines and then determines the best of the four. A by-product of these demonstrations is the calling of attention to the PDP-1 and its capabilities.

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 25, 1962

K. Larsen, WCO (cont'd)

Jim Kuffert of Beckman Systems is moving along rapidly to the completion of systems check-out. All the interface modifications have been checked-out and entered in the drawings package.

R. Mills

So we will realize what the capital equipment expenditures are, following is a list of Capital Equipment Purchases exceeding $500.00 for the month of April.

Vendor	Description	Amount
Allen Stationary	10 Letter Files	$ 579.50
Ferris & Larkin	5 Desks	534.00
Ferris & Larkin	10 Desks	947.50
Hollis Eng., Inc.	Comb. solder flux unit	7,130.00
Etchamatic	#700 Spray Etcher	3,467.57
Tektronix, Inc.	1 Oscilloscope	688.15
Eubanks Eng. Co.	1 Wire cutter & stripper	2,852.50
Teradyne, Inc.	Computer transistor test instrument	6,348.10
Edward Segal, Inc.	1 Model NRGM	1,065.00
Amp, Inc.	9 Hand tools	511.36
		$24,123.68

BIWEEKLY REPORT

COPY NUMBER 2

DATE May 11, 1962

H. Crouse

Vendor vacations will begin shortly and our procurement has been scheduled so no shortages of material should occur.

Twelve additional memory stacks were ordered from TMI on a scheduled delivery.

Purchasing will be moving shortly to Building #5, which will make our vendors happy at a minimum.

F. Kalwell

On all S.P.D.T. Toggle Switches ordered from Cutler Hammer, they will supply us with 6 1/2" wire leads with a 3/8" stripping on each switch.

We recently purchased a spray etcher for the Silk Screening Department at a cost of $3,450.00.

The Drafting Department recently received the Zerox 1824 printer which duplicates a micro-film aperture card onto an18" x 24" drawing.

I recently placed a blanket order for our yearly requirement on thin wall teflon tubing guaranteeing us readily available stock.

R. Blackwood

We have installed a visual board control system to facilitate tighter control of outside jobs. This system should result in fast and more accurate replies to inquiries concerning outside vendor information.

Vacation schedules of subcontractors are being compiled and will be forwarded to parties concerned. Except in a few cases, we do not anticipate any interruption of delivery schedules due to vacations.

Printed circuit boards and assemblies are being received at a steadily increasing rate. We now have four sources for assemblies and two for the etching and lugging phase. A good liason has been established with all subcontractors.

R. Hughes

We received two 567 scopes from Tektronix May 8, 1962. These scopes use sampling techniques and have digital readout so that times and voltages may be read directly as numbers instead of interpolating a scale reading.

DF633 DIGITAL EQUIPMENT CORPORATION · MAYNARD, MASSACHUSETTS

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 11, 1962

R. Hughes (cont'd)

These scopes are DC coupled, and one may read VCE SAT and other voltages directly on the scope.

These scopes are for use in the Production Test Area to speed up testing time.

G. Bell

I am very happy to say the PDP-4 performed well at the SJCC. The PDP-4 group would like to thank all those who helped make the relatively tight delivery schedule possible. Although specifications were present for PDP-4 for some time, no changes or drawings occurred until about February 15. Hopefully, we will go into a fairly modest production schedule shortly - until then, we will start by making 3 machines with these deliveries:

1. June 15 - Nabisco
2. June 22 - DEC - Sales - Prototype
3. July 1 - Corning Glass

The testing and assembly will require 2 weeks, thus all components must be delivered 2 weeks prior to the above dates.

The initial machine will be used for module testing.

R. Doane

VHF Modules	45%
Raytheon Digital Encoder	35%
Miscellaneous	20%

The VHF multivibrator testing has been completed, and so has the testing of the flip-flop module. Since a tester for the flip-flop has been built, I am now between one and one-half weeks behind schedule. Two very knotty problems in the multivibrator account for the slippage. Both problems were primarily matters of circuit geometry, rather than speed.

Raytheon (Norwood) built a sophisticated analog-to-digital encoder using 10 mc packages in 1906 patch-panels. It worked marginally. The major problem is excessive lead lengths. Since I feel we are responsible for their not knowing that 1906's are not usable for 10 mc systems, I have made a wiring layout for 1901's. We have had it wired, and it is in their hands, for which we are charging them only the price of the 1901's.

A new layout for the 6202 with a new method for providing logical delay will soon be tried by Tom Russell, who has already built a new 6202 tester. Hoped-for improvements:

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 11, 1962

R. Doane (cont'd)

1. Less noise on FF outputs
2. Greater complement sensitivity
3. Tighter control on delay, allowing reduced maximum total transition time specification
4. Faster rise and fall times at FF outputs

J. Cudmore

Mag. Tape Sense Amp. 1536	5%
Automatic Module Testing	70%
QC, Test Data Sheets, Spec Books	25%

The Magnetic Tape Sense Amplifier 1536 first model has been built, but due to an error in the sketch sent to Drafting the layout is being revised. This package has the same pin connections as the 1549 but has a trimpot gain and a trimpot balance adjustment for each amp. This package should obsolete the 1549.

The Mark I Automatic Module Tester was used for the first time on the night shift May 10 to test 1103 inverters. The Sampling Digital Read-out scopes should be in use in making relatively simple tests within the next week.

The copies of the "spec" books are finally being made. There will be approximately twenty copies of all the test specs.

Barbera Stephenson

Customers

Two of our good customers, Brookhaven and CERN, made quite a splash in the news with their simultaneous announcement of the discovery of a new fundamental particle, the anti-Xi-minus. The theory predicts 30 fundamental particles, (plus some others, which are in dispute) and the anti-Xi-minus is the 29th of these to be found. Since the anti-Xi-minus exists for only about 0.1 nanoseconds, its discovery was quite a feat.

Pseudo random number generators for scrambling and unscrambling secret messages seem to be back in again. The ingenuity that people use in this area is really amazing. General Electric's Laboratory has just placed an order for about $34,000 worth of equipment including a 188 Type 4216 flip-flop, which they will use just to build one scrambler and one descrambler. Raytheon, Bedford, is also considering our equipment to build four, 16-stage scrambler-descramblers. Their method is basically a shift register with an

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 11, 1962

Barbera Stephenson (cont'd)

exclusive OR at each stage.

Doug Hogan of N.S.A., Fort George G. Meade, Maryland, visited here last week to look into the possibility of purchasing a PDP-1 and 32 channels of D-to-A and A-to-D conversion. They have about 26 PACE TR-10 analog computers plus a number of other analog devices which they would like to combine with a high speed digital computer to make a mixed analog-digital computation system with high speed data transfer back and forth.

Jay Ball over at BBN is using our modules to build a new type of audio transmission system. He is converting the audio to a digital signal and transmitting binary bits, but instead of transmitting the absolute amplitude of the signal at given times, he is transmitting the increase or decrease signal level at each time. This means that considerably less bits must be transmitted, since audio has a slow rate of change, and a more economical system all around.

The National Radio Astronomy Observatory in West Virginia has sent us a request for quote for a 100-channel 20 megacycle, digital correlator. Each channel involves two stages of a 10 megacycle shift register and 32 stages of a 20 megacycle counter.

Cambridge Electron Accelerator sent us a request for quote, calling out our modules, for a display system which includes six 40-stage shift registers, the outputs of which will all be displayed on indicator lights. The interesting thing about this is that the read-out will not be numeric. To load it the operator will look into this bank of 240 lights and tell by the counter in the lights the information he wants to know.

2311

The Multiplexed Digital-to-Analog Converter was shipped to MIT Friday. Hurrah!

Judith Ebner

New books available in the Library:

"Tables for Statisticians" - Arkin, Herbert and Colton, Raymond R. - 25 most frequently used tables with explanations and instructions. Includes table of squares, square roots, cubes and cube roots, logarithms of factorials, chi square, random numbers etc.

"Metals Handbook - 8th Edition" - American Society for Metals

"Advanced Mathematics in Physics and Engineering" - Bronwell, Arthur - This text is intended primarily for students in engineering and physics at the senior and graduate level.

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 11, 1962

Judith Ebner (cont'd)

"Frequency Response for Process Control" - Caldwell, W.I.; Coon, G.A.; Zoss, L.M. This book explains the analysis of complete systems by means of highly effective techniques, and gives typical solutions to many practical problems.

"Operational Mathematics" - Churchill, R.V. - This book is written for students of mathematics, engineering, physics, and other sciences, whose mathematical background has reached the level of advanced calculus.

"Graphic Chart Papers" (pamphlet) - Codex Book Co., Inc. - Shows the construction of - and the use of graphic representation charts. Also gives a list of books for supplemental reading. Pamphlet available for use with "How to Chart" by Walter E. Weld.

"The Practice of Management" - Drucker, Peter F. - Peter F. Drucker, author of this book, is widely recognized throughout this country and Europe for his brilliant and unconventional studies of modern industry.

"Theory of Markov Processes" - Dynkin, E.B. - The present book aims at investigating the logical foundations of the theory of Markov random processes.

"Adhesive Bonding of Metals" - Epstein, George - It is the purpose of this book to give sufficient details so that an engineer or technician faced with the problem of joining two materials will be able to determine if an adhesive bonded joint would be advantageous, what type of adhesive to select, how to employ the adhesive, and how to design the joint for optimum performance. In particular, adhesives are considered which are most generally employed with metals.

"Total Quality Control" - Feigenbaum, A.V. - This book gives you full details on how to plan a quality system, set up a suitable organizational structure, integrate the various functional activities, engineer the necessary plans and controls, and measure the result in terms of costs and product quality levels.

"Annual Review in Automatic Programming" (Second Volume) - Goodman, Richard - Editor Contains papers concerned with problems of languages for scientific computation, and with problems of a common business data-processing language.

"Handbook of Automation, Computation and Control" (Volume 2) - Grabbe, Eugene, Ramo, Simon and Wooldridge, Dean E. - Editors - Computers and Data Processing - A.) Computer Terminology - B.) Digital Computer Programming - C.) The Use of Digital Computers and Data Processors - D.) Design of Digital Computers - E.) Design and Application of Analog Computers - F.) Unusual Computer Systems

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 11, 1962

Judith Ebner (cont'd)

"Handbook of Noise Control" - Harris, Cyril M. - A handbook of how to control "unwanted" sound. The nature of noise, its measurement, and techniques of its control in buildings, industry, transportation, and the community are all discussed in detail.

"Introduction to Numerical Analysis" - Hilderbrand, F.B. - This volume is intended to provide an introductory treatment of the fundamental processes of numerical analysis which is compatible with the expansion of the field brought about by the development of the modern high speed calculating devices, but which also takes into account the fact that very substantial amounts of computation will continue to be effected by desk calculators (and by hand or slide rule) and that familiarity with computation on a desk calculator is a desirable preliminary to large-scale computation in any case.

"Communications Dictionary" - Holmes, James F. - A compilation of terms used in the fields of electronic communications and data processing.

"Digital Computer Principles" - Irwin, Wayne C. - This is an introduction to the fundamentals of digital computers ranging from basic arithmetic through the operation and programming of general purpose computers. The book, written for students and industrial personnel who have had no previous training in computer operation, evolved from a training course given by the author at the National Cash Register Company.

"Electroplating Engineering Handbook" (2nd edition) (Reinhold Publication) - Graham A. Kenneth

"Statistics for Business Decisions" - Kurnow, Ernest, Glasser, Gerald J. and Ottman, Frederick R. - The meaning and understanding of how statistical concepts may be utilized to solve problems in business are stressed by tying every technique to practical problem situations. Emphasis is placed on how to take action on the basis of data rather than the data as an end in themselves. Thus, the emphasis is not on compiling of statistical information, but on using it once it is compiled. Numerous examples throughout the book portray specific decision problems. All topics covered center on sampling, with skills in computations de-emphasized.

"Engineering Secretary's Handbook" - Laird, Eleanor S. - Demonstrates, with practical examples, how to handle over 100 jobs--large and small--faster and easier. How to increase your usefulness, perform with confidence, cope with everything from assisting with drafting and blueprint work to acting as administrative assistant to the Chief Engineer.

"Who's Who in America" - Marquis-Who's Who in America

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 11, 1962

Judith Ebner (cont'd)

"World Who's Who in Commerce & Industry" - Marquis - publisher - This book contains two sections; Section I gives career sketches of leading businessmen and others noteworthy in the field of commerce and industry. Section II lists alphabetically selected leading businesses and provides business-to-executive reference by indexing listed executives by name under each business.

"Facts from Figures" - Moroney - This book attempts to take the reader on a conducted tour of the statistician's workshop. The reader is shown many tools and machines, given a quick explanation of their purpose and method of operation, and then encouraged, after watching the craftsman for a while, to try for himself.

"Estimating Machining Costs" - Parsons, C. - This book analyzes the cost estimator's job to show you the personal and technical background needed and the tools and methods with which the estimator works. Other important fundamentals are covered in a discussion of the relation of cost estimating to engineering, and of such basic factors as tool life, machinability, and cutting-tool materials.

"Electronic Switching, Timing and Pulse Circuits" - Pettit, Joseph M. - The aim of this book is to promote both physical understanding and analytical techniques for dealing with several important classes of electronic circuits.

"Design of Transistorized Circuits for Digital Computers - Pressman, Abraham I - Using "worst-case" design, this book explains how switching time and drive capabilities and requirements of all the essential digital computer building blocks may be calculated, and how these blocks may be assembled in chains to perform computer-type logical operations. Methods for performing computer logic to obtain maximum operating speed and pyramiding factor are analyzed in detail.

"Handbook of Power Resistors" - Ward Leonard Electric Co. - The material presented stems from more than a half century of practical design and manufacturing experience and represents the collective effort of the sales and engineering staff.

"Webster's New Collegiate Dictionary - Webster

"How to Chart" - Weld, Walter E. - Shows the construction of - and the use of graphic representation charts. Also gives a list of books for supplemental reading. (Also available for use with this book - "Graphic Chart Papers" - a pamphlet.)

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 11, 1962

J. Burley, DCO

Acitvities of the past two weeks of the DCO accounts include the following:

National Institute of Health, Washington, D.C.: Dr. Thompkins has decided on the Linc Computer rather than PDP-4 (no tape) and PDP-1 (too much investment). We should receive a purchase order in the next ten days for about $20,000 worth of cards to build the Linc. John Cooley is progressing on the redesign of his system (switching from Control Logic to DEC).

Applied Physics Lab: Relatively quiet here for the moment (quiet only by comparison to their past activity level). There are some huge requirements around the corner; purchasing dates I don't know.

Compudyne Corporation, Hatboro: Since the last Bi-Weekly they have settled on our units to be used in the 40 systems they will be building in August or September. This will involve some $20,000 worth of DEC equipment.

Westinghouse Air Armament, Baltimore: It was reported earlier that Westinghouse was going to use 3C's because of political implications with NASA/Goddard. Goddard is heavy with 3C equipment and pressured Westinghouse to use 3C on the S-52 contract. However, Westinghouse has reversed their decision and will use DEC (about $50 to $75K) because, 1.) Our line is most complete 2.) the 3C's district man goofed with certain Westinghouse people. No word yet on the S-67 (OGO) contract. Westinghouse wants this very badly. It could involve some $100K of our gear.

NASA - Greenbelt (Goddard S.F.C.): As yet have been unable to get any word on the acceptance of the A.S.I. 210 Computer installed here. Of approximately 10 with whom I've talked, only one even knew of its existence. A.S.I. has contracted Datatrol Corporation, a local programming firm, to "produce a single interpretive system" for the 210. In discussing this with a representative of Datatrol I learned that this program will take approximately 3 months to complete. Gradually I am getting some interest generated at Goddard. They are so heavily saturated with 3C's and Packard-Bell, however, that I judge this facility to be the most difficult of all my accounts to break into in a big way. I'd pay most any price for success with this outfit. (Westinghouse's attitude should prove helpful).

NASA - Langley Field: Another disappointment. These people, too, believe 3C's spawned digital logic and by their graces it survives. Have been attempting to sell the Instrument Research Division here without success (annual requirements "will not exceed $20,000"). These people refuse to go against past successes by substituting DEC for 3C's. There's no reason to give up here yet - some day they will be our customer.

U.S. Army Strategic Communications Command: Interested in the PDP-1 - sending a repre-

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 11, 1962

J. Burley, DCO (cont'd)

sentative to Maynard, May 15, to see the PDP-1. This group has the responsibility for evaluating all commercially available computers for use by the Army. They make recommendations for purchasing and review/recommend all Army requisitions for computing/control type equipment.

Diamond Ordnance Fuze Lab: Once before we looked pretty strong on a system requirement here, but were under bid by one of our competitors. We're getting another chance now and have hopes with our unbuffered flip-flop packages. D.O.F.L. people much prefer our product line and will do their best to buy from us.

I.B.M. - Rockville: Activity on the increase here after a mild period. Several systems in the planning/design stage. We can expect much more business out of this DEC oriented group.

Welex Electronics - Washington: See earlier reports ref Olmstead AFB contract for 9 each (with possible addition of 5) Q4RO Systems. After being shelved this contract is active again. We are specified for cards ranging in value from $157K (9 systems) to $210K (9 + 5 systems). These prices reflect the 20% discount). Bid opening date is June 12. Welex built the Q3RO System, prototype for Q4RO.

Western Electric - Winston-Salem: Interest here in current drivers. Their whole North Carolina group has been sleepy recently - something due to come their way soon.

Comments:

Last week I attended the Engineering Design Show in Chicago. The interest was marvelous though it would be difficult to evaluate truly the good we did. All in all, I say this Show is a must for us if the enthusiasm of the attendees is any guide. They are hungry for knowledge of our work and products. Some pointed inquiries were made in the booth and should result in some sales. Among some of the things noted at the Show:

1. An inexpensive ($200.00) Alpha Numeric Keyboard to be used with a Friden Model 2 ($650.00) paper punch. No hard copy is produced but I should think it has possibilities. I'll send information to those interested.

2. An extremely low cost, moderate speed (50/sec) in line-pulse counter, indicator, and printer, also a settable counter with print out. Total package sizes within 5" x 6" x 5".

3. An industrial type Digital Control System manufactured by Reliance of Cleveland.

4. Manually settable crossbar for prototype and lab work. Four 10 x 10 arrays for cost of $27.00. This was designed for use in vending machines but it incorporates some interesting

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 11, 1962
Page 10

J. Burley, DCO (cont'd)

design features. The cost is attractive, too. Manufacture is Cherry.

Again I close with "business looks better every day" - all we need are more modules and more salesmen.

R. Lassen

I would like to again emphasize the new personnel request procedure.

All personnel requests now on record with the Personnel Office were returned to their originators for re-submission to Ken Olsen. In the future, all new personnel requests will go directly to Ken Olsen. The Personnel Office does not have authority to advertise for, recruit or hire an employee without management approval. Thus far, we have received no approvals - there are no exceptions to this. The solution of your personnel needs does not lie in relating your needs to me but rather in presenting your needs and plans to top management. The company philosophy of continuing to look for exceptional people has not changed.

We are in the process of improving our office procedures. Margaret and Jo Reilly have been cataloging and indexing our reference files. We have eliminated some unnecessary and cumbersome records which have accumulated over the years. We are using loose leaf binders for our surveys, employee lists, contact references and wage structures thereby eliminating the "where is it" routine.

Seven men have now accepted from Wentworth and we have several other good men from the local technical schools to whom offers should be made if we have the need.

I am very much relieved concerning the decision to stabilize our hiring rate. Our selection process of late has been on a production line basis - an extremely dangerous situation. We will have time for a more thorough review of the applicant and I plan to propose some aptitude testing in the near future. I feel we can be even more selective, especially in view of our increased hourly rates.

The next biweekly will contain an up-to-date personnel break down together with a report of termination of employment for a one year period.

K. Fitzgerald

EN 1000	50%
JN 100-0-0	50%

Attended the ASME, Design Engineering Show in Chicago, April 29 - May 2nd.

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 11, 1962

K. Fitzgerald (cont'd)

The booth activity was very encouraging as far as our digital logic was concerned, however, I think that we could have been much more impressive if we had had some literature on PDP-4, as we had many questions along the lines of process control systems etc.

Also found at the show that Lamson & Sessions Company is currently producing a special new Hook-Hurl bolt which we are considering using to eliminate the misalignment of cabinets when they are bolted together. Also, it was discovered that the people who are presently making the "Pem stud" that we use in all of our indicator and control panels are coming out with a brand new design which will not protrude through the front surface. We are waiting for samples, prices, and delivery on these now.

On May 8th I attended the ASTME Tool Show in Cleveland, where the primary concern was investigating different companies that produce inter-changeable punch and die units for multiple punching of some of our standard parts, and investigating methods and means of increasing our Chromicoat capacity here in the plant. As a result of my observations at the show, I found that the best method for increasing our Chromicoating capacity was to build somewhat larger tanks, design special holding fixtures for the pieces, and automate the method of dipping that we are now using. Also, we should maintain more uniform control of the temperature and the "ph" level of our Chromicoat tank, thereby insuring a more even coating. As far as new punching arrangements, we probably will use the Whistler magnetic die and punch set-up in our present press brake and look for a larger press to complement this set-up later on. There was a scarcity of sheetmetal working people at the show, so I could not observe any of the shears, or presses that I was in hopes of seeing.

L. Prentice

General Engineering	70%
Plant Security	10%
Chicago Design Engineering Show	20%

During the past two-week period all engineers in the Mechanical Section visited the Design Engineering Show in Chicago and spent approximately 2 days. This is our first exhibit at this show and booth duty was shared by the Sales Department and the Mechanical Engineers. I am sure that they gained some enlightening experience as to the type of customer and customer requests that were made at the Show. Response to our exhibit at the Show was greater than I had anticipated, and a greater interest was shown by those who did call at the booth. Friday morning was spent in the used machinery section, Clinton Street, Chicago, looking for used equipment, primarily a Diamond Press for use in our Sheetmetal Shop.

A meeting was held this past Tuesday with Ken Van Dyke of Van Dyke Associates, who have been our industrial design consultants in the past. We are exploring the possibility of

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 11, 1962

L. Prentice (cont'd)

further consultant services on the regular basis. He is to make a proposal in writing as to what he thinks that our requirements are, and what the cost for this will be.

A meeting was held yesterday to resolve the styling for PDP-4. Accord was reached and four cabinets will be immediately ordered to house four computers and to bring up to date the items discussed at this meeting. Judging from the interest expressed at the Chicago show on process control computers, there should be a reasonably large volume sales on PDP-4.

Requests have been received from BBN to up-date their Mag Tape door section on the last unit shipped to them. This will be done tomorrow. We will try to install as fast as possible the door stops on the computer mag tape doors to prevent damage to the paint due to over opening of this section.

A request has been made from ITT to up-date the three cabinet line unit with doors matching our present doors and trim matching our present system. This is being worked on by Ken FitzGerald, and it quite possibly may be necessary to send several people to Paramus to install these.

More emphasis will have to be extended on getting a new system installed for increasing the production of printed circuit boards. Receipt of quotations for dies has been extremely slow. Ron Cajolet has worked on Display 31 and it is drawing to a conclusion. These units should be finished in the near future unless further modifications are a necessity.

A. Blumenthal

EN 2174	85%
EN 1054	10%
EN 1056	5%

ADX-5

The last area remaining to make fully operational is the memory 4 thru 7 bay. An 814 power control has been modified to make it cycle up and down with the main power sequence. Some preliminary tests on memory #4 have been made but aside from showing up a bad coax cable no definite results were had.

A crosstalk problem which plagued memory #3 was solved by terminating the MB and MAD lines. This also improved the margin on memories 1 and 2. The same measure will be taken on memories 4-7. The duplex tape system has been checked out with a single tape control at a time on line. The 1802 relay units, which will make it possible to run a complete test, are due for delivery this Monday.

dec BIWEEKLY REPORT

COPY NUMBER

DATE May 11, 1962
Page 13

A. Blumenthal (cont'd)

The machine will probably be shipped Wednesday or Thursday of this week.

dec BIWEEKLY REPORT

COPY NUMBER 2

DATE April 27, 1962

J. Fadiman

The Automatic Core Tester 2113C was shipped out on schedule to Standard Elektrik Lorenz, Stuttgart, Germany on April 19. The necessary import and export certificates were finally received on that date and I am leaving for Europe next week to install the system. I will spend one week in Stuttgart, one day in Munich, Germany talking to Siemens & Halske, and the rest of the time at Philips in Eindhoven in order to clear up all the remaining troubles on our Memory Tester 1516B.

The Semi-Automatic Core Tester 2110B for RCA, Needham has been completed for two weeks, and is still waiting for Model 52 Negative Drivers and a Current Calibrator, Model 71. The machine has been entirely checked out and as soon as these items are received it will be shipped off to RCA immediately. We are already over three weeks late on delivery, most of it due to the lack of the negative drivers.

The Core Tester 2113E for General Electric is in the final stages of wiring and the 2108E for Ampex Computer Products Co. will be wired after that. Work is proceeding on the remaining two Automatic Core Testers and the Memory Tester 1516G for Hitachi. We will soon be waiting for modules on all of these systems.

During the last two weeks, the Memory Exerciser 2209 for Daystrom Instruments was put together and checked out. Final checkout and the wiring of the output plugs are being done now and we will ship the machine on schedule May 1. There appear to be no serious troubles with this machine.

Fred Gould has made another installation trip - this time to Fort Monmouth for the last two of the Memory Buffers 2007. Unfortunately, he again found that there has been damage to these buffers in shipment. In the future, it appears that we must always ship such an instrument as the printer separately. We should provide better padding and better supports for our systems in the crates, especially for single bay systems which can be easily tossed about. Fred Gould and Ken FitzGerald will get together to discuss better packing techniques and make some immediate changes.

Future sales:

We should finally receive the purchase order within a few days for the Memory Tester 1516H for General Electric, Syracuse. We have already started work on the design of this system. We have sold another Automatic Core Tester in Japan, this one to Hitachi Central Laboratories through the Rikei Trading Company. The firm purchase order for this machine should arrive in about two weeks, with a 12-week delivery schedule.

Dick Whipple has just come back from a very rapid three-day trip to the West Coast in which he took care of a few difficulties on our Memory Tester 1516A at Lockheed Electronics. Incidentally, Lockheed is interested in borrowing the 2113B, which is an Automatic Core

DF633 DIGITAL EQUIPMENT CORPORATION · MAYNARD, MASSACHUSETTS

dec BIWEEKLY REPORT

COPY NUMBER

DATE April 27, 1962

J. Fadiman (cont'd)

Tester which we are making for stock. Dick also reports that Ampex is interested in two more Semi-Automatic Core Testers, Model 2108. Electronic Memories, Inc. is interested in another Core Tester 2113 and a Memory Tester 1516. We are definitely getting more competition in the Memory Testing area. Mr. Modlinski, the ex-Chief Engineer of TMI, is already designing Core Testers and Memory Exercisers and it looks as if EMI is also designing a Semi-Automatic Core Tester. We should have a full report soon from Ken Larsen on all of these activities.

Four men from IBM, Owego were here today to discuss the Memory Tester 1520. We are just about certain to receive the purchase order for this machine.

There has been a definite improvement in the state of module deliveries to Systems, since Jim Myers has clearly taken over the job of module coordinator. Of course, systems are still being delivered late because modules are not available, and delivery time is much, much too long. However, it appears to me personally that the modules which are being produced in Production are being much more properly distributed than they ever were before. The real solution will, of course, never be found until we are able to produce sufficient plug-in units to meet our needs and to have a sufficiently large inventory for customers.

A. Blumenthal

EN 2137	50%
EN 1031	50%

ADX-5

Checkout of ADX-5 has been slowed somewhat by last minute changes in memory field switching, high speed channel, and addition of extra completion pulse traps. If all goes well, however, the May 15 delivery date still seems achievable. A Type 52 mag. tape control and two tape driver have been checked out, awaiting the completion of sequence break checkout to be connected in.

High speed multiply/divide is operational but still needs a modification on the MB and IO complement systems to eliminate the last bugs. The connectors for mag. tape and high speed channel are in the process of being checked now.

Assembly of the extra memories has begun, two of which should be delivered this week, 3 next week and two the following week.

The new completion pulse trap panel should be ready for installation next Teusday - about a day will be consumed in tying it in.

dec BIWEEKLY REPORT

COPY NUMBER

DATE April 27, 1962

A. Blumenthal (cont'd)

ITT's requirements on operation of the duplex tape control have changed with the elimination of program control over the system. This should reduce the checkout time required for it.

The change in the op code for JDA on the ITT machines has posed a problem in getting the standard programs to run. A program has been written to seek out the JDA's and change their code. Many new tapes have already been prepared which will now be used for all ITT machines.

Inquiries have been received from some PDP-1 users as to the terms of a service contract for their computers. The warranty has expired on 3 machines, PDP-1B at BBN, Cambridge, PDP-1C-5 at MIT and PDP-1C-6 at CRL. This is obviously a matter requiring early attention. The data contained in the existing service reports is presently being compiled to provide a basis for formulating a contract. We'll meet to discuss this in a couple of weeks. In the meantime, all interested parties should give the matter some thought so that all pertinent facts and problems will have mention at the meeting.

A master file for PDP-1 drawings is in the process of being set up to provide an immediate source of information on the status of all machines. Also, all drawings will be scrutinized for places where information is not complete or up-to-date. It will be a matter of weeks before it is complete.

Production test procedures for single channel sequence break are being devised and will be complete within a couple of days. The last major area of the central processor remaining is memory. This will require a different type of format than the others, including waveform photographs and a discussion of memory operation.

D. Denniston, NYO

The N.Y.O. is quite busy as a result of the I.R.E. Show. We are completing a number of applications at this point and we have the "Design Engineering Show" to look forward to in Chicago next week.

I went over to see some of the people at The Liquidometer Corp., in Long Island City, N.Y. They had requested at the I.R.E. Show that we get together to talk over some of their possible applications and to give them an idea of our modules in general. They are now considering building a system from our modules which they call a "T-Meter Simulator". It is essentially a four decimal digit display of the period of a reference signal or the phase difference between the reference and a second variable phase signal of the same frequency. I have prepared an estimate for them.

dec BIWEEKLY REPORT

COPY NUMBER

DATE April 27, 1962

D. Denniston, NYO (cont'd)

I have also been at Ft. Monmouth twice in the past two weeks. My first visit was to meet Fred Gould to inspect and check-out the Memory Buffers, the 3rd of which was damaged in shipment. The worst problem with the Memory Buffers was that the only army scope available could not be synced properly. Also, since this scope was last calibrated in 1960, we were a little doubtful concerning the intervals of various delay modules. I brought about nine training modules back to the office which they claimed defective. However, upon check-out here in the office I found nothing wrong with these modules except for a little flux in the eyelets. This is not the first time this has happened. I might say, at this point, that the Radar School instructors do not bother to examine modules reported faulty by students.

This week I went to Lockheed Electronics in Metuchen, N.J. I am preparing an estimate for a "Remote Location Monitor and Control System". It is a commercial application and will be used to monitor and regulate fluid flow.

I also took a 721 Power Supply over to Bell Tel Labs in Whippany on loan and brought their new one back to the office for repair. There is practically no output from the transformer secondary. While I was there, I also had the opportunity to answer some of the larger requests for catalogs and logic books.

I will be visiting Ft. Monmouth again this week to repair a faulty power supply and return some of their equipment. I will have some flux solvent with me on this visit, along with my "eyelet cleaning" (electric razor) brush.

J. Burley, DCO

Activities of the past two weeks of the DCO accounts include the following:

Remington Rand-Univac - Ordered $11,500 of Lab modules, was shaken by our 10 week delivery. Delivery improved a bit to get them off the hook.

Minneapolis-Honeywell, Pottstown - They have definitely decided to "standardize" on their own in-company developed logic cards. This means that the Pottstown facility will become a card manufacturing facility.

G.E. - Missile & Space Vehicle Div., Phila. - This is virgin territory. They are presently using P-B, Reese, and 3C's, know little or nothing about DEC. Initial call indicates this account could be large.

R.C.A., Camden - A call here showed these people know absolutely nothing about using our equipment although they have had 3 racks of 3000 Series for a couple months now.

dec BIWEEKLY REPORT

COPY NUMBER

DATE April 27, 1962

J. Burley, DCO (cont'd)

This is an ASW Techniques Group with plans to start using digital logic techniques. We are fortunate to be here first.

National Institute of Health, Wash., D.C. - Two groups here about to order a good amount of equipment. Dr. Thomkins will order one of the following within 20 days: System cards to build a Linc Computer (See Lincoln Labs), a PDP-1 or a PDP-4. John Cooley should be ordering soon some 50-75 4000 Series cards.

Applied Physics Lab - They will be assisting us in the evaluation and testing of our VHF line sometime in June thanks to Russ Doane and Stan Olsen. Regular orders appear to be still coming without end from this excellent account.

Compudyne Corp., Hatboro - a requirement here for some 40 systems, each requiring 5 4000 Series cards. We appear to have about a 50% chance of getting the order.

Naval School, Dam Neck - We're in trouble (though not serious) on delivery here. They have more funds available and may be ordering more of our standard 3000 Series rather than the Training Modules.

Georgetown University - A very small account but success here would lead to other similar sales. Another small order entered this past two weeks.

Westinghouse, Baltimore - No news yet on the large NASA contract. The requirement here would be for some 1000 of our 4000 Series.

Martin, Marietta - Virgin territory here also. Their assistant director of engineering is interested in our equipment and has plans to make use of digital logic techniques.

Southwestern Research Institute, San Antonio - Money is available here to purchase necessary equipment to build an X-Y Coordinate Converter (derive 0, Rho unnecessary). Still in the early stages of study between us and them.

Weather Satellite Activities Div. - U. S. Weather Bureau - Use of the PDP-1 as interface system has been ruled out due to our lack of a control system to permit PDP-1 to communicate with an IBM Tape System. We still have an opportunity to shoot for the special digital black boxes of the overall system.

NASA - Greenbelt - A.S.I. (Advanced Scientific, Inc.) has delivered their first PDP-1 type computer here. Base price about $92,000. I'll be trying to get some feedback from NASA people on its acceptance soon.

dec BIWEEKLY REPORT

COPY NUMBER

DATE April 27, 1962

J. Burley, DCO (cont'd)

Comments:

Will be in Chicago May 2 and 3 this week for the Design Engineering Show. Now that I've had some time to at least get acquainted with some of the large local accounts, I'll be getting farther from Washington, D.C. in the weeks to follow. My trip to Philadelphia this week was most rewarding and pointed out the need for more basic contact work. Sales-wise we (all of DEC) are not even scratching the surface of this country. Our not doing so is putting more and more of our competition in business every day. Presently, we pretty much sneer at the competition and their capabilities, but in the not too distant future they will be formidable enemies for they must learn, given enough chances and we're giving them their chances often enough. I suspect that our field might go much as has the transistor field. A few companies were strong in the beginning, but then there arose 15 or 20 who were also strong and recognized - far too many for the industry to satisfy. Then the price war ensued and profits took a tumble.

L. Prentice

General Engineering	1000	85%
	1020	5%
	1053	10%

Changes to the Mag Tape and standard computer cabinets have been received from Drafting and have been undergoing final review by me. First model of PDP-4 has been completed. Drafting has made a good start on the Buffer 2010. These should be ready for release in the near future. Dick Hebbdon has been made foreman of the Sheetmetal Shop and has been working with Klaus Doering to try to complete analysis of our chromicoating problems. This will take approximately 1 more week.

Ken FitzGerald is working to get prices for additional tanks to extend our capabilities in Chemical Conversion Coatings and new stripping tank for removal of paint.

A meeting was held today with Liberty Mutual man in regard to our procedures on the Tool Crib. I believe that these can be resolved satisfactorily so that the necessary records to prove loss can be kept. Prototype model of a device for straightening and cutting 22 pieces of wire for amphenol 22 pin connectors is working fairly well. Some refinement; guards, safety devices, etc. need to be added before this machine is turned over to production. The aluminum casting for 30-A Display has been evaluated and some re-work is necessary to the pattern and also to the concept for holding the tube in place.

A trip was made to Electro-Circuits in Lowell to review their methods of producing etched circuit boards. They have some very good ideas. Time is necessary to up their production

dec BIWEEKLY REPORT

COPY NUMBER

DATE April 27, 1962

L. Prentice (cont'd)

to what we require, but they seem capable of making the necessary adjustment for this. Our own program was reviewed last Tuesday when a considerable amount of work has to be done - production of dies, holders, fixtures, etc. to boost our production. Some small start has been made, as reported in the last Bi-weekly, to get proper templets for the Nawhide machines, so this machine can be put on a regular production basis. Parts have not been received yet to make up a drill machine, especially for producing templets for the Nawhide Machine.

R. Lassen

We are returning all open personnel requests to their originators for re-submission to Ken Olsen for his review. In the future, all requests for personnel will first be submitted to Ken Olsen. The Personnel Office has no authority to either advertise for, recruit or hire an employee without management approval. There will be no exceptions to the above procedure and all requests must first be signed by an authorized manager. I would strongly suggest that the request for personnel contain a plan for both the immediate and future utilization of the employee requested.

I feel that the above procedure will provide one of the many controls so necessary for the effective development of a dynamic growth firm - and we certainly are that. It will allow top management to keep in closer touch with our growth and will, therefore, provide a tool for better planning.

Recruiting for female assemblers has improved - 50% of last week's applicants were as a direct result of our new starting rate. I suspect that our rate of female hiring will improve as "the word gets around," however, I'm not convinced that this will solve our long term labor problems. I still feel we have a somewhat exhausted labor market to draw from.

We have had extremely poor results with respect to recent engineering offers. The reasons for losing some of these people are varied from salary, location, type of work and tremendous competition from other companies. I feel that our salary offers have been quite liberal especially when "we really wanted" the individual. Recently we have been running into people who expect increases far beyond what the market will bear.

Recruiting efforts at the technical schools are starting to pay off and we are starting to receive acceptances, including three boys from Wentworth.

Barbara will start concentrating on secretarial recruiting this week, as we soon will be losing some of our "army" secretaries, particularly in the Sales Group.

dec BIWEEKLY REPORT

COPY NUMBER

DATE April 27, 1962
Page 8

D. Adams

These semiconductors have been tested since the last report.

Semiconductors	Mfr.	Units Tested	Percent Reject
D-001-1	Clevite	55869	2.53%
D-003-1	"	2354	1.2%
D-662-1	"	32363	0.36%
1N 469	Hoffman	161	1.86%
1N 3005	Motorola	19	0.0%
1N 3208	"	1000	0.4%
MD-95	Sprague	2863	0.91%
MD-114	Philco	6000	4.0%
MD-114	Sprague	3642	0.3%
2N 1065	Gen. Inst.	2500	1.56%
2N 1721	Tex. Inst.	74	0.0%

Judith Ebner

New books available in the Library:

American Management Association Publications

"The Cost-Minded Manager" - by John D. Staley

"Developing a Product Strategy"

"Packaging for Profits" - Papers and discussions based upon material presented at AMA's National Packaging Conference for 1960.

"Shaping a New Concept of Administrative Management" - In this report, administrative executives from some of our country's leading companies tell why and how forward-looking top managements are now giving the administrative function the same kind of emphasis, respect, and support that has in the past been accorded the marketing, manufacturing, research and development, and financial functions.

"The Power of Packaging" - A report based on material originally presented at the AMA Packaging Conference in Chicago in April, 1961.

dec BIWEEKLY REPORT

COPY NUMBER

DATE April 27, 1962

Judith Ebner (cont'd)

"Optimum use of Engineering Talent"

"Developing Competent Subordinates" - by James M. Black

"Planning and Developing the Company Organization Structure" - Part I deals with the dynamics of organization. This is an analysis of the major problems as they arise at various stages of a company's growth. Part 2 deals with the mechanics of organization. It offers detailed guidance for analyzing the existing structure and modifying or changing it, in the light of the best established practices, to conform to the needs of the individual company.

"Managerial Performance Standards" - by Virgil K. Rowland

"Classics in Management"

* * * *

"The New Mathematics" - by Irving Adler - This book is for anyone who has had elementary algebra and plane geometry. It deals with the new methods and contents of modern mathematics, revealing that the concepts of advanced mathematics lie hidden in the elementary mathematics we all learned in school.

"Computers - Key to Total Systems Control" - American Federation of Information Processing Societies Publication - This work is based on the papers presented at the 1961 Eastern Joint Computer Conference held in Washington, D.C. December 12-14. The theme of this meeting was, "Computers - key to total systems control."

"Communication and Electronics - Volume 79, Part I (1961)" - American Institute of Electrical Engineers

"Digital Computer Fundamentals" - by Thomas C. Bartee - In this book it is assumed that the reader already has an understanding of the basic electronic and electrical principles which would be covered in a first course in electronics and a knowledge of elementary algebra. It deals only with the principles or fundamentals of digital computers, covering the important aspects of the subject in an introductory fashion.

"Handbook of Automation Computation and Control - Volume 3" - by Eugene M. Grabbe, (Ramo, Simon and Wooldridge) - (Systems and Components) A. Systems Engineering B. Manufacturing Process Control - C. Chemical Process Control Instrumentation D. Chemical Process Control Systems - E. Industrial Control Systems - F. Component Selection - G. Design of Components

dec BIWEEKLY REPORT

COPY NUMBER

DATE April 27, 1962

Judith Ebner (cont'd)

"Mathematics Magic & Mystery" - by Martin Gardner

"Modern Dictionary of Electronics" - by Rudolf F. Graf (2 copies) - Electronic Terminology and their functional definition.

"How to Design and Specify Printed Circuits" - Institute of Printed Circuits - This presentation embodies the collective know-how of pioneer firms in the manufacture of printed or printed wiring devices with respect to manufacturing experience on thousands of circuit applications. Individual member firms will provide additional and more detailed recommendations on consultation.

"Analog Computer Techniques" - Clarence L. Johnson - The treatment of the electronic differential analyzer contained in this book was written as an aid to the computer operator. The presentation of the material is such that the average person with a knowledge of the Ohm's law, Kirchoff's laws and a basic knowledge of differential equations can read and understand the majority of the material presented. In a few isolated instances Laplace-transform notation is used to prove a statement. The results obtained, however, are stated in such a manner that they can be applied to the setup of computer problems without a knowledge of Laplace-transform theory.

"The Second Color" - Journal of Commercial Art - A guide to what happens when printing inks are combined in color and screen tint combinations. (Color Charts)

"Computer Programming Handbook" - by Robert Nathan, Elizabeth Hanes - Written for the beginner, giving a practical approach to initial background knowledge in the field of computers.

"Display" (Interiors Magazine Publication) - by George Nelson, Editor - This book presents some of the most original work of more than 125 designers and architects of international note...with an interpretation of their design objectives and values by George Nelson.

"Computer Basics - Vol. 5" - by Howard W. Sams - Organization, Programming and Maintenance

"Handbook of Electronic Control Circuits" - by John Markus - Significant industrial circuits published during the period 1956-1959 are collected here for quick reference.

"Digital Computer Programming" - by D. D. McCrackon - This book is written for the person who needs to know how problems are solved on a modern stored program computer. It provides a general introduction to the entire field, with emphasis on the basic

dec BIWEEKLY REPORT

COPY NUMBER

DATE April 27, 1962

Judith Ebner (cont'd)

principles, and is written for people with no previous knowledge of computing who want to know how to prepare the detailed "instructions" for the computer, as well as for people whose work is so closely related to computer applications that they need to know what is involved in programming.

"Understanding Digital Computers" - by Paul Siegel (7 copies available) - This book has many remarkable features, but it is the last chapter which most demands special attention. In this chapter, which offers a detailed description of a specimen computer, the author ties together the concepts and principles that have been so clearly and carefully developed earlier in the book. It is, in a sense, the "capstone" of an unusually thorough, easy-to-follow, and well conceived exposition of the principles involved in operating and programming digital computers.

"Selected Semiconductor Circuits Handbook" - Seymour Schwartz, Editor - The purpose of this handbook is to make available to the semi-conductor circuit engineer a large selection of well-designed and reliable contemporary circuitry, as well as a comprehensive design philosophy text, as an aid in the design of circuits for electronic equipment and systems. The emphasis is on "building block" circuitry. The pertinent characteristics of each selected circuit are fully described, and the general design philosophy preceding each group of selected circuits is a guide from which other designs can be formulated.

"Mechanical Vibration" - by G. W. Van Santen - The object of this book is to review the elementary theory of mechanical vibrations, as well as some of the more important problems of vibration encountered in practice. The whole subject covers from ultrasonics to earthquakes and, from measuring equipment to fatigue phenomena, briefly touching upon each of these matters.

"The Compleat Strategyst" - by J. D. Williams - This book treats the mathematical theory of games of strategy. As distinguished from games of chance, games of strategy involve conflict among individuals or groups capable of rational activity. Instead of probability, this new domain of mathematics faces the more complex problem of intelligence and behavior. The application of this material applies not only in parlor games (chess, bridge, poker, for example) but also in economics, statistics, and the theory of military strategy.

"Tool Engineers Handbook" - Frank W. Wilson, Editor - A reference book on all phases of planning, control, design, tooling, and operations in the manufacturing industries.

dec BIWEEKLY REPORT

COPY NUMBER

DATE April 27, 1962

Judith Ebner (cont'd)

The following street maps are now available in the library:

Newton
Needham and Wellesley
Somerville
Arlington and Belmont
Waltham and Watertown
Lexington
Map of Greater Boston

dec BIWEEKLY REPORT

COPY NUMBER 2

DATE April 13, 1962

L. Prentice

1000	85%
1020	5%
1053	5%
2223	5%

Mechanical inspection seems to have overcome most of the backlog of work. We are trying to make up a schedule which will show the work load over a period of approximately one month. Changes to the mag tape cabinet and the standard computer cabinet have been forwarded to Drafting. These should be complete by the middle or last of next week. There should be on order, or on hand, approximately 50 mag tape cabinets, and approximately 44 standard cabinets are yet due from vendors. New orders are being placed today for 12 of the small cabinets such as are used in the Anelex Reader. These are to be used for the Buffers for the Dam Neck, 2010-1 Memory Buffers. These will be purchased minus some of the holes so that they may be used for various other projects, color display, Anelex Reader, etc. Ron Cajolet is working to up-date the drawings on the mag tape doors. These changes should be complete and available for Drafting in the near future. Scott Miller has completed and released to Drafting all of the design work necessary for PDP-4 with the exception of the reader punch combination needed with PDP-4. Indicator panels are due for delivery tomorrow, April 13. The table is nearly completed. It is also the new sheet metal sheath for the Teletype Printer. Decisions have finally been reached on the Accounting System to be used in the Tool Crib, and the necessary paper, files, etc. are now on order to complete this.

Projects now under way are a new device to put 22 cut pieces of wire on a tape to be used with the Amphenol 22 pin connector used on all our system plug-in units. The first casting for 30A display has been machined and should shortly be completely assembled for inspection. Drill templates have been made for drilling two locating holes in the 12000 printed circuit boards now on hand. The drill jig will also be used for locating holes in the hard aluminum templates for the Nawide Machine, so that this machine can be put on a regular production basis. Some boards have already been produced on this machine. However, it is hoped that a template drilling machine, plus the above mentioned drill jigs, will make this a much more useful tool.

M. Sandler

Hoping to allay your doubts and fears about increased module production, I want to make you all aware of our plans and programs.

Production = Material + Labor

Material is inert and only the application of labor will change its form from components to finished goods. For some time we have been unable to add labor hours in the form of

dec BIWEEKLY REPORT

COPY NUMBER

DATE April 13, 1962

M. Sandler (cont'd)

additional employees - our hiring has been negated by terminations. Our new rate structure will undoubtedly bring us people we sorely need.

Labor hours may be added by purchase. Outside contractors have been performing the labor operation of assembling components to boards, but our vendors have supplied only 140 boards per day; our own thinly-spread assembly group has been expending labor hours to perform assembly of 260-300 boards per day. After several conferences and plant visits, we are confident that within the week vendors will be delivering at the rate of 350-400 assemblies per day, and I am reasonably certain that their rate will rise gradually and we will be able to count on 700-800 assemblies per day. This will mean that we can shift labor hours spent on component assembly at DEC to those operations of soldering connectors and final assembly of transistors.

Labor hours may be saved by methods changes. We look forward to significant savings by changing the method of adding transistors.

We will need good planning and follow-up by our stock control and purchasing people and better and better delivery performance from our suppliers in order to keep material flowing in --- labor hours, whether added, purchased, or saved must be applied to material to give us production.

Testing will be a limiting labor hours operation unless we look ahead now. Investigations are under way to automate testing procedures, and again, I am sure we will now be able to readily have people we need.

Generally, then, have your doubts and fears if you must, but remember Material plus Labor equals Production --- I believe our Labor shortage period is ended.

R. Doane

VHF Modules	70%
Interviews	10%
Current Drivers and Miscellaneous	20%

Before announcement of a line of modules for higher speeds, a system will be built to try them. The schedule that has been established calls for experiments on a system of 21 modules to be completed by July 26.

dec BIWEEKLY REPORT

COPY NUMBER

DATE April 13, 1962

J. Cudmore

Mag. Tape Sense Amp. 1536	30%
Automatic Module Tester	20%
Test Data Sheet Revision and Correction	20%
Technician interviewing, Quality Control and Miscellaneous	30%

The Mag. Tape Sense Amp. 1536 has been released. This package has the same pin connections and gain and frequency characteristics as the 1549. This package contains two variable gain difference amplifiers. Each amplifier will have a balance pot as well as a gain pot and will result in an improved tape sense system.

The automatic module tester for performing DC tests should be fully operational in a week to ten days.

I spent some time talking to Maynard Eberbrepson of the Institute of the Deaf in St. Louis. He is building a "Linc" computer and is using our memory modules and Lincoln Labs selection technique. "Linc's" memory selection technique uses a diode decoding scheme and modified 1972's and results in a great saving in packages.

I have been in fairly constant contact with Bill Shotts of Johns Hopkins who is visiting us and learning our module testing techniques. He seems very impressed by the test procedure and hopes to set up a test center for Digital modules at Johns Hopkins.

D. Denniston

Since Millie and I were both at the I.R.E. Show, we "again" missed the last edition of the Bi-Weekly. We will "again" try to cover the activity in the New York area for the past four weeks.

I have made several trips over to Bell Labs in Murray Hill, New Jersey. There are several groups there, all involved in various phases of memory research work, that have been responsible for the majority of orders from Murray Hill lately. They are all using our modules for testing their techniques. Since we still owe them a good deal of equipment which has been on back order for some time, I feel that along with bringing back some equipment that we had previously given to them on a loan basis, and helping them with some of their logic, these trips have also helped to keep their spirits up. I have also been at Bell Labs in Whippany.

I also have visited several companies in Princeton, New Jersey during these past 4 weeks, namely R.C.A., Forrestal Research Center, Princeton University, and Western Electric. There is a fantastic number of potential customers in this area. So, I will be getting down to Princeton very soon again to do a little missionary work.

dec BIWEEKLY REPORT

COPY NUMBER

DATE April 13, 1962

D. Denniston (cont'd)

I stopped in at Ft. Monmouth R & D Labs as a result of the I.R.E. Show and have prepared an estimate for them on what we have called a "Pulse Interval Counting System". The use and some concepts are classified, but it looks interesting from what I do know about it.

Speaking of the I.R.E. Show, we haven't even begun to scratch the surface regarding the work that can be done as a result of this show. The number of reply cards we have been sorting is in itself amazing. We have also been suddenly deluged with a vast amount of literature and information requests.

Jim Burley very nicely presented a map recently in the Bi-Weekly which will eliminate confusion that up until this time existed as far as our territories were concerned. At this time, I would like to present another map which I feel might also eliminate a little confusion as far as New York State is concerned. This map outlines the counties presently under the New York Office in New York State, and, of course, like Jim's map the boundaries are "penetrable when necessary".

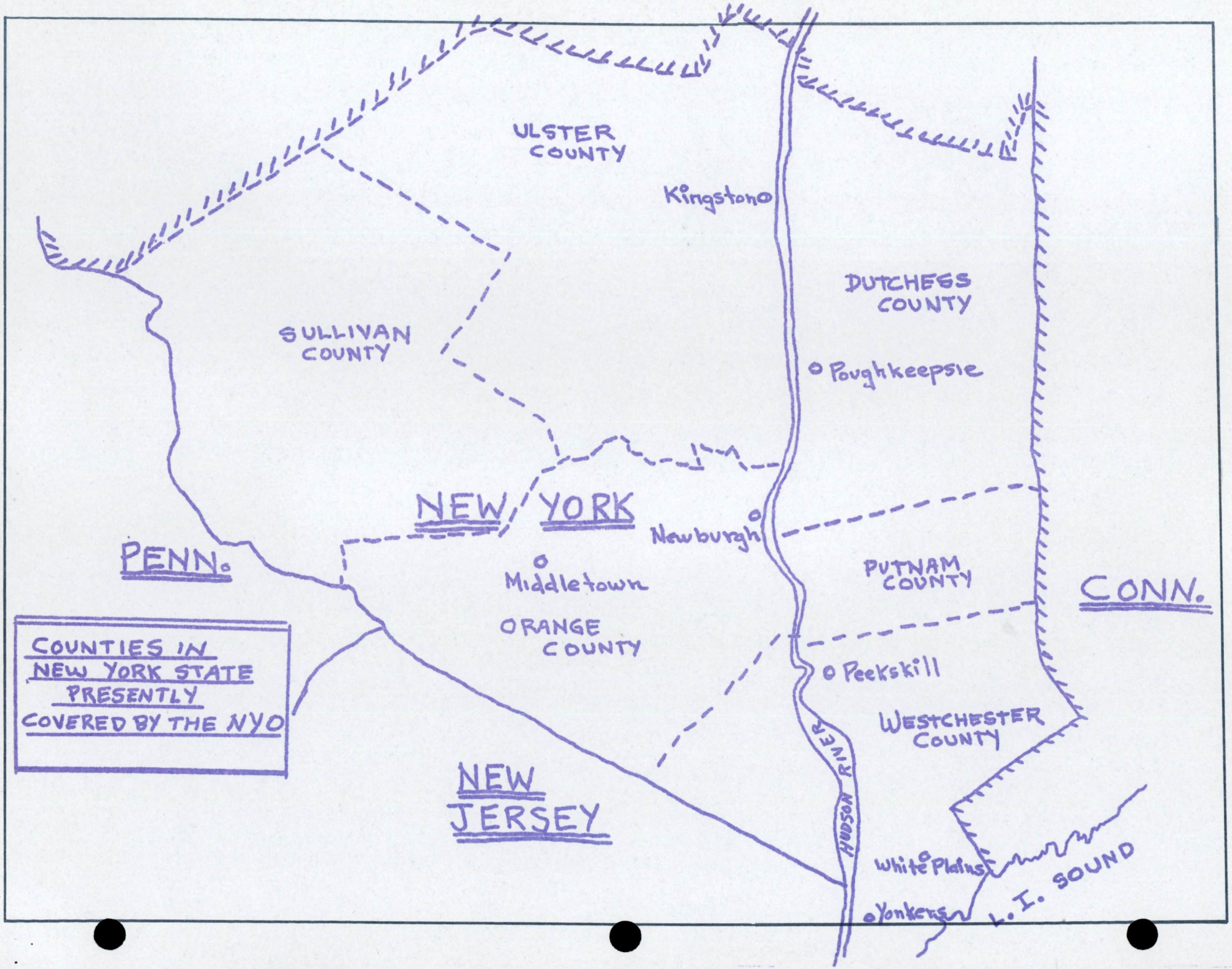
J. Fadiman

Checkout has been nearly completed on the Automatic Core Tester 2113C for Standard Elektrik Lorenz in Stuttgart, Germany. We plan to ship this on April 18. All wiring has been completed on the Semi-Automatic Core Tester 2110B for RCA, Needham. We are awaiting modules and drivers and plan to ship this machine to RCA on April 19. Mounting panel wiring should be received tomorrow for the 2113E for General Electric and the 2108E for Ampex Computer Products Co. Front panels have already been completed for these systems. The Memory Tester 1516G for Hitachi is completed, and we are awaiting modules.

The FAA Buffer 2009 has finally been installed down in Texas. Unfortunately, the Air Lines dropped the Buffer on its first trip and Fred Gould had to return with it, repair it, and then go down with it a second time for installation. However, now FAA is extremely happy with it and they are seriously considering ordering another one in the next fiscal year. This was the first machine that has ever been damaged in transit and we hope it won't happen again. However, the customer is very much impressed by the speed and efficiency with which we handled this difficult situation. Thanks to Fred Gould!

The basic design has been done on the four Navy Buffers for Dam Neck, Virginia and these are proceeding according to schedule. The work is now in Drafting for these Buffers.

I have spent a considerable amount of time in Field Service Work last week. We modified one of the RCA, Needham Core Testers for use with the CH70 Ramsey Handler, testing at a speed of 10 per second. Others of their Core Testers may have to be similarly modified in



dec BIWEEKLY REPORT

COPY NUMBER

DATE April 13, 1962

J. Fadiman (cont'd)

the future. Other Field Service Work has involved a service trip by Lee Butterworth for modification of the Daystrom Memory Exerciser, Model 1513. The display system on the Memory Exerciser 2207 at RCA, Needham has also been finally checked out, so that that machine is now working completely satisfactorily.

L. Butterworth

I just returned from a field trip to Daystrom in Archbald, Pa. where I made a modification to their Memory Tester 1513 (Memory Exerciser), one of our early models. As per telephone conversation, they requested two additional bits, one in X address register and one in Y, for 256 x 256 operation. The modification was done, but this did not turn out to be quite what they wanted. The initial problem here in this case was that over the telephone they could not explain what they wanted because of their lack of knowledge of our equipment and logic. After spending some time talking with them, I found that their system is made up of four separate 16K stacks. In essence, what they needed was a separate 2 bit counter from which they could decode four logical states. When they finished with one stack, it would automatically step to the next one etc. to all four stacks, with the control feature to hold on any given stack. The Exerciser was modified for this type of operation and Daystrom seemed happy.

It seems there is a need for some of our customers to learn more about our equipment. This could be accomplished by on-the-job training here at DEC and it gives us something to think about.

I also wish to say that I am grateful for the opportunity to make these service calls, as I am learning, too.

G. Bell

In the event I make a request for a service of some sort, i.e. modules, cables, panels, etc., it is for the Spring Computer Conference, and a delivery delay of any sort now will make it impossible to "announce" the PDP-4 at the show. Please help send us to San Francisco.

PDP-4 is going to the Spring Joint Computer Conference on April 27, 1962.

Barbera Stephenson

When customers use our modules to build up a system, they inevitably need a variety of accessory equipment for communicating to and from the system etc. They often look to us for recommendations in these areas. Since we have had a lot of experience with a variety of these things, it would be a well appreciated customer service if we could make some

dec BIWEEKLY REPORT

COPY NUMBER

DATE April 13, 1962

Barbara Stephenson (cont'd)

definite recommendations other than just mentioning names of manufacturers. I have outlined below the general areas most frequently inquired about. I also mentioned who I have been recommending in the past. If anyone could make some additional recommendations, comments, or corrections, I think it would do a lot to promote good will.

Core memories - primary interest is for a complete package, including read-write circuitry, which can be connected to DEC standard modules. I have been giving them a list of core manufacturers and mentioned Telemeter specifically because I know they do make a complete package which we can drive. I don't know if any of the others make this, or which is best.

Delay line memories and magnetic core shift registers - these are inquired about quite often when memory requirements are really too small to make cores economical but too large to use flip-flops. 3C's and DI/AN manufacture these, but I rather hesitate to mention them so I have not been making any recommendations.

Magnetic tape - here I have been mentioning Ampex and Potter but there are a lot of questions about the drive and control and signal compatibility. It would be nice if we could just hand them an application note and say, "Here's one typical system. Take it from this and extrapolate to what you want."

Paper tape - I have been recommending Teletype as a good source for low speed equipment. For high speed equipment?

Printers - Numeric and alphanumeric?
Keyboards for input - Principally numeric?
Shaft encoders - Gray code, BCD, sine, cosine and incremental?

Analog-digital conversion equipment - for high speed I have been recommending Raytheon. For higher accuracy, Packard Bell (if there are any others who could compete here and who don't manufacture digital modules, it sure would be handy).

Sample and hold - customer requirements range from 1 to 30. For 30 it is not so hard to find, but for people who need just one, it would be nice if there was some one who manufactured a circuit that could be used with our power supplies.

Analog equipment - there are a lot of customers who need analog equipment along with their digital circuitry. I have been recommending Applied Dynamics and Burr Brown.

Power supplies - principally well regulated power supplies for the A-D conversion equipment. Present recommendation is Waldon Associates.

dec BIWEEKLY REPORT

COPY NUMBER

DATE April 13, 1962

Barbera Stephenson (cont'd)

Transmitters and Receivers - generally they know what they want here but there are a lot of questions on how we connect things. It would be nice (like the tape systems) to have an application note for one specific system from which they could get ideas for other things.

Plug boards - for switching signals in and out, making secret codes and such?

Mechanical counters?

Indicator lights - for BCD we recommend I.E.E. (soon Nixie also). For individual lights we seem to have tried a lot, but which are the best?

Relays - what ones can be driven from our standard levels?

Cabinets - recommendation here is Colonial Cable.

Cable - what is the general feeling on Teflon?

B. Savell

1000	15.4%
1055	5.6%
2127	19.9%
1058	.47%
2101	8.8%
2100	14.25%
2065	9.35%
2099	2.8%
1024	1.87%
1048	1.07%
2042	.7%
1046	18.7%

The Systems Research Laboratories computer system (PDP-1C-17) left today for Wright-Patterson Air Force Base, Dayton, Ohio to be installed and have customer acceptance tests run by Leo Gossel. All the people involved in the checkout of the computer system here deserve a "well done" for compressing an already extremely tight schedule of five weeks down to four weeks from the beginning of checkout to shipping day. This achievement is all the more impressive considering that some of the people involved had no previous experience in PDP's, that one of the Central Processor options, High Speed Data Channel, was a new one that had never been previously checked out, and that a last minute

dec BIWEEKLY REPORT

COPY NUMBER

DATE April 13, 1962

B. Savell (cont'd)

modification was made in the operation of the Type 51 Tape Control. Credit is also due to Production for delivering a Central Processor with a minimum of wiring errors and to all departments for the excellent cooperation received in handling the short notice, last minute details that always seem to crop up.

R. Lassen

For the past two weeks we have been interviewing the June grads from Wentworth, Franklin Tech and Worcester Jr. These men have been visiting us during their school vacations as a result of invitations extended during our recent recruiting visits. Offers have gone out to several promising young men in the effort to fill our many technical gaps. One boy has already accepted.

We have made offers to two young electrical engineers recruited at IRE. I have hopes that one (who has expressed interest) will accept our offer next week. A third product of IRE visited us from Quebec on Friday; however, we have made no offer as yet.

We've all been going straight out for the past week in the attempt to squeeze our "advanced" July Merit Review in between our other activities. The whole thing went off fairly well thanks to the cooperation of all the department heads. My special thanks to Barbara Charnock, Margaret Rand, Eleanor Parker and Lucy White for their greatly needed extra efforts. The results of the review will go to Ken and Andy on Monday, April 16.

We have made an offer to a male Personnel Assistant and I hope to report in the next bi-weekly that we have him hard at work. I plan to split the responsibilities of the office so that we can see more people faster. This is the most important aspect to consider in light of the tremendous up-surge in personnel requests during the past month. We will also assign service and project responsibility to each of us with the expectation of eventually having a better and more well rounded personnel program.

As we grow larger, it becomes more difficult to focus individual attention upon our people especially with respect to promotion. One of the things that makes it so easy for me to discuss opportunities within our company with prospective employees is our readiness to promote from within. Therefore, I urge all of you to look inside first when you have a new opening in your section. There probably is a perfectly capable person in your department or in some one else's just waiting to be moved up. It might not be a bad idea to review carefully the current job openings which are listed in my bi-weekly for this purpose. I am giving some thought as to how this can effectively be handled on a more systematic basis.

dec BIWEEKLY REPORT

COPY NUMBER

DATE April 13, 1962

R. Lassen (cont'd)

Our current personnel requirements are:

Mechanical Technician (Blumenthal)
Sales Assistant (Mazzarese)
Sales Assistant (Myers)
Junior Acct. (Mills)
Advertising Trainee (Atwood)
Office Service Supervisor (Mills)
Clerk Typists (Beckman, Sandler)
3 Field Service Techs. (Beckman)
Jr. Programmer (Beckman)
Open - Technician Trainees (Sandler)
Open - Assemblers (girls) (Sandler)
Wiremen (Best, Bell)
Technicians (Hughes) (4) (Savell) (1) (Model Shop) (1)
Engineers (Electrical) (Fadiman) (1) (Savell) (1) (Hughes) (1)
Tool Crib Attendant (Prentice)
Engineering Writer (S. Olsen)
Mechanical Inspector (Prentice)
3 Electrical Draftsman
Mechanical Draftsman
1 Cost Clerk (Mills)
1 Draftswoman (Melanson)
1 Secretary-Receptionist (Towle)
1 Secretary (Blumenthal)
1 Purchasing Expeditor

We have received requisitions on the above. If you have an opening in your department and it is not listed above, please submit the usual form for management approval.

J. Hamilton

Current Drivers 100%

Text:

A. Eight tube drivers were tested and repaired in our Test Dept. Only 3 of 8 worked initially. The following faults were corrected:

a. Wires soldered to wrong connections; output jacks and pots
b. Wrong component installed
Resistor: correct colors but wrong sequence

dec BIWEEKLY REPORT

COPY NUMBER

DATE April 13, 1962
Page 10

J. Hamilton (cont'd)

c. 6BA8A were changed in order to get pulse shapes required

B. A variable air capacitor is being installed to replace the small Argonne capacitor in both the 52 and 62's. The plastic separators in the Argonne capacitor stretch and wrinkle over a long period of time.

New Projects:

1. To see whether a current driver will supply 125ma to a 33μh coil and have a rise time of less than 100 nanoseconds.

2. To sharpen the wave forms.

3. Write a reference paper containing wave forms and common troubles encountered in trouble shooting drivers.

4. Investigate the possibility of replacing the 3 2N1719's required in the negative current driver by another type, preferably by a single power transistor.

D. Adams

These semiconductors have been tested in the last two weeks.

Semiconductor	Mfr.	Units Tested	Percent Reject
D-001-1	Clevite	57234	2.5%
D-001-1	Transitron	474	4.65%
D-003-1	Clevite	646	5.3%
D-662-1	"	21239	0.5%
D-662-1	Transitron	10000	0.35%
D-664-1	Clevite	9036	1.02%
D-664-1	Tex. Inst.	10000	9.83%
Q-6-100	Inter. Diode	11	0.0%
1N 469	Hoffman	39	3.2%
1N 645	Tex. Inst.	1032	4.9%
1N 758	Transitron	61	0.0%
1N 1217	Westinghouse	1400	25.7%
1N 1220	"	400	0.0%
1N 1227	"	1120	2.7%
1N 1998	U.S. Semicon.	74	2.7%
1N 3005A	Motorola	6	0.0%

dec BIWEEKLY REPORT

COPY NUMBER

DATE April 13, 1962

D. Adams (cont'd)

Semiconductor	Mfr.	Units Tested	Percent Reject
1N 3156	Motorola	2	0.0%
1N 3209	"	50	0.0%
MD-95	Sprague	1897	17.5%
MD-114	Philco	10045	3.2%
2N 769	"	500	1.4%
2N 1065	Gen. Inst.	14	0.0%
2N 1146A	Clevite	100	6.0%
2N 1184	RCA	495	7.5%
2N 1184B	"	500	16.2%
2N 1218	Sylvania	250	0.5%
2N 1305	Gen. Elect.	5000	0.72%
2N 1494	Philco	16	0.0%
2N 1719	Tex. Inst.	250	35.2%

K. Fitzgerald

EN 1000	15%
JN 100-00	85%

For the past two-week period the Cabinet Shop has been running well. We have very little difficulty in assembling and putting out on the floor completed mechanical assemblies for Computers, Systems, etc. There is only one problem that has arisen in regard to cabinets in the past two weeks and that is the control of the parts, such as doors, end panels, etc. These are on the unit when they leave the Assembly Shop and naturally they generally have to be removed for the electronics assembly, test, and check-out procedures. These parts must stay with the original unit in order to guarantee that the parts are available for the unit and that they will fit. Whenever any parts are missing from the assembly when they leave the shop, there is a shortage list attached to the top of the cabinets. This should also stay with the unit and allow the Project Engineer to know at all times the mechanical assembly status of his unit. These shortage lists are also duplicated in the Cabinet Assembly Shop, but the original should remain with the cabinet right up until the time of shipping. We are also designing wooden storage bins for the components such as doors and end panels, which will stay with the machine to keep them from getting lost, strayed, or stolen.

We have been fortunate in obtaining another Co-op student from Northeastern to alternate with Dave Nevela, in our department, and therefore allow some continuity to the work that Dave has been doing.

dec BIWEEKLY REPORT

COPY NUMBER

DATE April 13, 1962

K. Fitzgerald (cont'd)

The Machine Shop has been working on many new styles and types of machines to help automate and speed up the production of modules. They are presently working on a machine for cutting and taping the wires which are used between the module plug and the board. This machine, when completed, will allow the girls to insert all 22 of the wires at one time, rather than one at a time as in the past. They are also building another transistor lead cutting machine and Joe Gill is working on a device to automate the testing and rejection procedures for diodes.

J. Burley, DCO

Tuesday thru Friday of this week was spent going to and attending the Southwestern IRE Convention in Houston, Texas. The attendance was average. Because of very poor performance by Railway Express, my 550 new catalogs did not arrive until the show was half over. Nevertheless, 450 copies were eagerly grabbed up, another 50 Bingo cards filled in. Our Rep, J. Y. Schoonmaker Co., was very helpful in guiding prospects from their excellent booth location to my "not so excellent" location. There is still a decided lag in the firms of this area taking advantage of Digital techniques to solve their problems, but I sense this will change drastically in the next 6-9 months. Our competitors showed only thru their reps' booths. Over-all, I judge we did a successful job at the show - it was worth our investment.

APL still leads the pack in promise of large orders to come. There is a very confident air at APL for continued, well-financed activity. Westinghouse/Baltimore still looks good for $50-150,000. Rem-Rand/Blue Bell continues to buy in respectable quantities despite their disappointment in our delivery lead time. Telemetrics (Falls Church) is interested in the PDP-1. They are bidding on a contract in which is specified a PDP-1. It is yet too early to estimate the possibilities on this.

The meteorological satellite activities, Div. of The U.S. Weather Bureau, proved to be the most exciting new prospect. The task before them is to collect weather data from "Nimbus" and other weather satellites at their ground station in Fairbanks, Alaska. This data (virtually still raw data) would be carried over a couple A.T. & T. 48KC lines to Washington, D.C. where it would be reduced and studied. An IBM 7090 would be used by the Washington, D.C. Facility as a study tool. There will be extensive requests for pulse handling systems, hence, our participation. Success of this program would provide the government with confidence to establish other ground stations and data handling facilities. The possibilities are enough to cause Maynard Sandler to lose a bit more sleep.

It is difficult for me to hold my enthusiasm for the business prospects in my area -- they are very, very good. We should all be busy for a long time to come.

dec BIWEEKLY REPORT

COPY NUMBER 2

DATE March 30, 1962

L. Prentice

1000	85%
1020	5%
1062	10%

Mechanical Inspection has made its first outside of plant inspection at Colonial Engineering on some cabinets that we returned for rework. A deviation from the prints was presented to Colonial Engineering to allow measuring from the top of the pan to the top of the cabinet which would be 64 7/16 inches minus 1/32 plus nothing. This was due, in part, to the fact that Colonial Engineering in mounting the brackets for the rubber feet that go on the bottom of the Mag Tape cabinet had ground so much away from the weld that it's almost impossible to get an accurate measurement from the corners of the bottom of the pan. They are to reinspect these on this basis. The seven units are definitely out plus probably some others which they are now in the process of reworking. The use of a new catch made by Camloc for the Mag Tape doors has been demonstrated. This will be applied to all Mag Tape units now on the floor as quickly as possible. It is hoped that a still better method can be found for holding the Mag Tape doors. However, Camloc method will be applied to all production units until a better method is found.

New drawings are needed of the Mag Tape door. Complete revision. The Mag Tape door parts are broken down in the simple drawings and are, for the most part, not properly dimensioned.

Will those people who received the Inspection Proposal, particularly as it applies to vendor parts and procedures for supplying personnel with proper drawings and paper work, please contact myself or Bob Hughes so that this can be issued as a general memo and these procedures applied as soon as possible.

The Accounting Department has been asked to review the record keeping procedures for the Tool Crib. They have promised to come up with a more satisfactory method within the next few days. No satisfactory applicant has yet been found for the Tool Crib Attendant's position. A man has been found for the position of factory mechanic and will report to work Monday, April 2nd.

We have experienced some difficulty with some of the parts for Display 31. These are now undergoing re-design and re-work and should be available very soon. I believe all mechanical parts for Color Displays have now been completely assembled and delivered to the Production floor. Final elements for the main frame of PDP-4 should be completed within the next few days. Items remaining to be designed and drafted are the Table Console, a combination Reader-Punch housing, and a new housing for Tel-Type units. All of these will be preliminary designs and will be gotten out as quickly as possible so that

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 30, 1962

L. Prentice (cont'd)

they may be ready by May 30th. Some preliminary studies have been made to improve the production of Systems printed circuits. A proposal will be made shortly to design and build the unit for producing templets for the Nawide machine so that this machine may be put on a regular production basis.

R. Doane

VHF Modules	60%
Test Equipment	5%
Current Drivers	5%
I.R.E. Show	20%
Miscellaneous	10%

Except for transistors, the logic module model and flip-flop module model have been put together. The multivibrator module is functioning but needs much improvement. An order for about 60 units may be forthcoming from IBM Watson Labs, if early summer delivery can be offered. The first formal announcement will be made May 1st, though a news item appeared during the IRE show in an electronics news magazine.

E. Harwood

The Beckman machine has been moved into the test area and should go into initial Central Processor test on Friday, March 29. We just have the minimum number of modules for this machine so the initial testing will just include the timing chain. We are still lacking the memory and the high speed multiply and divide logic. I am pretty confident we will be able to ship this computer by the required delivery date of April 18.

ADX-1 machine

Leo Gossel, Paul Gadaire, and I made a trip to Paramus to install the Memory Field Extension Type 15 on the ADX-1 machine. The installation went fine and we were able to complete it in 3 days. This included complete checkout of the memory switch.

BBN, Cambridge machine

We are planning to install the second memory in the BBN machine on Monday and Tuesday, April 2 and 3. I am also planning to ship the Mag. Tape 51 for this machine on Tuesday, April 3. It should be installed on the following Monday, April 9. The only other area remaining to be done on the BBN machine, after the installation of the second memory and Mag. Tape 51, would be the installation of the new drum and all the logic changes in the Central Processor required for this.

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 30, 1962

E. Harwood (cont'd)

ITEK machine

On Tuesday and Wednesday of this week, March 27 and 28, Paul Gadaire and Bill Newell installed the new Teletype punch on the Itek machine and removed the old Tally punch. On Wednesday, John Shields went down and assisted in the checkout and this job was completed much ahead of schedule. We had quoted from 3 to 4 days, but due to the fine effort by Paul, Bill and John Shields, the whole job was completed in 2 days.

J. Fadiman

During the past two weeks, Systems has concentrated on construction of systems already designed. The Semi-Automatic Core Tester 2110A for RCA was checked out and shipped out to RCA yesterday. One problem that we encountered was interaction between the step repeat and pair repeat delays caused by the fast rise times inherent in using high speed plug-in units. This was remedied by substituting twisted pair wire for strip cable for all delay controls. The 2110B is now being wired and will be ready for shipment in about a week, provided the plug-in units are available. Another Semi-Automatic Core Tester 2108E is now being constructed for Ampex Computer Products Co. This will be ready in about 4 weeks, provided that plug-in units are available. The mounting panels will come back all wired for the 2113E for General Electric Co. in Phoenix next Monday. Thus, construction will begin on this machine next week. Wiring will be completed on the Memory Tester 1516G for Hitachi by the end of next week and we will be ready for plug-in units to start checkout. We have made a change in the Memory Testers suggested by Philips, using separate buses for the positive and negative drivers. This requires a change in the Read-Write switch 1977 to a new Read-Write switch Model 1984. This modification is now being taken care of in Drafting.

All mounting panels are completely wired and all front panels have been received for the Memory Exerciser 2209 for Daystrom. These are now being wired together and we expect to make the required delivery date on May 1, 1962.

The FAA Buffer 2009 has been shipped out to Oklahoma and Fred Gould will go down there next week to perform the installation. Memory Buffer 2007-5 has already been sent to Fort Monmouth and 2007-6 will be sent next Wednesday. Fred Gould will make the installation there in about 2 weeks. This takes care of all of our commitments on Memory Buffers except for the four Model 2010's for the Navy in Dam Neck, Virginia. Mechanical design will be started on these next week.

Several letters of quotation have been sent out directly to companies in Japan who are interested in our Core Testers and Plane Testers. I expect that the results from these should materialize during the summertime. The purchase order has been received and the technical

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 30, 1962

J. Fadiman (cont'd)

specifications written for the Foxboro job. Work will begin on this in about one week. Delivery date of the entire system is July 31, 1962. For the Systems division, this work involves several Buffer Registers, a few counters and control flip-flops, and an A to D converter.

E. Towle

A new experiment in Air Force - Contractor relationship took place during a two-week period beginning February 26 and extending through March 9, 1962. A Data Processing Seminar was held at the Wright-Patterson Air Force Base in Dayton, Ohio, and all manufacturers of Data Processing Equipment were invited to attend. The purpose of the Seminar was intended to acquaint the contractors with the "Logistic System" employed by the Air Force so that future Data Processing Equipment could be designed to meet their application. The Seminar was conducted in cooperation with Ohio State University and consisted of four lectures daily, during which the entire logistics system of the Air Force was described in great detail, from Requirements and Procurement, through Transportation to all bases and Commands throughout the world.

Each system was described by an instructor from a particular facility, and near the end of the period the Data Processing Equipment currently being used was described in detail. Incidentally, IBM Equipment is predominant, with the exception of two Univacs and one Burroughs. As could be expected, this situation did not please the other companies represented, and tended to invoke much discussion.

I would like to mention here that DEC was the only small business concern represented at the Seminar, which in itself seemed to distinguish our company from the so-called "giants." It was interesting to note that while most companies were competitors of each other, DEC is in the advantageous position of furnishing equipment to all companies represented, as well as the U.S. Air Force.

As would be expected, the two weeks of classes produced a considerable amount of information, much of which I was able to reduce to an outline form. Also, a sizeable amount of literature was given to me describing the entire Logistics Command. The course outline and all pertinent information have been turned over to Stan Olsen and will be available to all interested persons.

In conclusion, I want to add that although tangible results are difficult to obtain on a visit of this nature, the fact that DEC was interested enough in the problems of the Air Force to send a representative was a signigicant boost in prestige for our company.

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 30, 1962

K. Fitzgerald

ITT Console End	25%
General Engineering	10%
100-00	65%

During the past two-week period we have moved the Cabinet Assembly Shop from the Sheetmetal Shop to its new headquarters in Building 5. We are presently working on jigs and fixtures to facilitate and make more uniform the assembly of these cabinets. We have also placed an order with Donnelly Mfg. in Waltham, for three more ITT Console Ends to cover the existing orders in the house.

I have devised a new Shop Requisition Form which I hope to be able to use officially in the very near future. However, there are some questions that have been asked about this requisition and procedures, I will try to clarify some of those now.

1. If and when we go to this new form they will be either self carboning or throw-away carbon forms, so that it will not be necessary to write the same information three or four times.

2. This form is designed to incorporate all of the pertinent information needed by four different departments. Namely, Engineering, (The Shop) Production Control, Mechanical Inspection, and Cost Accounting.

3. It is conceivable that some requisitioners may not have use for all of the blanks on the Work Requisition, for instance Engineers requesting work on EN numbers will not be concerned with part number, job number, lot number, etc.

Let me see a sample!

4. The original requisitioner needs only to fill out the top half of the form as completly as he can and the approving, scheduling, and inspection, etc., will be handled by others.

I have a few extra forms which I hope to be able to use temporarily on a trial basis before we go to the expense of having the finished product printed up. So again I would like to ask for any comments or suggestions concerning this.

The new lathe for the Machine Shop came in during this past week. It has been set up and it should help speed up our lathe work. The machining of the new display casting means that we must have a 7 inch riser block for one of our milling machines which we have ordered.

No further progress can be reported on the Technicians Tool Boxes as the results of the initial survey have not been compiled as yet. However, we are working on it.

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 30, 1962

A. Blumenthal

EN 2133 100%

ADX - 4

Checkout of this machine commenced on Thursday evening, March 29. The module complement was not complete at this time, but we were able to procede by relocating certain modules to suit the immediate test being performed. Memory is due to arrive Monday morning and hopefully many of the missing modules will arrive early in the week.

An extra set of line units has been added to the system, their assembly will take about three weeks.

J. Burley

The real news, of course, is IRE and our booming success there. I'll pass to the more eloquent to describe this phenomenon.

News since the last Bi-weekly:

1. Westinghouse landed a large NASA contract (see Bi-weekly, March 16) which could use $100 K of our equipment. We look very strong here.

2. Welex is bidding on an Olmstead AFB contract which specifies DEC "no substitute" and requires some nine systems, each using approximately 250, 4000 Series cards. If Welex doesn't get the contract, I'll find out who did for follow up by area sales office.

3. No decision at NASA Langley yet on which vendor will be the chosen one. Very difficult to evaluate this group since they are new to the digital field.

4. Another $25 K coming from APL soon.

Work backlog and IRE prevent my being more complete. However, the overall picture in my area is very good in the sense I am not short of prospects, big ones at that. Will be keeping my eyes open for someone to help handle it all if this activity level is maintained.

G. Bell

I am ready to take orders on PDP-4, and will assign delivery dates. There will be only a few options offered initially. That is, only those which are in production for PDP-1 and apply to PDP-4. The machine consists of 250 modules, and this number will rise slightly before the production model is ready, because a memory field protect feature, built-in

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 30, 1962

G. Bell (cont'd)

block data transfer, and "law-instruction" will be added. As soon as the present modifications are made I will order five PDP-4's, to obtain checkout, construction, and operating statistics.

George Rice is handling the IO equipment now, doing a bit of customer liaison, and will be responsible for coordinating the F-41 (F-11 type) brochure. Bob Buyer, our technical writer, will write the F-45 (F-15 type), which will cover more basic programming and include the IO characteristics of PDP-4. When this is done, I would like him to work on a conventions, procedures, and standards manual. A production oriented critic and designer must shortly consult on making PDP-4 producible.

D. Adams

Semiconductor Testing 100%

Semiconductors tested during the period from January 18, to date.

Semiconductors	Mfr.	Units Tested	Percent Reject
D-001-1	Clevite	228832	2.7%
D-003-1	Clevite	11600	5.0%
D-662-1	Clevite	73454	0.52%
D-664-1	Clevite	13862	3.7%
Q-6-100	International Diode	200	5.5%
IN67A	Transitron	2000	1.5%
IN429	Hoffman	200	1.0%
IN469	Hoffman	100	0.0%
IN750	Texas Instruments	50	0.0%
IN758A	Transitron	12	0.0%
IN764	Transitron	100	0.0%
IN964A	Motorola	100	0.0%
IN1217	Westinghouse	1000	31.8%
IN1341	Westinghouse	5000	0.12%
IN1876A	U.S. Semicor	100	0.0%
IN1998	U.S. Semicor	4	0.0%
IN2970B	Dickson	100	0.0%
IN2974B	Dickson	1100	0.0%
IN3024B	Motorola	100	0.0%
IN3156	Motorola	34	0.0%
IN3114B	Dickson	100	0.0%
IN3116	Dickson	100	0.0%
IN3208	Motorola	1000	0.4%

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 30, 1962

Semiconductors	Mfr.	Units Tested	Percent Reject
GA-212	Texas Instruments	1000	0.2%
MA-80	Philco	12575	0.44%
MA-80	Sprague	10544	0.62%
MD-93	Sprague	3222	4.4%
MD-94	Sprague	4579	4.3%
MD-95	Sprague	4913	0.62%
MD-109	Sprague	800	0.62%
MD-114	Philco	5000	0.62%
S1188A	Texas Instruments	250	1.2%
2N167	General Electric	450	0.22%
2N398A	Motorola	1000	0.9%
2N456A	Texas Instruments	400	0.0%
2N599	Philco	5500	1.2%
2N656	Texas Instruments	100	0.0%
2N674	Philco	1675	5.7%
2N711A	Texas Instruments	2000	0.25%
2N744	Texas Instruments	500	1.8%
2N769	Philco	300	0.66%
2N995	Fairchild	29	3.4%
2N1065	General Instrument	4000	0.9%
2N1184	R.C.A.	600	5.8%
2N1204	Philco	1000	3.1%
2N1304	Texas Instruments	3000	1.2%
2N1305	Texas Instruments	60000	0.75%
2N1306	Texas Instruments	26	0.0%
2N1308	Texas Instruments	27	0.0%
2N1310	General Instrument	500	10.8%
2N1472	Philco	60	3.3%
2N1494	Philco	288	0.0%
2N1495	Philco	100	1.0%
2N1496	Philco	43	0.0%
2N1499A	Philco	1600	1.7%
2N1499A	Sprague	1000	0.7%
2N1719	Texas Instruments	155	23.8%
2N1754	Philco	13416	0.5%
2N2099	Sprague	41	0.0%
4JXIC741	General Electric	11000	0.67%

Total Tested 490,832

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 30, 1962

B. Stephenson

IRE Show

Without a doubt, our booth at the I.R.E. Show was quite a success. The digital module catalogue was a best seller, five a minute. During the latter part of the show large numbers of people came up specifically to ask for it. Many also requested to take, or have us send, copies for friends. A lot of old customers stopped by the booth and, with only one exception, they had nothing but good things to say about our modules and were quite happy with the way their systems were working. One customer from M.I.T. announced that he had been around to view our competitors and decided there really wasn't anyone that presented any competition to us. Brookhaven, unfortunately, was a little unhappy over delivery and miscellaneous other minor things. There was also one prospective customer who had heard some rather bad reports on our current drivers and was somewhat dubious.

A large number of people stopped in to discuss prospective systems. Among the most interesting ones were a special purpose computer for Commercial Banking, a pulse height analyzer to fit into a torpedo, and a digital missing pulse detector.

Most people were quite impressed by the fact that we had a 10 megacycle line, but a number of them often inquired as to when we would be able to supply them with higher frequency circuits. What they would really like to see are frequencies going up toward a 100 megacycles.

Customers

The week before the show, we had quite a rush on bid requests - mostly for special systems. We suggested that they consider using our modules to build it themselves and in many cases we included an estimate of the modules that would be required. These bids included the University of California, the U.S. Navy Underwater Sound Labs., Aberdeen Proving Ground, White Sands, Holloman Air Force Base, and Martin Company.

The University of Wisconsin, and Avco Corporation sent us letters requesting detailed information. It appears that both these groups are expecting to be placing considerable module orders.

Among our recent visitors to the plant, were a group from R.C.A. in Burlington, who are planning a distributor system for random pulses, General Electronics Laboratories, who are building a large scale coding and decoding system with our 4000 Series modules; and Hamilton Standard, who are planning a system for reading mag tapes into computers with a temporary store between the magnetic tape unit and the computer.

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 30, 1962
Page 10

B. Stephenson (cont'd)

2311

Lee Butterworth has checked out and calibrated the first nine channels of the 2311 multiplex digital-to-analog converter. The remaining portions of the machine will be completed as soon as we are able to get the modules for it. Marla Moody has prepared a draft maintenance manual.

R. Hughes

Components

We are now using Texas Instruments' type GA-212 transistor in place of Philco's type 2N599 transistor. The price of these devices is $0.85 and $2.20 respectively. The performance of these devices is identical except that the GA-212 is slightly faster. Yearly usage is 5000.

The 2N1754 and 2N1499A type transistors have been replaced by the MD114 transistor (Philco and Sprague). The MD114 has all the features of the 2N1499A and a special saturation spec. to guarantee that it will work in our circuits. The price is $0.85. The 2N1754 was $0.90 and the 2N1499A was $0.95. Yearly usage is about 100,000.

2000 2N1305 transistors have been ordered, with the equivalent of transipads molded right onto the case and with leads cut to length. Our goal is to solder dip all transistors in the boards and eliminate the use of solder lugs.

The new D.C. Coupled Sense Amplifier 1538 will eliminate existing PRF sensitivity problems in our computer memories. This unit requires two transistors to be mounted in the same can. In the display system for this job, we used the FSP-2. After a meeting with Dick Best and Ben Gurley we decided that the FSP-2 wasn't good for either job because the differential base to emitter voltage wasn't specified as a function of temperature. The result was that in the display system we are going to use a 2N2060, which has a defferential V_{BE} specification of 5 micro volts per degree centigrade over the temperature range -55 to +125 degrees centigrade. This transistor will be used in small quantities and cost about $50.00. The transistors used in the 1538 sense amplifier have a spec. of 25 microvolts per degree centigrade and will cost $9.00 per thousand. This compares well with the FSP-2 price of $23.00 per thousand.

The 2N224 and 2N1370 transistors have been replaced by the General Electric 4JX1C741. The price on these units is $0.73, $0.43, and $0.45 respectively. The 4JX type has higher voltage and better saturation than the other types.

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 30, 1962

K. Larsen, WCO

During the last two weeks, one of my major projects has been the installation of the Beckman machine. I was quite surprised after assembling the machine and applying power, the machine ran the program that was in memory. I understand from Ed Harwood that the last program run at Maynard was a checkerboard program. It was quite a surprise to see it after being shipped across the country by truck.

It was interesting to note that BBN had a crash program that involved data reduction of digitized PCM telemetry data from the Titan II launch at Canaveral. The task was to reduce the critical information data in addition to their normal vibration study and give the Aerospace people information needed that might influence decisions involving modifications to the missile before the next firing. The responsibility for this part of the program was actually STL's, but their computer department did not have their programs ready to decommutate and analyze this data. BBN was the only company to have programs and a computer able to rapidly output the charts necessary to have this detailed evaluation. The computer program reduced the data and displayed it on the scope and they took photographs of the scope and reproduced them on ozalid reproducible vellums for distribution. This story could be aptly headlined, "7090 loses to PDP-1".

Two groups at North American Aviation, Space & Information Systems Div., are seriously looking at our machine for their Apollo space capsule checkout which would involve about 10 PDP-1's and the Saturn S-2 booster ground support equipment which would involve several PDP-1's.

Beckman Systems Div. is writing another proposal for a large system that will include another PDP-1.

Aerojet-General, Azusa, is considering a PDP-1 in a system to monitor the test firings of the Nerva nuclear propulsion engine. The PDP-1 was recommended in their proposal to NASA.

H. Crouse

New books available in the Library:

Adler, Irving - "Thinking Machines"

A layman's introduction to logic, Boolean Algebra, and computers.

Eisler, Paul - "Technology of Printed Circuits"

This volume concentrates chiefly on the production of electronic circuits by the foil technique. It is a report and guide to actual practice and also an account of more general and academic aspects of the subject.

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 30, 1962

H. Crouse (cont'd)

Gille Associates, Inc. (Publisher) - "Data Processing Annual"

Varied information in the Data Processing Field including: Computer Guide Updating; Forms Design; Colleges, Universities and Private Schools giving courses in the field; Computer Users Organizations; Local Suppliers of Equipment and Services; Books in the Data Processing Field, etc.

Horsey, Eleanor F. (Editor) - "Microminiaturization of Electronic Assemblies"

Twenty one papers which were presented at a Symposium held at DOFL (Diamond Ordnance Fuze Laboratories) on September 30 and October 1, 1958. These papers include information in the specific field of microminiaturization, where the term "microminiaturization" is defined as the design of electronic equipment to produce size and weight reduction of an order of magnitude below that of subminiaturization.

Hoyt, Samuel L. - "Metals Properties"

ASME Handbook of metal properties.

Hurley, Richard B. - "Transistor Logic Circuits"

Both logical mathematics and transistor logic circuits are covered in an integrated treatment in which both areas benefit from each other, thus offering the student or reader a more profitable experience.

Korn, Granino A. and Korn, Theresa M. - "Mathematical Handbook for Scientists and Engineers"

This book gives reference to definitions, theorems, and formulas. In addition, it provides a connected survey of mathematical methods. Notes and cross references show the inter-relations of the various topics and their importance in science and engineering work.

Raskhodoff, Nicholas M. - "Electronic Drafting Handbook"

This handbook presents the principles and practices of electronic drafting. It is intended to serve as a reference guide for persons doing electronic drafting in private industry or for the Government; as a text book for students taking a course in this specialty; and as a means of assisting individuals interested in furthering their careers in enginsering drawing through specialization.

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 30, 1962

H. Crouse (cont'd)

Schwop, John E. and Sullivan, Harold J. - "Semiconductor Reliability"

The contents of this book have been gathered from laboratories of major producers and users. Results, analyses, and conclusions of many large-scale test programs are given. The viewpoint throughout is empirical and practical, rather than theoretical.

Suckling, E.E. - "Bioelectricity"

This work explains electrical theory and electronics in a language that is easily understood by physicians, physiologists, and biologists in general. "Bioelectricity" presents an insight into what the physician or physiologist is trying to do so that electronic technicians, engineers and physicians can better understand the type of equipment they should design.

Stanier, William (Editor-in-Chief) - "Plant Engineering Handbook"

This handbook provides engineers and management with information to more efficient use of men and machines.

J. L. Atwood

We did very, very well at the I.R.E. Show again this year. Booth traffic was good, interest in our equipment was high, and the acceptance of our literature was most satisfactory.

Our estimate on catalog distribution was that we would pass out an average of 3,000 a day during the four days of the show. To be on the safe side, however, we sent a total of 20,000 copies to the Coliseum as rapidly as the binder could complete them.

This proved to be a happy precaution, in view of the response. The daily breakdown for catalogs and Logic Handbooks distributed and for reply cards deposited was as follows:

	Catalogs	Handbooks	Reply Cards
Monday, Mar. 26	2,550	240	285
Tuesday, Mar. 27	4,785	-	317
Wednesday, Mar. 28	5,175	620	190
Thursday, Mar. 29	3,055	325	119
Total	15,565	1,185	911

Another 600 or 700 reply cards were taken along by people who did not want to lug the catalogs with them!

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 30, 1962
Page 14

J. L. Atwood (cont'd)

So we have pretty solid evidence that approximately 23 per cent of the total 73,479 registrants at the Convention stopped at our booth at least long enough to pick up a catalog or a reply card. It seems as though this might be almost enough to convince the show management that we rate the extra space we have been requesting. At least we will give them a chance to think it over.

dec BIWEEKLY REPORT

COPY NUMBER 2

DATE March 16, 1962

R. Beckman

Several months ago, in my first contribution to the Biweekly, I climbed up on a soapbox and spouted off about how important the Biweekly was and how we should not neglect the responsibility of contributing to it. I'd like to think that my efforts helped a little in restoring the Biweekly to its proper place as a useful and informative publication. I haven't retired the soapbox, however, and I'm about to climb up on it again, on a different but related subject.

This time I'm disturbed about the fact that very few people get to see the Biweekly.

The Biweekly is not supposed to be a company newspaper and is not intended for wholesale distribution. The primary purpose of the Biweekly is to serve as a vehicle of communication between different departments and, as we grow bigger, even between different persons in the same department. To be effective, it must contain information about situations and projects that must be kept confidential to protect the company's interests. For this reason, the Biweekly is classified "company confidential" and its distribution is limited.

Unfortunately, the Biweekly might just as well be classified "burn before reading" for all the good it does a lot of people. In too many cases the Biweekly does not go beyond the person who originally receives it. The classification and limited distribution of the Biweekly is necessary to control the dissemination of some of the information it contains. It is not, however, intended to prevent the dissemination of necessary or useful information to people within the company.

The people on the Biweekly distribution list are, for the most part, in fairly responsible positions. As regards the Biweekly, they are responsible for safeguarding the information it contains. Their responsibility, however, does not end there. They are also responsible for insuring that the information gets to the people who can use it. This dual responsibility involves routing the Biweekly through the necessary people and at the same time impressing upon them that the material is confidential. How the Biweekly is routed will depend upon the department and section involved. In some cases, the entire Biweekly should be routed to everyone as a matter of routine. At the other extreme, only selected excerpts from the Biweekly should be published and then probably at rare intervals. Obviously, the subject matter involved would affect the distribution. For example, Gordon Bell's ideas on scheduling are extremely interesting and important to a great many people, but of little use to the women on the module production line. On the other hand, Steve Lambert's voluminous and informative reports on computer installations could be very valuable in the production department as a means of pointing out the need for careful, accurate work.

Another evil inherent in a system that suppresses information is the fact that the people who are the source of much of the information are discouraged from producing it. A high percentage of the useful and significant contributions to the Biweekly is made by people who are not on the Biweekly distribution list. We all have a certain amount of ham in us

DF633 DIGITAL EQUIPMENT CORPORATION · MAYNARD, MASSACHUSETTS

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 16, 1962

R. Beckman (cont'd)

(and this ex-Virginia ham will admit to more than his share) and it's pretty de-motivating to be asked to contribute to a publication that you can never expect to see.

There is still another category that should be considered; the people who, under normal circumstances, would never see a Biweekly, but who should be aware of its existence so that they can contribute to it when they have something significant to say. It is quite possible, for instance, that John Culkins and the people who work with him (without whom none of us would have an empty basket to throw trash in) could have information just as important as that supplied by Ken and Andy (without whom none of us would have a basket).

In the Navy they have a saying about "the 10% that never gets the word". I'm afraid that at DEC it's more like "only 10% (or less) gets the word".

As long as I'm on this soapbox, I might as well take advantage of it. New subject.

I'd like to talk about quality now. (I'm talking about QOM, Ben).

Recently, there have been several complaints from customers concerning the quality of our products. In a few cases the trouble has been caused by just plain carelessness. For this there is no answer except better training and increased vigilance. Most of the complaints, however, are more nebulous in nature. They have to do with methods and opinions as to what are the proper methods.

For the most part, production and quality control have been held responsible for the recent complaints. I do not entirely agree with this. To a great extent, I think that we are all responsible. Many of the complaints involved have been encountered on a smaller scale by myself and other DEC representatives in direct contact with customers. And some of these complaints date back to last summer. The point is, that if these things had been adequately reported and considered when they were small in scale, they would never have become large scale problems.

Sometime ago I suggested the adoption of a "quality defect report form". The idea was to provide a means of reporting defects in delivered material and direct customer reactions to these defects. I even went so far as to make up a rough form of what I had in mind and distributed it to various people. The project, however, died on the vine, apparently due to lack of cultivation. I'm pretty good at throwing fertilizer around and now that I'm in the vineyard permanently, I'm going to try to revive the whole thing.

I have, however, changed my opinion as to what constitutes a customer. "Customers" are not just the people outside the big brick walls who buy DEC products. For example, when Drafting does something for the Engineering Department, the Engineering Department is a

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 16, 1962

B. Beckman (cont'd)

as a text and reference book for the maintenance courses. The completion of the preliminary draft of the manual is scheduled for March 31st. Arrangements have been made with Cyburtek for the writing of manuals on the various PDP-1 options and a maintenance manual for PDP-4. Mag Tape options have highest priority, with the PDP-4 Maintenance Manual a close second.

Tentative procedures have been established to insure that the necessary documentation goes out with each computer. This involves the maintenance manual, block schematics, circuit schematics, wiring diagrams, etc. Approximately two weeks before the scheduled delivery date of a particular computer, a set of these materials is collected and kept in one location. At the time the machine is crated for shipment, this material is checked for completeness and turned over for packing and shipping with the computer. This, along with John Koudela's and Beverly Clohset's DECUS material, should insure that all available information arrives with or before the computer.

Most of the services that the Customer Relations section will try to provide are presently being adequately covered by other people. Our intention is to combine related information-type items into one routine system and to reduce to a minimum the time and effort required of the Computer Division in relation to these items.

J. Fadiman

Present Business:

The Memory Tester 1516F was installed two weeks ago at the Burroughs Corporation in Philadelphia, Pa. There were only the usual minor difficulties and the people all seemed very happy with the machine. Fred Gould installed the Memory Buffer 2007-4 at Fort Monmouth. There were no problems there. Some time has been spent on Field Service Work by both Fred Gould and Lee Butterworth. Fred Gould has been making some modifications on some of our older Automatic Core Testers at RCA, Needham, and Lee Butterworth has been taking care of some final corrections on the Memory Exerciser 2207 at RCA, Needham.

Wiring is proceeding on schedule for the Memory Tester 1516G for Hitachi in Japan. Work is also proceeding on the Memory Exerciser 2209 for Daystrom Instruments, Inc. This is similar to the first Memory Exerciser which we built in this company. The logic is now being wired and the front panels are being fabricated. This system will be ready for shipment on May 1. We are finally getting to the wiring of PEPR and this is now proceeding very rapidly. The design has been a long time in coming, but now that it is complete the rest of the construction ought to go fairly easily. Construction of the Digital-to-Analog Decoder 2311 has been nearly completed and this is almost ready for checkout. These last three machines are all being managed by Lee Butterworth.

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 16, 1962

J. Fadiman (cont'd)

Final checkout has been completed by Fred Gould on the Memory Buffer 2007-5 for Fort Monmouth. This will be shipped on Monday. Construction has been completed on the Memory Buffer 2007-6 for Fort Monmouth and checkout will be accomplished just as soon as the modules are available. Most of the checkout for the Memory Buffer 2009 for the FAA has also been completed, except for some missing modules.

The Automatic Core Tester 2113C for Standard Elektrik Lorenz in Stuttgart is now undergoing final checkout. Most of the system has already been checked out and we are awaiting the current drivers. The system would be ready for shipment on March 26 (four days ahead of schedule). However, ITT does not yet have the necessary paper work completed for importing the machine to Germany and this will delay shipment somewhat. Evidently, it takes ITT longer to process the purchase order than it takes DEC to build a machine. The Core Tester 2113B is largely completed and we are awaiting modules and current drivers. This machine will be used for demonstration purposes and also for loaning to any company who wants to see how our Automatic Core Tester works. Wiring is being done on the Automatic Core Tester 2113D for Hitachi. The necessary design changes are being made for the Core Tester 2113E for G.E. in Phoenix and this will go into wiring next week.

Our Semi-Automatic Core Testers are also proving to be a good seller. Construction is nearly completed on the Model 2110 for RCA in Needham, involving high speed plug-in units and six current drivers. We are awaiting modules and current drivers in order to check out the machine. Wiring has already been started on a second model 2110, also for RCA in Needham. We have just received an order for a Model 2108 with high speed plug-in units from Ampex Computer Products Company in Los Angeles. The construction of all core testers and memory buffers has been under the direction of Fred Gould.

New Business:

We are about to start on the construction of another four Memory Buffers for the Navy in Dam Neck, Virginia. These are of a slightly different mechanical design but approximately the same electrically. A considerable amount of time has been spent on design of an interface system for use with the PDP-4 Computer. We are doing this system for the Foxboro Corporation and this in turn is going into a system which they are manufacturing for Nabisco. Construction of this interface will start about the middle of April. I expect that an order will come in from G.E. in Syracuse for a Memory Tester 1516H, and I expect that an order will come in from Sylvania Electric Co. in Muncy, Pa. for a Semi-Automatic Core Tester 2110C. A little more in the future, chances look very good (about 90%) for receiving an order for a very large and complicated Memory Plane and Stack Tester from IBM in Owego. This is a $75,000 machine which will require a great deal of new design work. The Japanese business continues to look more promising and a good deal of time has been spent in making quotations directly to the companies in Japan who are interested in

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 16, 1962

J. Fadiman (cont'd)

our equipment. We have decided not to appoint any trading company as our exclusive representative in Japan. We will deal directly with the manufacturers in Japan but will go through a trading company for the trading operation if the customer wishes.

Personnel:

As usual, the Systems Division is short-handed in the Engineering Department. Dick Tringale has been devoting full time to the PEPR project, which is certainly the largest and perhaps the most complex system that our group has ever designed. Dick Whipple and I take care of the rest of the systems business with the very capable help of our Senior Technicians, Lee Butterworth and Fred Gould, and the other technicians under them who are rapidly learning about systems design and checkout on their own. Our working force has been greatly strengthened by the addition of Byron Bilder, a new employee, who is now busy doing systems wiring. Ken Peirce has also joined our group. He is taking care of some of the paper work involved in ordering parts and keeping track of scheduling, and is also contributing to the wiring of our systems. We are still looking hard for another good Engineer. Does anyone know of anyone?

L. Prentice

#1000	85%
#1020	5%
#1053	5%
#1073	5%

Mechanical Inspection is becoming a reality. Three men are now working full time. Mr. Richard Gaboury is in charge with Dave Clark and Bob Norton.

We are not able as yet to give complete service but hope to in a very short time. Proposed procedures for implementing mechanical inspection on vendor's parts and procedures for supplying inspection personnel with proper drawings and paper work reports to interested parties will be circulated shortly.

A Tool Crib has been constructed in Building 3 and will soon be a working facility. Proposed procedures for its operation will be written and circulated for review by all interested persons. This Tool Crib will issue and control all tools with the exception of those in Production. We have several applicants for the Tool Crib attendant's job. These are being checked out and a man should be available for this position shortly.

Design work and drafting for mechanical parts for PDP-4 are well under way and requested delivery dates should be met.

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 16, 1962

L. Prentice (cont'd)

A new typewriter table has been designed for PDP-1. Two models are now being made and the model selected should be considerably less costly to produce.

Other projects now in the design stage are improvements in the Mag Tape Cabinets, particularly in the doors and air baffles and new improvements in the frames for computers.

The new lathe has finally been shipped from Ohio and should arrive Friday or Monday.

H. Crouse

Dave Glazier has been added to the rolls as an expeditor; his efforts will be in the area of Production's needs.

Ampex Corporation will tentatively complete their order of twelve 4096 word memory stacks on April 15. The present balance due is five pieces. Ferroxcube Corporation, with a balance of eleven, will be completed in mid April.

New books added to the library

Evans, George W. II and Perry, Clay L. - "Programming and Coding for Automatic Digital Computers"

Techniques, methods, and other data essential to programming digital computers efficiently are brought together in this volume. It highlights systematic procedures that enhance programming and coding skills, and explains the computer's basic design so that you can use it with maximum effectiveness.

Grabbe, Eugene M.; Ramo, Simon; Wooldridge, Dean E. - "Handbook of Automation, Computation and Control - Vol. III" (3 copies) (Systems and Components)

Ledley, Robert S. - "Digital Computer and Control Engineering"

This book is a comprehensive elementary engineering textbook intended for senior undergraduate or first year graduate courses.

Lehman, Warren - "Parliamentary Procedure"

Randall, Clarence B. - "The Folklore of Management"

This book discloses the fables and folklore of management which are often the product of fads and fashions that have taken root in management practice; sometimes they are half-truths or attractive over-simplifications.

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 16, 1962

H. Crouse (cont'd)

"Robert's Rules of Order" - (Parliamentary Procedure)

Schwartz, Jacob T. - "Matrices and Vectors"

An elementary treatment of the subject; a combination of geometric material of the "vector analysis" kind with algebraic material.

Siegal, Paul - "Understanding Digital Computers"

In the last chapter of this book the author offers a detailed description of a specimen computer and ties together the concepts and principles that have been developed earlier in the book.

Gebhart, Benjamin - "Heat Transfer"

This book is presented in the form of a text but the content and method of presentation will also serve the general reader and the practicing engineer.

A.S.M.E. Handbook - "Metals Properties"

The Cambridge Communications Corporation's "Abstracts on Solid State and Computers" is now available in the library.

R. Blackwood

Dick King, our former expeditor, has joined me in subcontracting. Up to this point, I have expedited only those outside contracts for which I've had a specific request to expedite. This addition will allow us to follow-up on all purchase orders.

Two requests to you, the requisitioner, to further aid in getting material in the house correctly and on time:

1. Please furnish two prints along with each requisition, be it for sheet metal work, wiring, silk screening, painting, chromicoating, or what have you.

2. Allow for as much lead time as possible, especially on a wiring job. A job of this type requires our getting together material (panels, end plates, wire, connectors, etc.) to ship to vendor. This takes, in some cases, as much as two or three days to gather the material and another two days before the vendor starts the job, which means that five working days are lost and your lead time suffers accordingly.

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 16, 1962

D. Denniston

Somehow, our last Bi-Weekly contribution disappeared between our office and the final edition. Therefore, I am going to go over the activities of the NYO for the past four weeks.

I took a trip to Princeton University, at their request, as a result of a reply card. It seems that they were first introduced to DEC by some of the people at Brookhaven National Labs, and they had a few questions in the way of logical design.

I took another trip over to Republic Aviation Corp., in Farmingdale, L.I., to pick up their faulty Model 721, Power Supply. We looked this power supply over here at the office, and it was noted that the capacitor, which is an integral part of the transformer assembly, was arcing from its case to its mounting bracket. A frayed lead to the capacitor was in intermittent contact with the transformer assembly. We are now awaiting the arrival of a replacement transformer from Maynard. Maynard has shipped them a 721 replacement on a loan basis until theirs is repaired and returned.

After several attempts to reach Don Killen of Information Storage Systems in Pompton Lakes, I finally located him and asked if I might drop up to say hello and pick up some of the equipment he had there on loan. Mr. Killen was not available upon my arrival, but at least the equipment has been returned.

I have been to Ft. Monmouth twice in the last week (one visit to each of the sections using our training modules). At the Radar Division I found several minor troubles, the most shocking of which was a 901C mounting panel shipped without any electrical connections - just the bare rack.

I also visited General Ceramics in Keasby, N.J. this week. They did have a few questions about the equipment they have there, and they have had a few slight problems.

We have been devoting quite a bit of our time to follow-ups as results of reply cards, letters written by Maynard, and various other sources, and some of these prospects look almost encouraging.

J. Cudmore

EN 1026	65%
EN 1000	30%
EN 1010	5%

EN 1026 - I have spent some time on the Rem.-Rand Univac tape system and the trouble lies in a form of PRF sensitivity, as yet unlocated.

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 16, 1962

J. Cudmore (cont'd)

I am also checking out a new 1549 tester which gives a more comprehensive check to the unit. Since the 1549 has undergone many changes, and the tape head manufacturers can only provide heads with a 20% tolerance, a new amplifier with a gain pot and a balance pot is being designed.

EN 1000 - I am still following up test data sheet and tester modifications.

R. Doane

VHF	80%
Miscellaneous	20%

The VHF multivibrator is being constructed in its final high frequency version.

The VHF flip-flop and the VHF logic experimental boards are being etched.

All modules use the principle of current switching. All transistors stay out of saturation, but they do turn completely off.

A VHF burst generator has been constructed for use in testing the modules. The burst generator uses a resonating coax line to generate the pulse train.

The latest issue of Technology Revue (published by MIT) has the latest thought on the "Think" slogan. The article is titled, "A Game's Worth of Thought", and the author proposes that the investment of a game's worth (roughly equal to that amount of analytical thought required for a hard-fought chess game) on whatever problem solving project comes to mind each day would provide the thinker with great benefits. The author shows that many famous people spent only about a game's worth or two every day.

K. Fitzgerald

EN 1000	15%
100-00	85%

The Engineering Department Tool Crib, which was originally designed for servicing the Sheet Metal and Machine Shop, has been structurally completed. Candidates for the Attendant's job have been interviewed and we should make an offer soon. The operational scope of the Crib has been increased so that now we are probably going to service the whole Engineering Department. This will mean that the Crib will be handling approximately 85 persons including Engineers, Technicians, and Shop people.

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 16, 1962
Page 11

K. Fitzgerald (cont'd)

A Sheet Metal worker's basic tool box has been designed and purchased and as soon as padlocks are ready they will be issued. It has also been requested that I design, set up, and purchase tool boxes for the remaining Engineering Personnel, primarily Engineering Department Technicians. In the very near future, a memo and tool list for Technicians will be circulated throughout the Engineering Department so that the present status of all tool boxes can be determined. This is necessary in order to determine the types and quantities of tools which are missing from the tool boxes and should be replaced. As soon as this is done, replacement tools will be purchased and all people with tool boxes will be required to turn them in to the tool crib for inventory, marking and fill out of the box. The box will then be reissued to the individual with a padlock and these boxes will be re-inventoried periodically.

The Tool Crib will maintain an adequate stock of all special tools and infrequently used but necessary tools. These will be available to anyone at any time. Cooperation on the initial inventory of tool boxes is essential in order to get this program under way.

Most of the recent difficulties that have been experienced in the Shops for the past two weeks have been caused primarily by lack of parts, due probably to the fact that vendors are saturated with work and are having trouble making deliveries on time. One of the biggest problems has been the lack of cabinets and the amount of necessary rework on cabinets when they are received. Donnelly Mfg. Co., who has been very good on cabinets in the past, is starting to slip a little bit, particularly in the painting department. We have been in contact with their engineering department and we hope to eliminate this problem on future orders.

We have received, and put into operation during the past two-week period, a quantity of special steel carts and storage racks which we purchased from a local welder and which were designed to handle the special plastic tote boxes and groups of mounting panels that are prewired by outside vendors. They seem to be working out well. If anyone else feels that they have a need for special carts or wagons of this type, our source on these items is very good.

A. Blumenthal

EN 2133	10%
EN 1054	25%
EN 1031	65%

In an attempt to meet the proposed delivery dates on PDP-1's, three job shop engineers have been added to the checkout force. Their stay at DEC will probably be for 4 to 6 months. Their initial indoctrination to DEC logic was accomplished by attendance at a

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 16, 1962

A. Blumenthal (cont'd)

series of lectures given by Rodney Wilson, a fact for which I was very grateful. A man to be permanently employed will begin on March 19, in time for the next lecture series.

A total of 2 1/2 days was spent at BBN ironing out the bugs incurred by the addition of a memory module. The extra cabling added to the MB outputs for the inhibit logic has necessitated the addition of diodes on these lines to hold overshoots down. These will be added to the standard diode list so that future PDP's will not have this trouble when memory is added. The existence of cross-talk in the 1607 pulse amplifiers was also revealed. Don White has come up with a solution which we will try out in the near future.

A bug, which affected only the sound learning program, was found to be caused by noise on the power clear line, at the typewriter logic, caused by IO bits switching. This signal will be routed through a different cable for a permanent cure.

The display system was also aligned completely. Aside from this, field service has enjoyed a fairly quiet bi-weekly period.

ADX-4

The central processor, except for memory and in-out, is almost completely wired. Another couple of hundred modules must be supplied before basic checkout can commence. Their delivery dates are not available and ADX-4's sixth position on the priority list doesn't give much encouragement for an early date.

The first memory will be available about March 22, with the two optional units coming on April 2 and 9.

The operator control panel, indicator panel, in-out units and line unit control panels should be available late next week. Wiring in of the line unit control panels will be done the week after next. Mag. tape will be a late comer, probably around April 25.

With the new organizational setup, I find that I am able to coordinate things that were previously not my responsibility. Jack Smith will now take care of module installation and, after instruction by Bob Reed, the wiring in of line unit plug panels and in-out logic.

Being responsible for the machine being accompanied by an accurate and complete set of drawings upon shipment, I find myself compelled to go through the drawings and make all the necessary corrections.

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 16, 1962

J. Burley, DCO

My time has been about equally divided between working with customers and prospects and getting the DCO organized to operate by my methods. We will be finding ways to better utilize our time here - to permit us more time with customers. Lora and I are experimenting on cutting out repetitious work on her part to free her to help me more. One attempt that shows promise is the spirit duplication of repeating information on the sales call reports. On those accounts with whom we work a lot, we are making spirit masters to run a stock of semi-blank reports. We will print the company name, division, address, telephone number, area code and pertinent facts for locating plant. Some of these should start showing up in Maynard soon. (Lora has been ill this week. Are secretaries really helpful??,,ask me!)

My most shining prospect, sales-wise, is Westinghouse Air Armament Division, Baltimore. They feel they are certain to land a large NASA contract involved in observatory work on the sun. Delay will be critical, since the earth is in the proper position for such studies only once a year. The cost of delay failure is evident. This purchase would involve some 1000 units of our 4000 Series. Technically, DEC is an alternate to 3C's at Westinghouse, but Elbert Dragon confided that we now have the edge because of the breadth of our line and our relatively good packing density.

Walter Reed Hospital Institute of Research is interested in our logic to replace their relay logic used to program stimulus and reward in animal behavioral research. The contact here is Dr. John J. Boren. Our only competition appears to be Tech-Serv. The postal authorities discourage my giving a candid opinion of this equip., but to neophytes I suppose a FF for $9.95 is attractive even if it shouldn't work.

Two more calls indicated that standardization on one supplier of modules is a growing thing. N.S.A. at Ft. Meade is thinking in these terms among their six suppliers plus their own N.S.A. designed cards, which, I understand, are very good - and fast. Along these lines, Kathi (my leader) and I did a bit of recruiting last Saturday night for one of N.S.A.'s logic circuit design engineers. Understand Dick Best will now talk with him.

NASA at Langley AFB is the other outfit looking for a single-source supplier of modules. My 2-hour demo and talk will prove effective, I hope. I was number 8 to give a talk.

Another promising new customer - Chemstrand Research Center, Durham.

The impossible happened last Friday night when I got a linear variable output from a 4209 FF. Checking out Georgetown University's A-D converter indicated this is possible if one gates the direct set input through clamped inverters driven by the outputs of a 1547 D.A., which is, in turn, driven by varying differential inputs. (Please note that this was unintentional. Moral: Don't assume the customer knows even the most obvious - CHECK!)

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 16, 1962

J. Burley, DCO (cont'd)

To eliminate confusion re the division between Dave Denniston's and my sales area, the following map is offered. This is meant only to be a guide - the dotted line is penetrable when necessary.

I suggest we all prepare for the tidal wave of work that typically follows the N.Y. IRE. Clear your desks, sooth present customers, and stock up on aspirin. It's going to be a whopper.

F. Kalwell

The Bruning Stars reproduction machine has arrived and is operational in the Drafting Department - total cost of the machine is $6,575.00.

Brand-Rex Corporation has supplied ribbon cable at a cost of $98.00/M feet. They are approved as a source with scheduled deliveries of 10,000 feet on March 20th and 15,000 feet one month hence.

Bank Vault Service and Lock Co. has supplied a Meilink floor safe for the Accounting Department at a cost of $725.00.

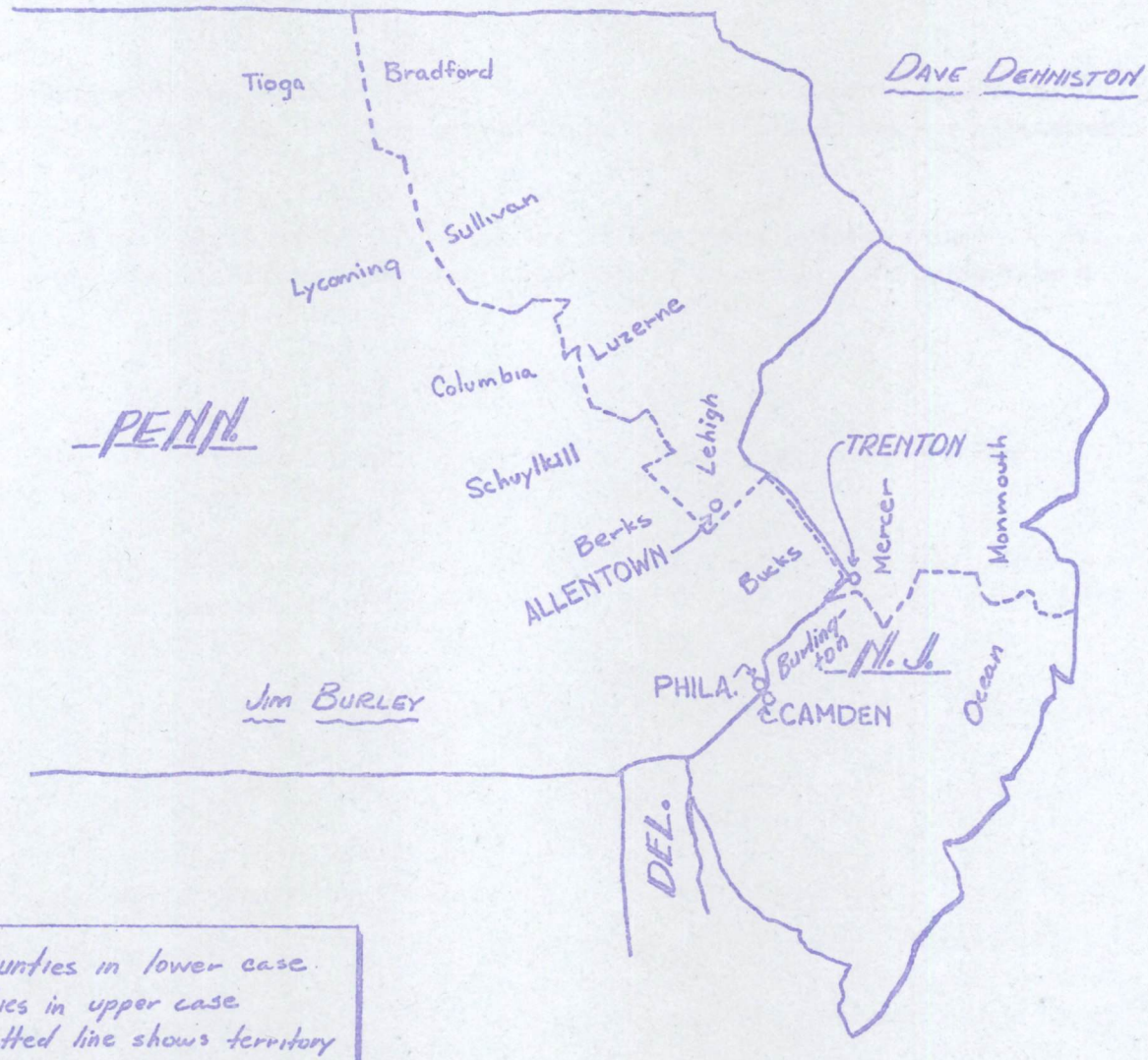
J. Koudela

Introduction of Mrs. Beverly A. Clohset (Programmer, Sales Department)

Although Beverly started at DEC about two months ago, it appears to be important to formally introduce her at this time. This is because her work at DEC is involving more and more personal contact with other DEC employees and many of these have not had the opportunity to become acquainted with her.

Beverly graduated Cum Laude from Central Michigan University with a Bachelor of Science Degree in Mathematics. She is a member of Kappa Mu Epsilon (honorary mathematics society) and Kappa Delta Pi (honorary education society). Prior to coming to DEC, Beverly taught mathematics at Clarenceville High School in Michigan. She is married, has one son, and her husband is a lieutenant in the Army Finance Corps at Fort Devens.

As a full-time programmer for the PDP-1, Beverly is organizing, building, maintaining and distributing the program library and will soon be developing and conducting formal programming courses for prospects, customers and DEC personnel. Because of this activity, she will be one of the primary users of DEC's own PDP-1.



TERRITORY DIVISION BETWEEN NEW YORK & WASH. OFFICES

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 16, 1962

R. Lassen

Our current personnel requirements are:

1	Clerk-typist	M. Sandler
1	Clerk-typist	J. Myers
1	Secretary	A. Blumenthal
1	Draftswoman	
1	Technical typist	R. Hughes
Open	Assemblers - female	
Open	Technician Trainees	
Approx 4	Wiremen	M. Sandler
4	Technicians	R. Hughes
1	Wireman	Model Shop
1	Technician	Model Shop
1	Technician	R. Savell
2	Wiremen - Technicians	G. Bell
1	Sheet Metal worker	Model Shop
1	Adm. Asst.	N. Mazzarese
1	Computer Check-out Tech.	A. Blumenthal
1	Electrical Engineer	R. Hughes
1	Electrical Engineer	R. Savell
1	Electrical Engineer	J. Fadiman
3	Electrical Draftsmen	
1	Mechanical Draftsman	
1	Purchasing Expeditor	
1	Mechanical Inspector	
1	Jr. Cost Accountant	
1	Office Services Supervisor	
1	Switchboard Receptionist	
1	Personnel Assistant (Male)	
1	Receiver	H. Crouse
1	Mechanic	L. Prentice
1	Tool Crib Attendant	L. Prentice
	Custodians - Maintenance	J. Culkins and G. Brown
1	Matron	

We are also trying to make contact with Engineering Writers, Programmers and Field Service people.

We have added the following people since the bi-weekly of February 16:

1 Shipper

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 16, 1962

R. Lassen (cont'd)

1 Computer Check-out Technician
1 Electrical Engineer
1 Engineering Writer
5 Assembly - Female
3 Technician Trainees
2 Cost Clerks
2 IBM Operators - Female
2 Wiremen
1 Purchasing Expeditor (Male)
1 Programmer
1 Administrative Assistant
1 Mechanical Inspector

Offers have gone out to three graduating Electrical Engineers - only one has expressed interest thus far.

We also have good prospects for Junior Cost Accounting, Tool Crib Attendant, Electrical Engineering Maintenance Mechanic and Switchboard-Receptionist.

The next two weeks will be pretty well taken up with recruiting for Technicians at the local technical schools and then to IRE.

We are currently drafting job and wage structures for all remaining non-exempt categories. Barbara Charnock is now in the process of taking an area wage survey of non-exempt clerical jobs which are most applicable to our own clerical structure. I will feel more at ease when this project is completed because it will enable us to continuously evaluate our wages with respect to the specific responsibilities of each non-exempt employee. Please bear in mind that the evaluation of an employee's responsibilities with respect to the job description structure is a continuing thing. It is not something to be done periodically "when time permits" and it is not related to individual performance or merit rating.

Barbara Charnock

On Thursday, March 15, 1962, DEC held the March meeting of the Twinbrook Personnel Association in the Executive Dining Room.

I was quite pleased that the attendance was greater than it had been at the past couple of meetings. Part of this was due to the fact that advance notice had gone out to all members that Maynard Sandler was to be the guest speaker and inasmuch as Maynard is known and respected in many of our neighboring industries, several people attended that have not attended previously.

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 16, 1962

Barbara Charnock (cont'd)

Maynard spoke on the subject of "People and Production" relating to Personnel. We always have a speaker or a combination of a speaker and moving pictures at each meeting, but of those that have spoken previously, I felt, along with several other members, that Maynard offered a more interesting and informative speech.

Maynard stressed the importance of while automation is here and becoming more and more a part of industry the human element will always be an important factor. He brought out the factors involved in cycle - time relating to productivity and I was quite surprised at the reaction in that the general feeling among many personnel people had been "Fill the job openings and let production worry as to how the people are going to turn out."

These monthly meetings have enabled me to learn a lot about the variance in personnal procedures within different companies. The DEC policy of always trying to get people that will "Reflect the Company Image" and not becoming panicky and lowering our standards at times when the proper personnel are not readily available, has resulted in our not having some of the problems and personnel turnover that other companies are experiencing.

J. Atwood

The end of the DIGITAL MODULE CATALOG job is in sight. This has been a back-breaker, as I think you will realize when you see the completed book. Nothing less than the complete cooperation of Dick Best, Barbera Stephenson, Bob Beckman, our free-lancers, and the entire gang in the Advertising Department would have let us accomplish this project in the required time. While it really isn't fair to single out anyone in our group, I think we are all agreed that Frank Howland did a truly remarkable job of ramrodding the paste-up portion of the job.

A 5000-copy reprint of the LOGIC HANDBOOK, with the "Supplement" incorporated, is in the works. Like the catalog, this is due for delivery in time for the I.R.E. The PDP-1 MANUAL is next in line for reprinting. This one has strung out a bit because of the number and nature of the changes which have to be made. However, the pressure is on.

The I.R.E. booth is "different" - to say the least. Our plans for a real in-depth display utilizing the extra space behind our booth went up in smoke when we figured out how much of that extra space would have to be set aside for literature storage. What we expect to be a day's supply of catalogs will make a pile some 8 feet wide by 6 feet deep by 6 feet high. We also seem to be a bit short of some products we had hoped to exhibit. So we will probably have to confuse them with our footwork.

Next big one - the Spring Joint Computer Conference and the introduction of the PDP-4. It looks as though we will have a chance to pull out all the stops on this one, and that

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 16, 1962

J. Atwood (cont'd)

presents an interesting and appetizing prospect.

We are all looking forward to the move to Floor 3. This will be our first chance to get sorted out since we moved into our then commodious accommodations on the First Floor.

dec BIWEEKLY REPORT

COPY NUMBER 2

DATE March 2, 1962

J. Cudmore

EN 1000	90%
EN 1026	10%

Like everyone else, I have had my turn with the cold "bug" and spent three days out last week. I am currently embroiled in the task of checking, correcting and following up all the test data sheets. I never realized so many similar circuits could be checked in so many different ways. When this project is completed, all similar units will be tested in a consistent manner and, hopefully, the test data sheets will reflect this. Many testers have been changed slightly and a few have been redesigned.

E. Harwood

The Beckman #1 machine was shipped out on February 28. This was approximately two weeks late according to the delivery date we had planned on. This machine was in the best physical and electrical condition of any of the machines we have shipped out to date. It also was the first one to have a true DEC acceptance test performed on it. I hope it arrives in good condition after being on the road for about ten days.

The ADX-0 machine is still in the house under checkout. We hope to be able to ship this machine out on March 2.

The CRC #1 machine is in checkout. It has most of its options on it at the present time. We are currently missing the multiply/divide package and some assorted modules. Also, the in-out indicator panel is still missing on this machine.

The CRC #2 machine is still in final assembly and wiring stage and it is missing a number of its options including multiply/divide and sequence break system. It also is missing the in-out indicator panel and a large number of modules. It is, at this moment, approximately one week behind in its schedule.

The SRL machine is also in final assembly and wiring and at the current time it is approximately four days behind schedule. We are missing a large number of modules on this system also.

The ADX-4 computer is on schedule at the moment, but a general consensus is that we under estimated the time involved to checkout this machine, so unless we can speed up the schedule, there is a possibility of it being late.

Status of modifications for BBN in Cambridge - At the present time, we are in the midst of trying to get the new memory system working on the BBN machine. I have brought the old

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 2, 1962

E. Harwood (cont'd)

system back to the plant for modification and we will take that down and install it in approximately one week. I figure at this time that we are at least two weeks behind the schedule Andy quoted to BBN which said that we would be done with the memory and mag tape by March 15.

H. Crouse

A commitment was made on February 28th to Potter Instruments for 20 Tape Transports; delivery to begin May 15, 1962 and to continue at the rate of 2 per week. Total cost $130,000.

The receiving department for all engineering and production materials is now located in Building #5.

New books available in Library:

A.S.M.E. (Edited by W. A. MacCrehan) "Small Plant Management"
This book is based on a systematic study of small plant activities in different industries by the Small Plant Committee of the ASME. It provides a wealth of information on such aspects as small plants as economic units, management tasks, solving important problems of small plant management, and the future of the small plant. The revised Second Edition brings you abreast of major developments in the field ... helps you achieve a balance between time-honored techniques and more modern devices for better management.

A.M.A. "The Commercialization of Research Results"
In this report, executives with experience in all phases of long-range planning and research management discuss the various aspects of a successful development program. All these papers were originally presented at a special conference on "Commercializing Research Results," held by AMA's Research Development Division at The Hotel Roosevelt on January 10-11, 1957.

A.M.A. "Executive Committee Control Charts"
The DuPont Chart System as applied to systematic reporting of key data to the executive group by the financial staff of the company.

Graf, Rudolf F. - "Modern Dictionary of Electronics"
Electronic Terminology and their functional definition.

Honig, Jacobs, Lewin, Minrath and Murphy (Compiled by) "The Van Nostrand Chemist's Dictionary"
Brings together the information most needed by the chemist of today. It covers

dec BIWEEKLY REPORT

COPY NUMBER

DATE

H. Crouse (cont'd)

such terms as inorganic and organic, analytical and physical as well as industrial chemistry and chemical engineering. Also covered are the chemical elements, radicals, ions and type-compounds, reflecting the latest terminology in naming compounds of silicon and phosphorous.

National Electronics Conference, Inc. - "Proceedings of the National Electronics Conference, 1961 Vol. 17"
This volume contains the technical papers presented at the 1961 National Electronics Conference, International Amphitheatre, Chicago. The papers cover the following areas: Communications Systems, Optical Communications, Space Communications, Antennas, Microwaves, Network Theory, Solid State Devices and Circuit Microelectronics, Applications of Ceramics, Bionics, Digital Control Systems, Digital Data Transmission and Logic and Switching Theory.

Philosophical Library - "Modern Computing Methods"
This book, written by members of the staff of Mathematics Division, National Physical Laboratory, Teddington, Middlesex, is intended to serve two purposes. First, it is a working manual for all scientists and engineers who engage in computations which are not of a trivial nature; second, it provides a basis for courses in numerical analysis at universities and colleges of technology.

Shigley, Joseph Edward - "Theory of Machines"
Part 1 is written both for the student of engineering and the practicing engineer. It gives the reader a solid background in mechanism analysis. Covering the field thoroughly, it stresses basic theory and builds strong methods of analysis. A strong feature of Part 2 is its use of the unit vector approach from the beginning to determine the static and dynamic forces in machinery. This method is of great value for analyzing static forces bearing reactions in gear trains composed of spur, helical, bevel, and worm gears. It is also used for the dynamic analysis of linkages, including space mechanisms, and to introduce momentum concepts.

U.S. Department of Agriculture - "Wood Handbook"
Basic information on wood as a material of construction with data for its use in design and specification.

A College and Technical School Catalogue Shelf is in the process of being organized in the Library. Particular emphasis will be given to information from schools offering courses related to our activities at Digital, in order to serve those people interested in furthering their education via our "Tuition Refund Plan."

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 2, 1962

J. Fadiman

Memory Tester and Core Tester Sales (Japan)	(EN 1037)	50%
Memory Tester and Core Tester Sales (U.S.A.)	(EN 1037)	10%
Special Systems Sales	(EN 1038)	10%
Memory Tester 1516F Checkout	(EN 2123)	5%
Follow-up work on Memory Tester 1516D	(EN 2122)	10%
General administration work	(EN 1000)	15%

This Bi-Weekly Report covers the last three weeks. The first of these three weeks I spent in Hong Kong installing the Memory Tester 1516D for Ferrotec, Ltd. The system arrived there on time with no damage, and was installed with no serious problems. The only things wrong were a few minor revisions that are necessary in the drawings, which are now being taken care of.

The following week I spent in Tokyo, Japan. The people there are interested in our Automatic Memory Plane Tester 1516 and our Automatic Core Tester 2113. I visited eight major manufacturing companies who were interested in buying our Memory Tester equipment and three trading companies who are interested in being our representatives. The Totsuka Plant of Hitachi, Ltd. are purchasing a Memory Tester 1516 and a Core Tester 2113 with Ramsey Handler. We are now in the process of making this equipment for them. The next most likely company is Mitshubishi, which is probably the largest engineering concern in Japan. It is almost sure that they will order two machines sometime in the Spring. It is expected that Nippon Electric Co. will also order a Memory Tester and a Core Tester sometime this Summer. They do not yet have the money approved in the budget. Tokyo Electronics Company (TDK) is, perhaps, the largest manufacturer of memory cores in Japan. They expect their business to increase very rapidly and are going to need more equipment in addition to the Reese equipment which they already have. They are very likely to buy both an Automatic Core Tester and a Plane Tester from us. Fuji Electric Company will also need a Core Tester and a Plane Tester in about three months, and their preference is to buy DEC and not Reese. Other people who are interested in our equipment, with whom I visited, are the Oki Research Laboratory, the Central Research Laboratories of Hitachi, who wish a somewhat improved Memory Tester and Core Tester, and Toshiba (Tokyo Shibaura Electric Co.), who are interested only in our Automatic Core Tester 2113.

The conclusion is that we ought to sell about 8 to 10 machines with a total volume of business of $400,000 to $500,000 within the next 18 months. All of the companies will definitely send an engineer to this country to learn about our machine during the time of checkout. Prices were quoted directly to the companies involved and all engineering discussions will be held directly between the companies involved and DEC whether or not we deal through a trading company. The trading companies with whom I talked are the Rikei Trading Co., the Nissho Trading Co., and Shoshin Shoju, Ltd. Of these three, probably

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 2, 1962

J. Fadiman (cont'd)

the best and the one most likely to do a good job for us is the Nissho Co. However, no trading company can take the place of direct discussions between DEC and the engineers of the companies involved and good service done by DEC and the engineers from the companies who will buy our equipment. Reese has sold a good deal of equipment in Japan. I believe there are about ten Systems there. All of the companies are dissatisfied with Reese equipment because it does not work well according to the original specifications. Also, the after-service, as the Japanese call it, is very poor. This is the thing that has hurt Reese more than anything else. I think we can do a good job of following up and selling our equipment there and showing them that not only do we make good equipment which is reliable, but that we will make sure that it is well maintained.

During the time that I was in the Far East, the first new Automatic Core Tester 2113A was shipped to Ampex Computer Products Co. on February 14, 1962. The report from Ken Larsen is that Ampex is extremely happy with this machine and there are no problems. In addition, the Memory Buffer 2007-4 was shipped to Fort Monmouth on February 21, 1962. The report from Fred Gould, who was handling this, is that there are no problems there either.

The Memory Tester 1516F for the Burroughs Corp. in Philadelphia has been fully checked out during this week and will be shipped today. Very little checkout time was required on this machine. I guess our techniques are finally improving. The Memory Buffers 2009 and 2007-5 have been completely wired and all mechanical parts have been completed. We are only awaiting plug-in units for final checkout. Wiring on the Core Tester 2113C for Germany is about 75% completed, and this machine should be ready for shipment by March 30.

New Business

The people from General Electric in Syracuse, N.Y. were here and they are definitely going to buy a Memory Tester 1516 with some improvements. Price will be in the neighborhood of $55,000 and the purchase order should be received within a month. They are also interested in an Automatic Core Tester with six drivers and completely flexible programming such as we have in our programmable Pulse Generators 2108 and 2110. We will figure out what the System will cost and make them a proposal next week. Chances of making this sale are also very good. We are making an Automatic Core Tester 2113E for General Electric Co. in Phoenix, Arizona. This is a standard machine with only slight changes in the programs. We are also going to do a job for the Foxboro Co. This involves a PDP-4 Computer, which Gordon Bell is taking care of, and a good deal of additional equipment which the Systems section will provide. The quotation for the Systems parts of this will be given on Tuesday. In addition to these new orders, we have 8 or 9 machines under construction at the present time for delivery during the Spring. I expect that the Japanese business as well as some new systems will start coming in during the early Summer.

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 2, 1962

J. Burley

However slight my contribution this first time to the "Bi-Weekly," I shall at least pay my respects to this very strategic effort. I believe it to be a promising and proven solver of the old communications problem.

Lora has been giving her, now routine, "above and beyond" performance, as secretary to the DCO manager by phoning customers and prospects. This office has been without an active manager for the entire month of February, indicating the need for much catch-up and renewed aggressiveness per the Beckman manner.

With the background of the "electronic wastelands" of the Southwest, the leads on my desk now are enough to make the writer drool. The next report from DCO should be filled with more regarding the finite activities with customers and promises to be more interesting reading for those interested in profit and loss.

One suggestion - in correspondence originating from Maynard, I suggest the clear distinction between "representative" and "area office". I suggest our three field offices be referred to as "local office" or such. There is no argument that a factory man can better serve a customer than a representative and the customer knows this, hence the desirability of taking advantage of the fact that we are successful enough in some areas to justify a full office force.

I extend my sincere thanks to the scores of folks at Maynard who made my first month with DEC everything I hoped it would be.

K. Fitzgerald

100-00	General Overhead Sheet Metal	80%
1000	General Engineering	10%
1076	ITT Consoles	10%

Since the last Bi-Weekly report we have hired an additional man in the Sheetmetal Shop to set up the procedures of layout, setup work, and machine operation, which was discussed in the last Bi-Weekly. We hope to start getting this setup rolling within a very short time. This will undoubtedly improve our quality and possibly the quantity of our work.

For the past month or so we have been having our SPU handles hard anodized at Duralectric Corporation in Natick. This should eliminate the problem of corrosion which was evidenced by Steve Lambert on the Geotech machine and it should also eliminate scratches and blemishes after the unit has been used three or four times. We have only had one problem with this process to date and that was because after the handles are sanded they are shipped

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 2, 1962

K. Fitzgerald (cont'd)

out wet from the coolant used in the sanding machine. If they dry out in shipment before they are anodized, they pick up stains and corrosion spots that cannot be removed in the anodizing process. We have changed our method of shipping so that these should remain wet and therefore eliminate this problem. However, we had to take back and resand about 6000 handles on February 28th.

The cabinet assembly shop is fast becoming a reality. The space in Building 5 has been allocated for it and the plan drawn up. Electricians are about 90% complete with their work. Carpenters are complete with their work, and all that remains to be done is to receive the tools and equipment necessary so that the Shop can be set up and operated. We are sending Eddie Mayall from Sheetmetal to run this new Shop. He will be assisted by Jack Grieves and John Mancini.

We are currently experiencing some difficulties in delivering computer cabinets to wiring assembly on time because we do not have the cabinets. The vendor supplying these cabinets has been working on a very tight schedule and has just not been able to meet our required delivery dates. We have contacted him and asked him to send in some partially completed cabinets so that we can finish them ourselves in time to catch up on the backlog. These cabinets are due in today, March 2.

The new Tool Crib is coming along nicely and we should have that in a semi-operational stage within a week and a half. Dave Nevela, our Co-op student from Northeastern, is setting it up for us. We hope to be able to hire someone to operate this area before Dave goes back to school.

R. Doane

VHF Multivibrator	50%
Solid State Circuits Conference	30%
Miscellaneous	20%

Biweekly Report 2/16

The first design of a multivibrator for generating standardized 2 1/2 volt 10 μsec pulses can be tested soon, as preliminary design is completed and construction is well along. The reactances in the circuit will be scaled by a factor of 10, so that the repetition rate of 3 Mc maximum will simulate 30 Mc operation. This measure will allow refinement of circuit geometry and proof of design soundness in a general way without requiring the solution of all stray reactance problems from the start. The multivibrator is expected to provide the only source of tightly standardized pulses in the VHF line (the gated pulse

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 2, 1962

R. Doane (cont'd)

amplifier re-standardizes amplitude but not width). The circuit should provide the clock, delay, or pulse generator functions without modification. Period of the one-shot will be remotely controllable without sending VHF signals to the remote controlling location. The output pulse width is to be standardized by R and C rather than by R and L, to limit tolerance to an acceptable amount.

The International Solid State Circuits Conference in Philadelphia left me with some impressions about the directions in which new developments are proceeding, based on the presentations of 15 of the 45 papers, discussion sessions in the evenings, and conversations with other engineers. These impressions are summarized here:

1. Microminiaturization: The emphasis seems to have shifted in two ways.

   A. Motivation for microshrinkage is increasingly from the wish to reduce the time required to communicate from place to place in a large fast system. Results already obtained seem to have relieved the pressure to reduce the weight and size of small systems that fly; this seems to be implied by the fact that I never heard anyone mention satellites.

   B. The inevitable transfer of attention from the size of components to the size of interconnections between components is taking place. Nobody any longer measures a single component to calculate how many could be contained in a cubic foot. The wild dreaming originated by the invention of integrated circuits seems to have abated. Thin film multiple-function circuits are very much a current interest, but there is a growing awareness of the need for practical methods of interconnection which can take advantage of size reductions without hamstringing test and maintenance, to say nothing of ease of production and reliability.

2. Digital Speed:

   The largest number for maximum bit rate claimed to have been achieved in the laboratory is 1.2 Gc. Along with the increased maximum measured rate under ideal conditions, there seems to be increased emphasis on the problems of utilization. Nobody claims to perform any useful function at 1 Gc, and the fastest speeds claimed for usable systems with the best tunnel-diode circuits is about 150 Mc bit rate. The fact that bit rate is far from a complete characterization of usable calculating speed is being recognized, as more people plan practical uses for the circuits.

   Of all the systems of logic circuits proposed, a simple elegant scheme by IBM impressed me as being the most useful for solving real problems. Significantly, no number was given for the simple bit rate of these circuits. Delay per stage and "fan power" (a composite of fan-in and fan-out) as well as the time of 0.45 μsec for 64 bit floating point multiplication measured in a system with 20,000 transistors

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 2, 1962

R. Doane (cont'd)

was quoted.

3. New Areas:
   A. Distributed logic
   B. Snap-off diodes
   C. Conductivity modulation in semiconductors by electric field control.

Biweekly Report 3/2

VHF Multivibrator	70%
Interviewing Job Applicants	10%
Finding Loading Characteristics of 1201	10%
Miscellaneous	10%

Tom Russell, a senior technician who recently has done design work on magnetic core shift registers at Sprague, joined us a week ago. For some time he will be occupied in collecting data on several of our standard products, as follows:

1. Delay and transition times for Flip-Flops and inverters as a function of loading.
2. Detailed data on terminating resistance vs length and configuration for cables carrying high-current pulses (52 and 62 Drivers).
3. Speed vs current for Current Drivers; also output capacitance vs output voltage; also speed vs transistor F_t.
4. Speed measurements on VHF circuits; also loading characteristics.

At present, data on 1201 flip-flops is complete.

Design of the VHF multivibrator has been tested partially at scaled-down speeds on the bench. After several changes in the circuit, printed wiring layout for the circuit has been completed.

Use of a new transistor from G E promises to solve the problems of pulse rise-time experienced in the present logical gates, and also allows increased flexibility. The next step is to make a new wiring layout, and try this new circuit.

L. Prentice

1000	85%
1067	5%
1069	5%
1050	5%

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 2, 1962

L. Prentice (cont'd)

Several people have been added to our squad since the last Biweekly Report. Mr. James O'Loughlin, Apprentice Machinist, Mr. Richard Hebden, Sheetmetal, Mr. David Clark, Mechanical Inspection, Mr. Richard Gaboury, Mechanical Inspection.

We are very grateful to have the help of these people, but this only stops the tide for a short period. We are desperately in need of two additional inspectors, a factory mechanic, and a tool crib operator. We have interviewed several applicants for the factory mechanics position but have had no real satisfactory applicant to date.

Building 5: Access way from Building 5 is well under way. This should be completed during the coming week. The new stock room is nearly complete. Delivery of our new lathe has been postponed again. This item was ordered the latter part of November and has now been postponed for the second time. All parts for Color Display have been delivered with the exception of the Operator's Control Panel. All parts for Display 31 have been placed with a vendor or ordered from our own Shops. Delivery of all parts should be complete by March 15. Design work for PDP-4 has been started and is proceeding in Drafting. A pattern has been ordered from Maynard Pattern Works and the Van Amn foundry for a new casting for the Type 30A Display. First casting from this pattern should be in our hands for inspection by March 15th.

A. Blumenthal

EN 1031 100%

The Beckman 1 computer (PDP-1C-15) completed test on February 23. It's checkout was probably the most thorough of any thus far. This was due to the smooth progress of check-out and the fact that we were not pressed for an early delivery.

The acceptance tests required by Beckman were extremely rigorous and consequently compelled us to evolve a procedure which will hopefully be refined and used as routine procedure. Only two troubles occurred in the process, one in the tape reader, caused by inadequate tension on the tape hold down springs, the other a bad flip-flop in the punch logic. The resulting down time was far below the maximum they allowed for the two day period.

Line voltage marginal checking was also done for the first time on this machine. The results greatly exceeded our expectations by permitting operation of the high-speed multiply and divide test down to 65 volts and up to greater than 140 volts.

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 2, 1962

B. Stephenson

Model 2311: The Model 2311 is a 32-channel digital-to-analog conversion system, which we are building for Jack Dennis of M.I.T. It will be used as a special output device for the TX-0. The cabinet frame, wired mounting panels, and power supplies have arrived and have been assembled. Lee Butterworth is presently working out the interpanel connections and the output wiring connections and the actual wiring should be completed early next week. The mechanical design has presented quite a few problems, as Roger Melanson will testify, but we hope it's finalized now. Our customer decided, after the design was nearly completed, that he was not pleased with it and that he wanted to choose the type of output connectors in the manner in which they would be installed. We were also somewhat squeezed for room since all the ladder networks have to be easily accessible for frequent calibration. However, the mechanical drawings have now gone to the machine shop and we expect to have the wiring completed and the modules available by the first of next week so that we can start checkout.

New Module Catalog: The new module catalog will cover 200 items. (All modules and accessories which are for sale, except classroom modules and those with MIL symbology.) The technical descriptions, except for one unit that hasn't been produced yet, have been turned over to Jack Atwood for processing.

Maria Moody, a graduate student at M.I.T., is coming in part time to assist in technical writing and did large portions of the write-ups for the catalog. Betty McElvien, from AID was in for six weeks to help us with the typing (and retyping).

For many of the new bulletins, Marilyn Cunningham has prepared mimeographed copies (with reproducible drawings) which can be sent out to customers upon request between now and April 1. Copies of most of these have been circulated in the Engineering Department.

This new catalog should simplify considerably the process of our giving to the customers the information which they need to know in order to simply and easily implement reliable systems with DEC Modules. There are a number of things we would like to improve, given the time, but for the first time in quite a while, we will have complete, easily accessible information on all of our modules.

All of us who have been working on this project have goals which we hope to accomplish with the catalog. In my portion, I have been aiming at the two following goals:

1. For the old customers and the customers with large systems, a detailed description of special input-output units. These customers need to drive punches, printers, transmission lines, buses and about everything else you can name. One of the advantages of DEC equipment is that we have such a wide line of this type of unit available. However, the customer must

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 2, 1962
Page 12

B. Stephenson (cont'd)

be aware of the unit and must know the voltages, currents, rise times and fall times.

2. For new customers, simplifying possible areas of misunderstanding and petty details. Many things which anyone who is familiar with DEC circuitry takes for granted are not necessarily obvious to the new customer (particularly people in the scientific and industrial control fields who are anxious to get their problem done and not spend time with the instrumentation.) DEC offers wonderful advantages in this line...with the simplicity of the basic logic and all of the built-in safety features which do a lot to eliminate trouble from common laboratory accidents. However, to these people, questions like "Which is the direct input and which is the indirect input?" or "Do the capacitors entitled A, B, C, give me increasing frequency or increasing period?" are just plain annoying. In this area, we are following the style of our first literature and labeling all of the terminals on the logic diagram. We are also adding a control section which explains what is controlled by various capacitors, potentiometers and how it's controlled.

Other Information in Process or Available: Advertising has just completed a reprinting of a corrected version of the logic handbook supplement and it is now in a size which is compatible with our present logic book. This supplement discusses the use of capacitor-diode gating and differentiating level logic. They are presently printing an article on the 1547 difference amplifier and also a short article on the adjustment of the ladder network.

Elsa Newman, with the help of Bob Beckman's elementary logic book (draft) is preparing a logic handbook primer which discusses what is a computer, what is the binary number system, and what is boolean algebra.

An article on BCD number systems and logic is about ready for Jack Atwood to run off on the offset press. An article on combined analog-digital techniques which is still in the draft stage. On the "hoping to get to soon list" is more information on analog-digital conversion techniques.

Customers: Most of the customer inquiries that have been coming up are in the areas mentioned above; however, some of the specific customers which may be of interest are the following:

Edwards Air Force Base: The group there has prepared a request for quote based on their ideal of the logic system, running at 5 megacycles with differentiating level logic. They are interested in what appears to be well over $100,000 worth of modules and Ted Johnson has been working quite closely with them trying to sell them on our type of logic. I wrote an article to go with our "no bid letter" describing the advantages of our logic and our modules and I hope that some time I will get a chance to edit this for use as a general reply for this sort of inquiry.

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 2, 1962

B. Stephenson (cont'd)

Boeing: They are one of our biggest customers, handled principally by Rush Drake Associates and Ted Johnson. Recently, they have run into some problems where they needed additional load resistors and so the model shop made up several of our model 1000's which were shipped off to them in quite a rush. They have also been having some problems with the 4213's used as buffers. They found a solution with series resistors between the pulse inverter and the pulse input. Don White is checking this out to see how reliable it is and if it isn't of course we will replace their 4213's as quickly as possible.

United Aircraft: This group is building a format synthesizer which they wanted us to build on a system basis, unfortunately, we had to turn it down, but it seems quite certain that they will go ahead and build the system themselves with DEC Modules. The principal reason is that the format synthesizer must be compatible with DEC Modules. This is quite common among old customers but not so common among the first timers.

Lincoln Labs: As most people around here are aware, Lincoln Labs. have been using our modules for constructing a new type of general purpose computer which they called the Link. They will be building two models, one to remain at Lincoln and one to be used by the Bio-communications section of the M.I.T. Research Lab. for Electronics. Plans for a third Link are now being made. Lou Osborn of the M.I.T. Synchrotron Lab. will be in charge of this Link and the machine will be located at the Cambridge Electron Accelerator, which is a joint project of Harvard and M.I.T.

Notes on Competitors: Raytheon is now selling the modules which they designed for their Air Traffic Control System. They have a very nice looking brochure out on them and also a sort of application's brochure which includes a lovely picture of the Cybratron which they built with DEC Modules.

They have a very interesting analog-to-digital conversion technique which is also described in this bulletin. It uses a variation on the successive approximation technique with N converters and delay lines. The first converter does the most significant bit of all the conversions, the second converter, the next most significant bit and etc. The analog information goes from one converter to the next through delay lines so that the aperture width and rate of conversions per second is effectively the same as the time required for the conversion of a single bit.

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 2, 1962

R. Lassen

We have been spending almost 100% of our time recruiting (making new contacts), interviewing and selecting new personnel. Over the past month we have had very little time for project work and have spent long hours keeping up with routine correspondence administration.

Unfortunately, the "bug" hasn't helped, as Barbara, Margaret and myself have all had a bout with it. Our thanks to Dick Best, Russ Doane and Don White for filling in for us during the M.I.T. and Worcester Polytechnic recruiting visits.

We have had moderate hiring success in some areas. However, several engineering openings still present a problem. Although we have been adding between 6 to 8 new people each week, we still have many openings to fill. I will report on this fully in the next bi-weekly.

Interviewing and Selection

It is a basic fact that the company's strength lies in the calibre of people currently employed. More important, however, the continued strength of the company will be in the people we will hire in the future. Since its start, DEC has maintained rigid employment standards. As the company grows, these standards will become more difficult to maintain because of the rapidly increasing demands for new people. It is imperative that we never lose sight of our original standards, therefore I would like to offer a few basic interviewing and selection reminders:

1. Plan the new job and know what it entails so you will be able to correctly evaluate the applicant's qualifications with respect to the job. Complete job knowledge will also enable you to discuss the job accurately and sincerely with the candidate. Please provide the Personnel Department with as much information about the job as possible.

2. Your questions should evoke pertinent information from the applicant. Questions should be short and designed to get the applicant to "talk freely." Listening and observing are the most important parts of interviewing.

3. Don't cut the interview short. Lack of information and "first impressions" quite often lead to poor selection. A hurried interview gives the applicant a rushed feeling and minimizes the importance of the job.

4. Interviews should be conducted in private, avoid disturbances. An interrupted interview results in lost thought continuity and is unfair to the applicant.

5. Immediately after the interview, jot down your impressions. These notes will be of great value when the applicant is being reviewed.

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 2, 1962

R. Lassen (cont'd)

6. Review carefully all the facts and evaluate the candidate on the basis of your judgment of his attitudes, experience, character, motivation, stability, intelligence, etc. If you have doubts - don't gamble. There will be other candidates.

7. Enlist the advice and opinions of others. Quite often a "third party" can throw new light on the matter.

S. Lambert

After a week's stay at Geotech Corp. in Dallas, Texas, I flew out to Jet Propulsion Laboratories in Pasadena, California to install their Computer. I arrived there on a Wednesday afternoon. The Computer arrived the following afternoon. It stood up well in shipment with the exception of a few loose nuts and bolts and a caster that had fallen off the bottom of the frame. The things that were noticed missing were chairs, paper tape and typewriter paper, which should have been sent along with the Computer. Many drawings having to do with mag tape were also missing.

Thursday was mostly spent setting up the PDP.

Friday began the first day of problems. It was found that the Read-In-Mode tape would not read into the Computer. As a matter of fact, no tape would read into the Computer. A day was spent trying to troubleshoot the problem, and Saturday morning we found that a package used in the AC control logic had a bad connection between pins P and R on the mounting panel. After getting a paper tape to read into the PDP, our next malfunction was with the typewriter. This was traced to a loose package.

Monday morning was filled with complaints from the maintenance men of JPL. Among the things mentioned were that the power control panel was difficult to get at in the mag tape. The control panel cable which goes up to the switches for each tape unit was flimsily mounted. The next complaint was that there was not enough space to move hands near the head of the Potter transport, such that tape could be easily loaded and unloaded. Another complaint was that there was no extra Reader bulb and that a lot of the hardware seemed to be loose. The screws were not tight. Also, Bob Oakley complained that he had the wrong Potter manuals. He complained about the fact that the door can be slammed on the friction pad and that the brake friction on the lower wheel of the #1 transport was very tight. On the same transport, the rubber around the door was broken loose. The doors themselves, because of the plastic clips, do not shut and stay shut. Oakley also mentioned that he would wish to have the reel for rolled paper tape on the teletype punch.

Tuesday was a day for checking out the PDP central processor. It was found that the sequence break did not work under program control. This was traced to a package missing in 3J9, the

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 2, 1962

S. Lambert (cont'd)

IOT for entering and leaving the sequence break package. Also, there was found on package 1C9 a solder shot.

Tuesday afternoon the mag tapes were turned on for the first time; however, one unit did not want to turn on. This seemed to be due to dirt in the power control panel underneath the relays, but it was found that it was dirt in the switch panel that had really caused all the problems. The power control circuits worked fine after cleaning the contacts with a piece of paper.

Wednesday was spent testing mag tape. It was found that the type of tape JPL uses, Audio brand, would wear out very fast on the Potter units. It required that the heads be cleaned every hour or two due to the build up of oxide on the head.

Thursday and Friday were spent writing a program that would patch up FRAP so that JPL could use a mag tape produced on the 1401 IBM machine; as the input tape to FRAP. This program also took data, that was supposed to be typed out on the on-line typewriter, and put it on another mag tape to be read by the 1401 and printed on the 1401's line printer. While writing this program, it was found that the Potter units were not compatible with IBM units at load point. This meant writing a small sub-routine that would make the Potter unit look like it was compatible with the IBM 729 tape drive. Another non-compatible feature was that the Type 52 Control does not have any means of writing an end of file marker. It was suggested that both of these features be incorporated in the 52 Control in future machines.

By Saturday morning I had finished writing the patch for the FRAP assembly program, but it still did not work. I decided to take off for home, feeling a little depressed. The next week I spent scheduling the CRC machine and a few nights on the same FRAP program. It was found around Wednesday, February 21, that Flags 4 and 6 were still wired up to the completion pulses of mag tape. The FRAP assembler program also uses Flags 4 and 6. After cutting the completion pulses away from the flags, I found that my assembler program was working fine. The decision has been made, therefore, not to use flags with the mag tape 52 Control.

Wednesday afternoon, February 21, I took another "good will" trip back to JPL to clean up the assembly program for them and describe to them the operation of mag tape and the other IOT's commands.

Thursday we found that magnetic tape units were still having problems. The 52 Control was not getting all the information over into the current address register. This was traced down to a package in 1H14.

dec BIWEEKLY REPORT

COPY NUMBER

DATE March 2, 1962

S. Lambert (cont'd)

Friday was another day of "bugs" with mag tape. It seemed that it was occasionally getting parity errors and missing characters. It wasn't until Saturday that we traced down a differential amplifier in one of the Type 50 units that takes the Read signal from the Read head. The gain of this amplifier was varying in amplitude. The remedy was to replace the differential amplifier. Another problem found with the same mag tape unit was that the tape guide had been tarnished and was wearing oxide off the tape, making the pinch rollers work harder. We replaced the guide.

Saturday afternoon everything was working fine except that the punch all of a sudden stopped punching paper tape. It was found that a spring on the feed pall had broken, and there was no spring immediately available. However, this did not affect the operations at JPL, as we were using mag tape extensively for everything. Instead of punching paper tape, we used a general purpose sub-routine that wrote onto mag tape instead of punching paper tape.

Sunday we spent time on problems of the Mariner Space Shot. Max Seamons mentioned that the PDP will be used in this space program as a prime data link for telemeter information coming from the satellite which is to be pointed at Venus. Data will be coming back to JPL from various tracking stations for many days. This will be a good test for the reliability of our Computer.

While talking with Ted Johnson at the California office, I found that he is not getting informed on the events happening at DEC in Maynard. He has not had much documentation at all in the line of our options. He did not know such things as a disc file being hooked onto the Itek machine or the fact that we had Anelex and Telex line printers on order. He complained a great deal about the documentation in the option area and the fact that we really don't have a good sales package describing in detail our options, especially in mag tapes. This same complaint was registered at Jet Propulsion Laboratories by Max Seamons, Tom Miller, Bob Oakley and Bill Sholey. If we had proper documentation, we would have had a good chance of selling a system to JPL, which would contain two PDP's interfaced with a disc file to a 7090 having on both machines three high speed channels and on one machine 25 line units. On the other machine, 5 operator consoles operated through a sequence break interrupt system along with paper tape punches, readers and typewriters on both Computers with card reader, card punch options on one of the machines. There were to be six 729 IBM mag tape units used through a control similar to a 52. As it turned out, IBM is building a system to operate these various IN-OUT devices.

After my second trip to JPL, they seemed to be pleased with the Computer, excluding some of the difficulties that they had. They were greatly relieved to have a means of preparing programs with their off-line key punch machines.

dec BIWEEKLY REPORT

COPY NUMBER 2

DATE February 16, 1962

H. E. Anderson

"RESPONSIBILITY"

Our present heavy commitments have led us to examine the way in which responsibility is assigned within DEC. Of particular interest is engineering and marketing responsibility for new products. Many of the concepts that are evolving also apply to the service parts of DEC. The idea is to create an environment in which the individual who is capable makes a proposal for the piece of work he wants to do. He attempts to sell the idea to his supervisor, based on its reasonableness, potential profit to the company, return on investment, etc.

Emerging from this is a person who might be called a "project leader." (Ben Gurley has called him a Computer Order Manager (COM) when the project is a particular customer's computer system.) The name "project leader" as used here has a specific meaning which unfortunately may not agree with the mental image most often associated with the phrase. A new name is needed as soon as a suitable one can be found.

He is essentially a manager who is able to plan and carry out specific pieces of work. In a completely ideal situation, he would select a project of his own choosing and make a plan which is submitted to his supervisor for review. If it is approved, he is then at liberty to carry it out with minimum intervention from other activities. A typical plan would include such things as a schedule, cash requirements, sales forecast, profit forecast, etc. A plan would be approved or disapproved depending on how well the manager had done on previous projects that he managed, the reasonableness of the plan, the compatibility of the plan with company goals and resources, etc. Assumptions that engineers or any other personnel would automatically be provided when required would be regarded as unrealistic. Plans would include training of personnel, return on investment, etc.

Relationship of such a project to other activities of DEC would be of a buyer-seller type; i.e., one could use any of the services or resources of DEC if he can arrange a suitable purchase arrangement for the services. Assuming that they have not already been committed is dangerous. The accounting would be such that charges would be made for these services. No artificial constraint forcing a manager to use internal services would exist.

Most of the above is slanted toward new products, but it can also apply to less complete tasks of a shorter time duration than most new products. There is much to be gained by the responsibility concept even if the profitability aspect is temporarily ignored. If a man's professional reputation and success is determined by how well he schedules and executes a job, he will give it better than average attention. An environment where the responsibility is unduly confused is perfect for neglect. Typical projects with respect to the PDP-1 are specific customers' computers, options such as magnetic tape or display, line units for ADX, basic computer checkout. Other typical projects are the PDP-4, training modules, and memory testers.

DF633 DIGITAL EQUIPMENT CORPORATION · MAYNARD, MASSACHUSETTS

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 16, 1962

H. E. Anderson (cont'd)

Most of these projects lend themselves to further subdivision into projects of smaller size and probably shorter duration. Success on these can be judged by such factors as satisfactory technical solution, state of documentation of results, completion time versus planned schedule, cost of task versus planned cost. As the project techniques become more sophisticated, the manager will be expected to "sell" at a profit, even on an internal basis. At this point, return on investment, etc., are also factors. Smaller projects serve as training grounds for managers to start growing.

Many jobs normally regarded as functional responsibility such as computer checkout, drafting, field maintenance and even sales can be regarded as a service to be utilized or not utilized depending on how well it is carried out, its availability, its cost, etc.

A project engineer who is responsible for a particular customer's computer would not necessarily carry out all the work involved himself or even with people working directly for him. If the customer's computer were a totally standard PDP-1, he would in all probability find it desirable to have it manufactured by the regular production group, checked out by the PDP-1 checkout teams, and perhaps field installed by a DEC service group now being established. If all computers were this straightforward, the project engineer concept would have little importance to customer computers.

Frequently a customer's computer has extensive special equipment. In this case, the project engineer would probably elect to have all the routine things done as in the example above, and his attention would be focused on the design, projection and testing of the special equipment. Parts of this work may be purchased from internal sources if they have the capacity to do the work and are available. If no sources are available to do the work, the project engineer is not relieved of his responsibility. He was in on the planning of the job from the beginning. Hopefully, he has progressed successfully through jobs of increasing scope, so that he never finds himself in a situation for which he is totally unprepared.

Some of the present heavy commitments of DEC could undoubtedly have been avoided if this type environment had been in existence during the last year. The solution to the present situation undoubtedly lies in clarifying the responsibility for the work to be done. If this is done carefully with an eye to the ultimate direction that we wish to go in, much can be accomplished.

The purpose of all of this is to create an environment where potential managers can grow and assume increasing responsibility. The engineer-manager is a highly desirable and necessary combination. Every DEC engineer is already a manager to one degree or another. As a minimum, he is a manager of his own time in carrying out the work assigned to him. He is called upon to sell his ideas for how to get the job done. All of life has these same

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 16, 1962

D. Denniston (cont'd)

in Cincinnati, Ohio. These people were one of the prospects I spoke about from the A.I.E.E. Show. They do seem quite anxious, and I feel that they are a good potential new customer. I might mention that I am in the process of preparing another application as a direct result of the A.I.E.E. Show.

I accompanied John Koudela and Pete Bonner to Lockheed Electronics in Plainfield, New Jersey last week, as a result of a request from one of the people there that someone get out there to discuss the PDP-1. They are very interested and the prospects there look very good for possible future systems.

We have also received another request from Curtiss-Wright in East Paterson, New Jersey for a price and delivery quotation for the PDP. So, it sure looks like they are still interested.

As you might expect, I have also been out to Bell Labs in both Murray Hill and Whippany on more than one occasion in the past two weeks. One of these trips was to again help some of the people in Whippany with our logic. Another was to help one of our customers out with some trouble he was having with the 110 Diode Gates he has. The problem seems to be a combination of poor gates and improper logic.

We have heard several complaints recently from the people at Bell Labs and Republic Aviation concerning our power supplies, mainly the 710. They feel that the prices of our supplies are very high considering what these power supplies contain. They have indicated to me that the ordering of these power supplies would definitely be kept at a minimum hereafter, and one group has mentioned that they would be getting their power elsewhere.

I also took another trip out to Republic Aviation in Farmington, Long Island last week. They are having trouble with their 721 Power Supply. It seemed that they were getting large spikes out of the -3 and -15 volt outputs and that these spikes were even intensified by just lightly tapping the supply. Hopefully, that has been cured. How?

Our "Hand-Holding" days are far from being over. We still have quite a few uncompleted orders. Our old customers seem quite a bit more patient than do our new customers; and it is these new customers who have us a little concerned. We have made arrangements with a few of them to loan them equipment until theirs is delivered. This has kept them somewhat subdued, but certainly not out of the picture.

S. Lambert

Installation of the Geotech PDP Computer

Last Monday night, January 22, the computer arrived in Garland, Texas intact after travelling through sub-zero weather. By Tuesday afternoon of the next day, the computer

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 16, 1962

S. Lambert (cont'd)

had been uncrated and placed in a location near a 224 volt output plug. While the in-out equipment was being plugged in, the masking tape on the back of the mounting panels holding the plugs in, was removed. However, when the tape was removed more than half of the digital labels fell off the back of the modules. This was probably due to the cold weather affecting the bonding of the glue to the aluminum. While removing the masking tape, it was also noticed that a small oxide coating was covering many of the aluminum module handles. When looking at the printed circuit boards, it was noticed that the printed circuits had oxidized slightly as the solder was not shiny. Also, in front of the computer on the mounting panels, the pin connections did not have a silvery luster due to oxidization.

Within two hours after the computer had been placed in position, it was running, but only in the basic machine instructions. The troubles that occurred were on the mag tape, punch and typewriter.

Wednesday was spent mostly on checkout of mag tape. It was found that in the power control of the mag tape a wire was missing that should go to the remote local switch from a -15 supply on the main frame. Light bulb sensing devices for load point were out, but due to some unknown reason, they came on and I was unable to either shake or cause any malfunction in the system after the lights had come on. While reading and writing with mag tape, it was found that many parity errors were made due to an oscillation in the read amplifiers. The remedy was to put .001 uf capacitors across the read head inputs just before the amplifiers.

The main frame of the computer stood up well under shipment with the exception of a few loose screws and one or two loose modules. No troubles were encountered lifting the tape transport into position on the tape frame. Trouble was found in the reverse-forward controls on the transport control panel. This seemed to be due to dirt in the contacts on the switches.

Thursday was another day of problems. This time it was concerned with the punch and typewriter. The main problem with the punch was it would miss holes directly after the computer had been turned on. The malfunction of the punch was traced to the heavy grease used in the moving parts. This was found by placing the punch in the freezer and cooling it off to a reasonably cold temperature. The punch was then placed on line with the computer and the test was performed. It was found with heavy grease and a cold punch that no holes could be punched directly after the punch had been taken out of the freezer, but as the punch warmed up a few holes would come in and eventually as the punch came to room temperature and above, all the holes would punch. The remedy for this situation was to change the grease to a lighter grade oil.

The customer had a complaint mainly with the tape catchers. It was found that the tape

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 16, 1962
Page 6

S. Lambert (cont'd)

did not fold properly within the box. Instead, it would roll into the box causing a great deal of difficulty. Another problem was that there was no way of putting a finger underneath the tape to lift it out of the box. My personal opinion of the tape catcher is that it should be redesigned along the same lines of the reader catchers. Another dissatisfactory point about the punch was that there is no means of telling a programmer when the tape is low in the punch. This feature already exists on the teletype punch for a roll of tape and could by some means be incorporated for fan-fold tape.

The reader was the only in-out device that did not cause any problems at the installation.

The typewriter worked fine for the first two or three days, but on Saturday it was found that a transistor in package 3H1, memory buffer decoders A3, went bad. It appeared to be that the Beta dropped considerably enough so that a typeout pulse could not be gated into the associated PA.

While looking through the machine, it was found that two packages were missing. One package, which is located in R 3H1, a 4113R, is used for reader return combined with sequence break. The other package, which was a Geotech modification, was in 3K15 and it was a 4603. Only one PA was used in this case and did not affect the central machine. One of the most disturbing factors of all was when I found a diode (662) that had split in half in one of the packages in the write amplifier in mag tape. This was due to the fact that it had not been relieved.

By Saturday afternoon the main machine and its optional equipment were working; however, another disappointing factor was brought up by Bob McMurray, the engineer in charge of the Geotech system. He had understood the contract to state that the tape system with Control 51 would space blocks automatically when given the proper command. I finally solved this problem Monday by designing a circuit that would operate through sequence break and count the blocks by interrupting the program at the end of each block and indexing a counter after entering a sequence break mode. There were five packages involved in this design, two 4105's, one 4209, one 4603, and one 4303 integrating delay. The circuit was wired in and tested and found to operate properly.

Bob McMurray was also concerned about other factors in the mag tape control unit. He had assumed that the control that he received with the Geotech machine would allow up to 64 tape transports. However, the single control only allows up to 3 tape transports. As of the time of my departure from Geotech, this problem had not been solved, and I told Bob to get in touch with Harlan Anderson to discuss further these discrepancies.

The people at Geotech were concerned with the fact that no manuals were received describing in detail the PDP and its optional items. It is their understanding that they will

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 16, 1962

S. Lambert (cont'd)

receive manuals in the near future. Geotech seemed to be pleased with the computer they had received, except for the items mentioned, and it is possible that they may be looking to us for the purchase of another similar PDP. I urged that they allow us to use our own frame-work if they were to purchase another PDP.

R. Lassen

Our current personnel requirements are as follows:

1	Sheet Metal Worker (Senior)
1	Factory Mechanic
1	Tool Crib Attendant
3	Junior Mechanical Inspectors
1	Technical Typist
Open	Technician Trainees
Open	Assemblers - female
1	Wireman - Systems) From Test
4	Technicians - Qual. Control)
1	Technician - Savell - From Test or Outside
1	Computer Check-out Technician - Blumenthal
1	Electrical Engineer - Qual. Control
1	Electrical Engineer - Special Systems
1	Electrical Engineer - Savell
3	Electrical Draftsman
1	Mechanical Draftsman
2	Keypunch Operators
1	Verifier Operator
2	Cost Clerks
1	Office Services Supervisor
Open	Engineering Writer
2	Programmers
1	Receptionist-Typist

We have added the following personnal since the last bi-weekly:

1	Receiver
1	Spray Painter
1	Stock Room Attendant
1	Janitor - evenings
1	Technician - senior level

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 16, 1962

R. Lassen (cont'd)

1 Applications Engineer
1 Production Coordinator
1 Production Control Clerk
1 Receiver-Inspector (Qual. Control)
1 Senior Mechanical Inspector
1 Apprentice Machinist
1 Mail Clerk
3 Assemblers - female
1 Advertising Clerk
1 Wireman

Two or three of these people are still pending either physicals or reference checks.

Offers will be going out to several others this week.

All hourly male Technical, Sheet Metal and Machine Shop personnel have now been reviewed with respect to a job and wage structure based upon area surveys. Proper wage adjustments have been made. I feel that this is an important step forward in insuring that our people are receiving fair wages in accordance with their skills. Very shortly I plan to evaluate the hourly Drafting and Clerical people.

Recruiting, especially for high level technical people, continues to be a major problem. We have expanded the number of agency contacts and are constantly reviewing our employment ads with Jack and Alex. We are attracting much more correspondence and more applicants, which has been helpful in some areas. I may propose the use of professional "search" organizations; however, I am reluctant to do so because of the high cost.

We would again like to emphasize that one of our best sources of technical and professional leads is you! Many of you have friends and associates who have good reputations in our field. Therefore, we urge you to "spread the word."

While we're making pleas, I wish to remind all of you of our Transfer Procedure. If a person leaves your department to go to another, please initiate the Transfer Request Form (in duplicate). This is especially important since the inception of the Cost Center Accounting System and it also provides us with information needed to build up an historical personnel record of each employee.

Speaking of historical personnel files, one of Barbara's first projects (when she can find a gap between group insurance and interviewing) is to research more modern methods of personnel record keeping. The final result will be to replace our present inefficient and cumbersome

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 16, 1962

R. Lassen (cont'd)

folder files with a comprehensive, easy to handle historical record file. Our present files require a lot of "digging" whenever we wish to review an employee's history with the company.

G. Bell

A memo has been issued which describes a system for making wiring lists. I have been working on the design of a system for wiring lists of assemblies and sub assemblies. The system has had one dry run and has been redesigned to better fit the capabilities of our IBM tabulator equipment. The present system yields a wiring list, a wiring check/checkout list, and has other list possibilities.

Eventually the job could be done more efficiently and completely with PDP-1, assuming it has magnetic tape, card reader, and line printer. At that time, wire lengths may be calculated, routing specified, loadings checked and rigor in card preparation omitted, adopting some short hand notations.

E. Towle

Telephones

The telephone business has been quite brisk lately. The additional space in Building #5 has necessitated the moving and addition of several phones. Everything seems to be moving along quite smoothly. I would like to suggest to anyone desiring additional phones or moving of existing ones to notify myself at least one (1) week in advance. The Sales Representative of New England Tel. & Tel. has been evaluating the telephone needs of all departments and made several proposals to improve telephone communications. Arrangements have also been made for a telephone company representative to interview all telephone users on the proper use of the phone. A movie on telephone courtesy will be shown at that time.

Office Supplies

Our office supplies will be much more plentiful when space is made available on the second floor in Building #12. A closer check on inventory will be possible and supplies will be available off the shelf. More coordination is needed in ordering supplies to insure that at least a minimum quantity of office supplies are available at all times. There definitely is room for improvement and hopefully everything will be consolidated at an early date.

Customer Correspondence

The increase in correspondence has been terrific during the last few months. The most popular item has been the Logic Handbook, which seems to serve as a very important tool in

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 16, 1962

E. Towle (cont'd)

present and future sales. Lately, I've received several phone calls from customers and prospective customers requesting more recent literature. Most people are not aware of the large number of additions to our module line. Foreign correspondence, of course, has become more frequent and in most instances requested price and delivery on specific products instead of general literature.

Branch Offices

Special requests from our three branch offices continue to come to my attention. I've tried to fulfill all requests as quickly as possible and certainly want all branches to feel free to route any questions to my attention. As our company grows larger, the chance of duplication in sales becomes much greater. I've attempted to coordinate our activities to insure much better service to customers. Just remember that I'm only a phone or TWX away.

H. Crouse

John Ketola is our new receiving clerk -- Jack Anderson has transferred to production wiring.

Approximately thirty sub-contractors are now supplying us in all the areas of production. The prime sub-contractors are:

Donnelly Manufacturing of Waltham	-	Computer Cabinets
Colonial Engineering of Cambridge	-	Magnetic Tape Cabinets
Engineering Model Shop of Ashland	-	Computer Sub-assembly Wiring
Pastoriza Associates of Boston	-	Computer Sub-assembly Wiring
McLeod and Hanopol of Charlestown	-	Memory Sub-assembly Wiring
Elasco Corporation of Boston	-	Memory Sub-assembly Wiring

If an engineering job requires sub-contracting in the area of wiring, please allow a ten-day delivery schedule, mechanical sheet metal ten-day average.

The 100 watt Revolute "Stars" white print reproduction machine recently ordered for the Drafting Department will be received in three weeks.

Final proposals have been received on microfilming of all drawings done in the Drafting Department.

New packaging concepts are being investigated for System Modules. Several plastic vendors have been invited to submit proposals on new designs.

Mrs. Judy Ebner is our new librarian. Please return all outstanding books not in use so the library can be updated. If you wish to order books, please submit the request to the library.

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 16, 1962

H. Crouse (cont'd)

The following books have recently been added to the library:

Statistical Abstract of the United States - 1961, 82nd edition, U.S. Dept. of Commerce

Published annually since 1878, it is the standard summary of statistics on the social, political, and economic organization of the United States.

Criticality Control in Chemical and Metallurgical Plant OECD OCDE

Electronic Maintainability Vol. 3, by Ankenbrandt, Reinhold Publishing

Maintainability as it has a direct bearing on the usefulness of any product, whether it be complex electronic gear in a satellite or guided missile, a huge electrical generator, or mi-lady's hair dryer (or her kitchen toaster).

Proceedings of the National Electronics Conference - 1961 - Vol. 17

Electromechanical Components for Servomechanisms, by Sidney P. Davis and Byron K. Ledgerwood - McGraw Hill

Facts and data in the selection of rotating components and their use in precision servo-mechanisms.

Control Charts in Factory Management, by Wm. B. Rice, John Wiley & Sons

Statistical Quality Control: What it is and What it does.

An Introduction to Linear Programming and the Theory of Games, by S. Vajda

A branch of Science concerned with analyzing data on which the correctness of future actions depends, and with condensing and presenting them in such a way that those with managerial authority can base their decisions on them.

Digital Voltmeters (two copies) - Non-Linear Systems, Inc.

Factual information of digital measuring instruments as a whole sales information on NLS instruments, applications of each, extensive technical data, prices and delivery information, etc.

Sampling Inspection Tables, by Harold F. Dodge

Including a comprehensive collection of "probability of acceptance" curves called operating characteristic curves.

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 16, 1962

L. Cleary

2125 - IBM Card Punch	45%
2106 - Uptime Card Reader	45%
2159 - Burroughs Card Reader	10%

The IBM Card Punch is completely wired and is presently awaiting modules. After the modules are delivered, off-line check can begin.

The Uptime Card Reader is completely wired. However, the machine is not due in until March 1, 1962.

I am completing a test program which will be utilized for an on-line checkout of the reader and punch.

The Burroughs manuals have been found incomplete and a letter for more information has been written.

W. Farr

EN 2042 Color Display	70%
Punch & Reader Control	15%
770 Tester	15%

The Punch and Reader Control is now operating after modifying the 4303 module. However, high frequency noise is a problem since the ground has more resistance since the filters were moved from reader chassis to control chassis. It appears that shielding and/or a new layout is necessary.

A 770 Tester is being constructed.

The color display is proceeding to schedule. Static tests were completed February 8, 1962. Dynamic tests were started on the 9th. Lines were displayed without deflection or convergence correction. Drawings are in drafting. All parts for the first display are due March 1, and we will get all, with the possible exception of the Anelex cabinets. The correction circuitry and the cabinets are the only foreseeable tight items.

A. Blumenthal

1031	100%

Checkout of the Beckman computer has, for the most part, proceeded much more rapidly than that of previous machines. This gives a very optimistic indication of the time that

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 16, 1962

A. Blumenthal (cont'd)

will be required to perform checkout once our ideals of production phasing have been achieved.

Work on CRC-1 commenced on February 23, but lack of a memory and certain modules has prevented a smooth continuity in the process. The machine has been returned to final assembly and wiring, even though the basic checkout procedure has not been completed.

Lora Dunn (DCO)

This has been one of those busy times with not too much new to report. Most of the calls have been the usual routine calls requesting literature and/or prices.

Mr. Favret and Mr. Caputo are very glad the equipment at Georgetown is now operating in fine fashion. Maynard should have another order for equipment from Georgetown by now.

Mr. Edgerton, from the Air Force Security Office in San Antonio, came in the office to get information on the PDP-1. He is most impressed with our computer and is planning to be in Maynard, February 19th, to see the computer in operation.

Bud Mangan, from IBM, stopped in to return a 1906 which we had loaned them. He had nothing but compliments for Ken Olsen, Harlan Anderson and also the equipment.

L. D. Holmburg, from Collins Radio Company in Dallas, stopped in the office to get information on the PDP-1. I must say, I almost fell out of my chair later when Jim Burley informed me that they are coming out with their own computer. (I suppose you can't win them all).

Since Jim Burley will be in the office to write the next Bi-Weekly Report, I would like to take this opportunity to express my sincere appreciation for all of the assistance which I have received from the various ones at Maynard since I have been in the office alone. Many thanks!

K. Fitzgerald

Sheetmetal Shop 100-00	90%
Gen. Eng. 1000	10%

The present load in both Machine Shop and Sheetmetal Shop at this time is just about the maximum load for the facilities, personnel, and required delivery dates. At this time,

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 16, 1962

K. Fitzgerald (cont'd)

there is no real back-log. However, we have run a day behind, or possibly two, on required delivery dates of some items generally due to either lack of information or lack of enough materials and parts. Most of the delays now are being caused by poor delivery from vendors, which was probably caused by ourselves when we sent most of the back-log and the regular daily demands for the past four weeks to outside vendors to be fabricated. This has inadvertently saturated some vendors and undoubtedly confused others.

Computer cabinet assembly is taking up a very large portion of the Sheetmetal Shop's work day. However, we are ironing out more bugs in the design and assembly techniques of these cabinets by completely assembling (as much as possible) all cabinets and racks for either computers or special systems before they are sent to the assembly floor for wiring. We have naturally had to abridge this plan on occasion, but to date we have managed to perform this on one computer, about eight Mag Tape 50 Units, two or three Tape Control 52 Units, two Anelex High-Speed Printer Cabinets, and we are presently working on doing the same for the Drum System, PDP-4, and Precision Display 31 Units.

It has been suggested that the Sheetmetal Shop set up a cabinet assembly shop in the new area of Building 5 close to the Mechanical Inspection and Stock Room facility. When this is done new assembly techniques will probably be instituted at that time, such as using Huck bolts to permanently bolt racks together and permanently fasten the trim strips to the frame. The present method is working out well but it can be improved upon.

Because of the present size of the Shop and predicted rate of growth, there is a need for having layout, setup, and machine operator type people. We have interviewed applicants with this objective in mind and expect to make an offer soon. Our present people will be used for the setup and machine operator function. We have hired a new Sheetmetal Trainee and we were fortunate in also being able to hire a new experienced Spray Painter. At this time, we have also made an offer to a Machine Shop Apprentice. This job has been open for some months now.

The Production Department has been most helpful in getting the Shop situation unsnarled. Now that they are expanding their stock room space, we should all be able to get more things from stock rather than direct ordering from the Shops. It is naturally going to take some little time to get the Stock Room supplied with ample stocks.

R. Mills

As the result of a detailed cost examination of a PDP-1, several things have come to light which require definition and expansion. The first one of these is the need for a more detailed breakdown by option for costing purposes, which we have already accomplished by

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 16, 1962
Page 15

R. Mills (cont'd)

assigning additional EN numbers to the standard and special options as well as the central processor. This system will be modified slightly by the addition of a system number preceding the EN number, plus a two-digit operation code following the option number. The second problem is a lack of definition of job descriptions or operations being reported on all the daily job tickets. The following schedule of operation numbers will be used starting immediately in conjunction with the expanded EN coding of PDP construction requests:

1. System	2. Subsystem	3. Mechanical	4. Circuit

1. Administration and Scheduling
2. Design
3. Drafting and Drawing
4. Checkout
5. Wiring and Construction
6. Installation
7. Field Service
8. Customer Communication

Example: If you were working on a mechanical component design, your operation code would be 32.

In every instance, you will be reading the major section being worked on first, and then the operation second.

In conjunction with the above, we are instituting a simple code for keeping track of new initial work being done, which will be designated by a plus (+) in front of the operation code number, and any rework being performed, which will be designated by a minus (-) in front of the operation code.

If any of you feel that the operation list above should be expanded, please let us know about it right away, as this system will be in operation very shortly.

L. Prentice

1000	50%
1078	15%
1053	35%

L. Prentice (cont'd)

The sketch has been completed for additional air lines in Building 5. This has been forwarded to Jack Smith and George Brown for execution.

Casting for the new 30A Display has been released to Purchasing for production of the pattern and release to foundry. The machine work for a good portion of the machined parts were not a complete set of mechanical parts for Display 31. There remains a considerable amount of detail to complete this and turn it over to Bob Savell by March 2nd. A cabinet has been marked for the color display. This has been improved and drawings are now in the process in Drafting to be completed so that these can be sent out to the vendor. There still remains some work to be done on the mounting for the convergence coil for the color display.

Preliminary sketches are now ready to be turned over to Drafting to produce all of the parts necessary for PDP, with the exception of the Indicator Light Assemblies. Some scheduling has been completed to indicate the amount of drafting required to implement the work done by this section. This should be complete and ready for release within a few days.

J. Atwood

Cost Center Pilot Operation

Our experiment in cost center operation is proving doubly beneficial. Since we perform, to a greater or lesser degree, many of the same basic functions as other future cost centers, we are having the opportunity to observe how the concept applies to such varied activities as the design, production (or procuring) and distribution of various goods and services. The experience should be helpful when the system is extended to those groups which develop, manufacture and market our corporate products.

In addition, we are for the first time getting the information we need to evaluate our own departmental performance. Such records as we have been able to keep in the past have not been sufficiently complete to permit an objective appraisal of our allocation of time and money to different functions or to substantiate the decisions we had to make on new personnel, additional equipment and the utilization of outside suppliers. However, the facts and figures coming back to us from Accounting now are both detailed and definitive. Together with the single set of records which we maintain on outside purchases, they give us a comprehensive picture of our activities.

The key information items in our cost center application are the job number and the operation number. Each job has a four-digit number. The first digit identifies the "function," and the second digit identifies the "activity." The third and fourth digits serve simply to serialize jobs within the particular "function-activity" category. The numbers are

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 16, 1962
Page 17

J. Atwood (cont'd)

determined from this table (which allows extra digits for categories with a high incidence of jobs):

FUNCTION - First Digit	ACTIVITY - Second Digit
1. Public Relations*	1. Space Advertising
2. " "	2. Publicity
3. Sales Promotion	3. Direct Mail
4. " "	4. Shows and Special Events
5. Technical Publications	5. Publications
6. Industrial Design	6. Audio-Visual Aids
7. Photography	7. Signs and Displays
8. Offset Duplicating	8. Forms, Packaging, etc.
9. " "	9. Miscellaneous
0. Cost Center Operations	0. (Unassigned)

*Taken in its broad sense, public relations includes employee, customer, stockholder, vendor, industry, and community relations (among others) and covers everything from recruiting to seating for salesmen.

The initial digits may be combined to classify any job we handle. Thus, the new Module Catalog, which is a sales promotion publication, carries the job number 3504. The ARD annual meeting, a public relations event, is 2401. And the new test data card, which involves the design of a non-advertising form, is 6805.

This type of numbering enables us to get from the Tab Room a runoff which shows, for example, that in January our labor costs were divided like this:

	% of Hours	% of Dollars
Public Relations	19.1	19.4
Sales Promotion	27.0	26.7
Technical Publications	8.1	7.2

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 16, 1962

J. Atwood (cont'd)

	% of Hours	% of Dollars
Industrial Design	0.4	0.4
Photography and Offset Duplicating	18.4	16.2
Cost Center Operations*	27.0	30.1

*This could also be identified as "Departmental Operations."

Two things are immediately evident from these figures. First, our design efforts, which are generally independent of deadlines, are not getting sufficient attention. Second, our cost center or departmental operations (supervision, production handling, costing, typing, filing, professional improvement, recruiting, training, and maintenance of equipment and facilities) represent too large a share of the total. This is due mainly to the lack of clearly defined guides as to what is and what is not directly chargeable to specific jobs, and this we are remedying.

We also get a runoff which shows us the allocation of purchased materials and services among these major categories. In January, these costs broke down as follows:

	%
Public Relations	23.3
Sales Promotion	19.5
Technical Publications	0.5
Industrial Design	0.0
Photography and Printing	11.7
Cost Center Operations	45.0

The obvious conclusion to be drawn from these figures on the first pass is that a large share of our spending is for cost center operations items, such as paper stock and "manufacturing" equipment, which are then used to produce individual jobs.

Our own record of outside purchases tells us how much we are spending for specific types of items. We maintain this record because the items covered, while they are significant to us, are not appropriate for inclusion among the standard Expense Element Accounts. This is the

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 16, 1962
Page 19

J. Atwood (cont'd)

breakdown of materials and services purchased in January as we have it in our records:

	%
Composition, Plates and Mats	1.4
Space and Time	19.6
Mailing Supplies and Postage	0.2
Exhibits and Displays	19.5
Printing and Binding	13.4
Professional Services	1.1
Paper Stock	15.4
Photographic Materials	4.5
Other Graphic Arts Supplies	3.8
Other Supplies and Materials	2.4
Purchased Equipment	17.1
Miscellaneous Expenses	1.6

Besides indicating that we had a good sized deposit already on hand at the post office, this listing gives us an idea how much outside printing we are doing, for example, and lets us keep tabs on the amount of money being spent for various types of supplies and materials.

One other listing from the Tab Room shows how our labor charges originate with respect to specific operation. Here are four major groupings for January in descending order of importance, based on the percentage of hours and payroll dollars charged to the various operations in our department:

9 to 12%	6 to 9%
List Maintenance	Offset Duplicating
Production Handling	Cost Center Accounting
Miscellaneous (1)	Reproduction Photography

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 16, 1962

J. Atwood (cont'd)

3 to 6%	0 to 3%
Collating & Binding	Plant Photography
Finished Art	Equipment & Facilities
Layout & Design	Copywriting
General Supervision	Reproduction Typing
Research & Planning	Direct Assistance to Other Departments
Production Photography	Shows & Special Events (3)
Displays & Exhibits (2)	Proofreading
Professional Improvement	Mailing
Typing & Clerical	Storage & Inventory
	Photocomposition
	Other Duplicating (4)
	Inquiry Processing
	Other Distribution (5)

(1) This was used as a catch-all while proper operation codes were being developed.

(2) This covers the design and construction phase.

(3) This covers setting up, manning and taking down.

(4) Other than offset.

(5) Other than by mail.

Obviously not all of these operations are significant. Some are intended merely to provide a selection of easily understood items to which time may be charged. However, even this first runoff provides information of value in directing individual efforts. Too much time was being spent in January on production handling, for example, and not enough on copywriting and mailing. And cost center accounting during this month when the system was initiated took much more time and effort than it normally would or should.

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 16, 1962

J. Atwood (cont'd)

So what does this mean to you as a prospective cost center manager? Simply this: that the cost center system can tell you far more important things than what you should charge for a particular job you do. It can tell you if you are maintaining a proper balance among the activities your group is engaged in - both in terms of your short-range obligations and with a view to the company's long-term development. It can give you a dollars-and-cents basis for evaluating the effectiveness of your efforts in various areas. It can provide the data you need to decide whether to increase or reduce the size of your staff, whether to add or dispose of equipment, whether to take on a new activity or drop an old one, whether to do something yourself which you are paying someone else to do for you, and whether you are making the best use of the personnel and equipment at your disposal.

All this and more you can learn from the cost center system without any additional effort on your part. The job numbers and operation numbers are going to be filled in in any case. How much or how little you learn from them is up to you. This brief survey serves to illustrate how I am getting them to tell me what I feel I need to know in order to run my particular cost center in a manner which will be most beneficial to the people in the center, to our "customers" and to the company as a whole.

dec BIWEEKLY REPORT

COPY NUMBER 2

DATE February 2, 1962

L. Prentice

1026	20%
1053	30%
1078	30%
1000	20%

We have endeavored to get started on a program of upgrading of drawing standards for paint, chromicoating, etc. plus the writing up of inspection procedures for inspecting all mechanical parts. Mr. Klaus Doering joined us to head up this work. He was formerly with the Bradley Company and had previously worked for the Ford Motor Company in Germany. This is a long and somewhat tedious task and it will be several months before the work that he is doing can be put into actual practice within the plant. We have requested and have interviewed several inspection personnel. These people will work at first under Mr. Doering's direction until inspection procedures have been set up and at least a number of them prove successful.

The 31 Precision Display parts are now beginning to be received. Most of these have passed the design stage and are now ready to be produced.

Work on the Analex Reader first cabinets is nearly complete. These should be mounted during the coming week and turned over to Systems people for the mounted and application circuitry.

The scheduled work on AXD-O, for the most part, has been kept within schedule. Unfortunately, we lost a front panel operator console panel due to not having any inspection procedure unit which would delay that approximately one week. At the present time, this, I believe, is the only item greatly behind schedule for the entire ADX-O set-up.

R. Whipple

Sales	50%
Development	30%
MT 1516F	20%

Special Systems Group is organizing itself so as to better cope with the increased work load. Being reminded of a certain fable about lions not too many months ago, we have set up certain paths of information-flow as well as new lines of responsibility. We are in the process of generating some procedures which will enable Hogan, Flaherty, Januskiewicz, and Stefanowicz to become responsible for the assembly of and the ordering of parts for individual systems under the supervision of Gould and Butterworth. Fred and Lee will thus

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 2, 1962
Page 2

R. Whipple (cont'd)

become more involved in scheduling, testing, etc. Paper work will become a new word to most of us, but it is a necessary evil quite often. A meeting with Maynard Sandler, Jack Smith, Henry Crouse, Ken Fitzgerald and Ken Olsen has helped lay the groundwork for some new procedures. Following are some procedures we hope to follow:

1. DEC is our primary vendor on all items except the silk screening of our control panels.

2. Jack Smith is our input for all wiring requisitions. If our delivery requirements cannot be met, he will handle all paper work with secondary vendors.

3. Ken Fitzgerald is our input for the requisition of mechanical parts that are not in stock. If he cannot meet our delivery requirements, we will deal through Bob Blackwood of Purchasing with a secondary vendor.

4. Module delivery dates will be requested on the basis of our system delivery dates. However, the latter must be considered flexible.

5. All of our dealings outside the group will be handled with requisitions or inter-office memos.

6. All our dealings within the group will be handled with AVO's (Avoid Verbal Orders).

7. Drawing changes will be completely handled by change notices.

R. Hughes and H. Crouse

Component Purchasing

A commitment for 54,400 transistors was made with Sprague Electric Company on 1/31/62.

The devices are MD93, MD94, MD95, and MD109, with quantity ratios of: 1.4, 4.0, 8.0, and 0.2 respectively.

The package price of the negotiated specification resulted in a net price of $1.26 each. The cost of a unit to these specifications is normally $4.15.

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 2, 1962

H. Crouse (cont'd)

Library

Recent additions to the library:

Radar Electronic Fundamentals - U. S. Government Printing Office

Sampling Inspection Tables - by Harold F. Dodge & Harry G. Romig - John Wiley & Sons, Inc.

Principles of Applied Electronics - by Ralph S. Carson - McGraw Hill Book Co.

Modern Dictionary of Electronics - by Rudolf F. Graf - The Bobbs-Merrill Co., Inc.

Quality Control Handbook - by J. M. Juran - McGraw Hill Book Co., Inc.

Statistical Quality Control - by E. L. Grant - McGraw Hill Book Co., Inc.

The Industrial Challenge of Nuclear Energy (Parts 1 to 4) - The Organization for European Economic Co-operation

Nuclear Graphite - The Organization for European Economic Co-operation

Electronic Amplifier Circuits Theory and Design - by Joseph M. Pettit & Malcolm M. McWhorter - McGraw Hill Book Co., Inc.

Precision Measurement & Calibration, Electricity and Electronics (Vol. 1) - National Bureau of Standards

Precision Measurement & Calibration, Optics, Metrology, and Radiation (Vol. III) - National Bureau of Standards

Precision Measurement and Calibration, Heat and Mechanics (Vol. II) - National Bureau of Standards

Health Physics in Nuclear Installations - The Organization for European Economic Co-operation

20-Complete Secretary's Handbook - by Besse M. Miller & Lillian Doris - Prentice Hall, Inc.

Banking Studies - Waverly Press, Inc.

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 2, 1962

H. Crouse (cont'd)

Roget's International Thesaurus - 20 copies - Thomas Y. Crowell Co. - Peter Mark Roget

Inventory Control Techniques - by Van De Mark - Jensen-Townsend Printing Co.

Management Models and Industrial Applications of Linear Programming (Vol. I and II) by A. Charnes and W. W. Cooper - John Wiley & Sons, Inc.

D. Denniston

Due to illness here at the New York Office, we again missed the last edition of the Biweekly. Therefore, this will cover the activities of the N.Y.O. during the past four weeks.

I have made several trips to Ft. Monmouth over the past weeks. While I was there, I stopped in a few times to visit with the people in the Radar Section to let them know that we are thinking of them. Possibly this will keep them somewhat happy, taking into consideration the very late deliveries of their equipment.

I also visited with some of the people at Bell Labs in New York City as well as Whippany. We have been receiving quite a few calls from several new customers at Bell Labs. These people are, in several cases, just beginning to use digital techniques and have had some technical questions in regard to our logic. I have spent quite a bit of time with them and I have just recently received a request from them that I visit again and possibly help them a little more.

Although we expected no great results from the A.I.E.E. Show, we have managed in the first two days to come up with a few good prospects. I might mention that we have discovered no competitors at the show but rather quite a bit of general interest in DEC equipment.

I also had the opportunity to get out to Republic Aviation in Farmingdale, L.I. Due to their application and specifications, I rather doubt that we will be able to sell them this time around.

I finally got out to I.T.T., in Paramus, along with Nick Mazzarese during one of his recent visits there. I managed to see their system (our computer) and talk with some of the people there.

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 2, 1962

M. Sandler

Production of modules was 7600 plus for the month of January -- that count was delivered to Finished Goods. We now aim for 10,000 units in March.

Our thanks to Bob Hughes and his Quality Control people for helping pave the way with incoming inspection of materials and real attention to our problems in Final Test.

During February we hope that some of our methods investigations will bear fruit and help to increase productivity, and we also hope to make better use of our outside vendors.

Lora Dunn (DCO)

My how time flies! Seems only yesterday we were sending in Bi-Weekly contributions, but it's that time again.

I have spent a great deal of time calling customers and potential customers that time has not permitted Mr. Beckman to contact in the recent past. This, I feel, has been time well spent.

The call to Bell Telephone Labs in Winston-Salem, North Carolina was timed just as if I had looked into a crystal ball. The day prior to my call, they had "knocked out" a Bus Driver and were trying to decide whether to destroy it or try to have it repaired. I suggested they return it to us for repair and in the meantime Jim Myers took one out of his hip pocket and sent it on loan. They were most appreciative, as they were in the midst of a project when this happened and this was causing a delay.

In calling Bendix in Baltimore, Maryland, I found that Mr. Cross is no longer with the firm so I spoke to his replacement. It turned out that they are setting up a separate purchasing department for equipment such as ours. They are evidently still interested in the logic modules, as I was referred to the manager of the new department. The manager was out of town, but I don't feel that this was a wasted call.

General Electric, in Philadelphia, is still in the "looking process" for a computer for the inclusion in a hybrid system. Mr. Gelman requested any current literature we have on the PDP-1, as it turned out he did not have the F-15B and F-11A. I sent him the current literature.

By somewhat of a coincidence, I stumbled onto Emerson Research and gave them a buzz. They were quite interested in getting our literature. At the present time, they are trying a new analog technique and plan later to go into digital. Their prime interests at the present time are; Analog to Digital Conversion, Counters, Clocks, and Multipliers. It

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 2, 1962

Lora Dunn (DCO) (cont'd)

appears to be a potential customer for DEC in the future.

Called FAA in Atlantic City, New Jersey to check on the system for which they had completed a logic diagram sometime ago. They put it out on a competitive bid rather than build it themselves as they were originally debating on.

A request came in from National Security Agency at Ft. Meade, Maryland, for literature and prices of our various equipment including the PDP-1. They were quite interested in the computer. I checked my old copy of the PDP price list with John Koudela and made the necessary changes and corrections and typed an up-to-date PDP price list and sent it along with other literature.

We should have an order for the equipment for Catholic University by now. The last time Mr. Favret checked in the money was burning a hole in his pocket and he was in the process of placing an order.

Needless to say, APL is still in business and checks regularly on the deliveries.

R. Lassen

We are actively searching for the following personnel.

Mechanical Inspectors	4
Technician Trainees	no limit at present
Female Assemblers	no limit at present
Draftswoman	1
App. Machinist	1
Programmer	1
Eng. Writers	at least 2
Special Systems Engineer	1
Inventory Control Clerk	1
Purchasing Expeditor	1
Applications Engineers	at least 2
Receiving and Inspection Clerks - Qual. Cont.	2
Technicians - Qual. Control	4
Ed Harwood	1
Bob Savell	1
Systems	2
Dick Best	1

The above Technicians will be drawn from Production Test when needed and when available.

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 2, 1962

R. Lassen (cont'd)

We are gradually adding to the Production Test Group in the attempt to keep the "pool" full.

Tool Crib Attendant	1
Factory Mechanic	1

Since the last report, the following jobs have been filled - (some pending physicals):

Sheet Metal Trainees	2
Female Assemblers	6
Janitors	2
Accounting Cost Clerk	1
Accounting Clerk (General)	1
Sales Secretary	1
Engineering Assistant	1
Wireman	1
Technician Trainee	1
Library	1
Sales Service Assistant to Bob Beckman	1

Offers have gone out to 2 Circuit Design Engineers and 1 Mechanical Inspector.

The Production and Engineering Group are in the process of classifying all hourly technical personnel. We are compiling the results and assigning rate scales. The job description structure for Sheet Metal people and Machine Shop people has been approved and will go to the Mechanical Engineering Department for classification. I would like to again emphasize that the purpose of this program is to objectively evaluate our job and wage structure for hourly people. It is in no way intended to infringe upon our merit rating policy.

We are beginning to make progress in organizing our office routine. We have outlined both short and long range projects to improve the efficiency and services of our office. Most of the short range projects are designed to improve our routine administration and to eliminate unnecessary repetition and "spinning of wheels." The longer range projects, which I will outline as we actually start them, are designed to improve the more important personnel functions. Implementation of many of our ideas will not be practical until we move into a larger and more efficient working area.

Margaret Rand has taken over telephone calls, appointments, records, correspondence, routine reference checks, plant tours and several other time consuming jobs thereby allowing Barbara Charnock and myself more time for interviewing the heavy flow of applicants.

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 2, 1962

R. Tringale

PEPR Controller 2310 100%

The logic drawings for PEPR have been completed and checked several times. All of the latest additions and corrections to the logic drawings have been made and checked.

Drafting has completed a good percentage of the wiring diagrams and Production should be starting the wiring on PEPR by February 5.

The modules for PEPR have been ordered and should be delivered by the 3rd week in February.

J. Fadiman

New Core Tester Designs and Modifications	25%
Proposal and Sales work on Core Testers and Memory Testers	30%
Field Service on Memory Exerciser (RCA)	10%
General Administration and organization	35%

The required modifications have been made to the Automatic Core Tester 2113A for Ampex. The machine has been completely checked out, except for the new Slicer Flip-Flop Units 1570 which we are awaiting from Production. Required modifications are now being made on the Memory Tester 1516F for Burroughs. This is necessary because of the additional loading imposed by the error decoding panel. All front panels have been wired and the mounting panels are now being wired-in. The Memory Tester 1516D for Ampex International Operations was completely checked out and shipped to Hong Kong on Friday, January 26.

Memory Buffers 2207, #4, #5 and #6 for the Signal School at Fort Monmouth, and #2009 for the FAA are being constructed now. The first one of these will go out the middle of this month, and all of them will be out by April 1.

We are, at the present time, constructing five Automatic Core Testers, Model 2113. Some of these have slightly different program modifications and these have all been made by this date. Model A is for Ampex and is now almost completely checked out. Model B is being built for ourselves and we may loan it to Lockheed if they wish. Model C is for Standard Elektrik Lorenz in Stuttgart, Germany, for which we have received the purchase order. Delivery date for this machine is March 30, 1962. Model D is for Hitachi in Japan and the system delivery date is April 9, 1962; we have also received the order for this. Model E, for which we have just also received the purchase order, is for General Electric Co. in Phoenix, Arizona. Delivery date is April 16, 1962. This machine contains all high-speed plug-in units. We have also received an order for a Semi-Automatic Core Tester, Model 2110, for RCA in Needham, which is like our 2108 except for all high-speed plug-in

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 2, 1962

J. Fadiman (cont'd)

units and logic for six current drivers; delivery date is March 13, 1962. We have also received an order for a Memory Tester 1516G for Hitachi in Japan. Delivery date for this machine is May 15, 1962.

NEW BUSINESS:

We have received a set of specifications from IBM, Owego for another Memory Tester. Although this order is initiated by the same group which is now using our Model 1517, the machine they want is completely different and very complicated and sophisticated. Dick Whipple is now working on this project. A bid has gone out to the Navy for four Memory Buffer Systems, Model 2010, and the chances of getting these four systems are very high. A proposal has been made to Remington Rand in Philadelphia for an Automatic Core Tester 2113 and chances of getting this system are about 50%. General Electric in Syracuse, N.Y. is again interested in a Memory Tester 1516 and they already have the money budgeted for this. However, we have not yet received the purchase order. They are also interested in a Semi-Automatic Core Tester Model 2108.

We have received the purchase order for a Memory Exerciser 2209 for Daystrom Instruments, Archbald, Pa. Price $20,000; delivery date is May 11, 1962. This is similar to the 1513, with some changes.

Orders are continually coming in in rapid succession to the Special Systems Division. I believe that we are now constructing something like 16 systems at one time. We are attempting to expand our group by the addition of both Engineers and Technicians. We are also setting up a better system of organization so as to better solve the eternal problems of "who is responsible for what."

A. Blumenthal

EN 1031 100%

PDP-1C-13 was shipped to the Jet Propulsion Laboratory on Monday, January 22. This machine received a more comprehensive checkout than any of the previous ones through a high temperature marginal checking process. This yielded benefits both in revealing temperature sensitive components and places where slight changes should be made to reduce noise. It has definitely proven useful enough to become a standard part of the checkout process.

Documentation of checkout procedures for PDP-1 has advanced considerably with addition of procedures for cycle one and the registers. The procedures for the rest of the machine were reviewed and refined considerably. The parts remaining to be documented are single

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 2, 1962

A. Blumenthal (cont'd)

channel sequence break and the three standard pieces of in-out gear. Nothing has been done yet on the optional equipment.

Checkout of the Beckman computer (PDP-1C-15) commenced on Friday afternoon, January 26. This machine has progressed more rapidly and smoothly than any of the others and, so far, we are staying with the schedule. At this writing, the central processor is fully operational, except for single channel sequence break, which has not been installed, and marginal checking is under way. On Tuesday, February 6, it goes back to final assy. for installation of options.

R. Doane

F_t tester for transistor speed measurements	50%
Text and pictures for catalog	15%
Test Equipment	15%
AIEE exposition	10%
Miscellaneous	10%

The new transistor F_t tester is now in use. The range of its usefulness is detailed below:

Emitter current, 1 to 130 ma in two ranges
Collector voltage, 0 to 25 volts in two ranges
Frequencies of measurement: 1,5,10,18-24, 35-50 Mc
F_t (common emitter gain-bandwidth product), 1 Mc to 1 Gc
Polarity, PNP or NPN

In production, this tester is used to measure the speed of MD93, MD94, MD95, and MA80 transistors. It is also an aid to circuit design, for instance, to determine the best bias conditions for maximizing circuit speed.

My one day trip to New York for the AIEE exposition at the Coliseum resulted in my having many interesting conversations with visitors to our booth. My estimate is that fewer than 50% of the people who stopped for a closer look knew enough about digits to ask technical questions. Many vowed they were going to study our literature to find out what it's all about.

A protest: the equipment that Dave Denniston had at his disposal for a working display seemed inadequate to me.

R. Doane (cont'd)

1. Lack of a 500 kc clock made the lowest frequency in a 4-flip-flop counter barely slow enough to see a flicker.

2. Of the four flip-flops, two operated only at certain positions in the counter.

3. The mounting panel and power supply had once been in a mounting rack, so the paint was chipped around the mounting slots.

I think the hardware we display at a show ought to be up to the quality standard of our literature, and show it. After all, we are selling the hardware.

An oscilloscope, perhaps a rack-mounted four-trace 'scope capable of high intensity display, would help draw attention; it would also allow Dave to demonstrate our logic in his office, where he now has only a makeshift arrangement. The test equipment committee has this on its agenda for the February 6 meeting. We welcome suggestions.

D. Adams

Semiconductor Testing

These semiconductor units have been tested since the last Biweekly Report.

Semiconductors	Mfg.	Total Tested	Percent Reject
D-001-1	Clevite	44250	1.05%
D-662-1	"	24630	0.55%
D-664-1	"	865	2.1%
Q-6-100	International Diode	200	5.5%
1N 469	Hoffman	50	0.0%
1N 750	Tex. Inst.	50	0.0%
1N 758A	Transitron	12	0.0%
1N 764	"	100	0.0%
1N 1876A	U.S. Semicon	100	0.0%
1N 2974B	Dickson	300	0.33%
1N 3024	Motorola	36	0.0%
2N 167	Gen. Elect.	200	0.5%
2N 398A	Motorola	1000	0.9%
2N 599	Philco	3500	0.72%
2N 769	"	300	0.33%
2N 995	Fairchild	71	4.2%
2N 1065	Gen. Inst.	2000	0.9%
2N 1499A	Sprague	1000	0.7%
2N 1754	Philco	2000	0.35%
4JXIC741	Gen. Elect.	2296	0.43%

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 2, 1962

G. Bell

Design Scheduling, The Definition of the Process by which a Concept Progresses to a Reality

This discussion is an attempt to clarify in my own mind the design process of producible items. The process is shown by a schedule. The schedule requires an organization by which the items on the schedule are enacted.

Equally important is the documentation of the design process, for it is the counterpart of final reality, (a produced item) or the specification of the item to be produced. Design is simply the production of documented concepts by which realities may be produced. Concepts hereafter will mean design, (or paper), and reality will mean the objects produced by the paper description.

Concept-reality denotes first a breaking down of sub-units which together satisfy the original design goals or specifications. The sub-units may be partitioned according to various groups who are capable of specifying the items to be produced. Thus a system may consist of sub-systems consisting of assemblies consisting of sub-assemblies consisting of parts consisting of.....[1] At some time there must be a description (or list) for every part within a device, in order to cross the concept-reality boundary. Perhaps, if a design is maximized as a production item, there is complete symmetry about the concept-reality or partitioning-recombination boundary.[2]

The following diagram, Figure 1, should clarify the above discussion.

Node 2, e.g., a sub-assembly is the realization of the sub-assembly design concept specified at Node 1. That is, there is symmetry.

From Figure 1, the importance of project planning is shown. The paths must be specified, and responsibilities assigned. At the system specification node, the sub-system perhaps can be completely specified, and responsibility for solution given to appropriate areas.

The appeal for a common scheduling procedure then is also based on the need for information

1. The detail of part listings should be defined to a workable level from an economic standpoint.

2. This may be true in computer design since the checkout of a system is a stage in the recombination or production process. To check a system effectively, the checkout of several parts should be simultaneous. Before a complete system is checked, the sub-assemblies must be working. This is a simple matter of average access time to various parts for various size sub-assemblies. That is, we would never start to check a system with unchecked modules.

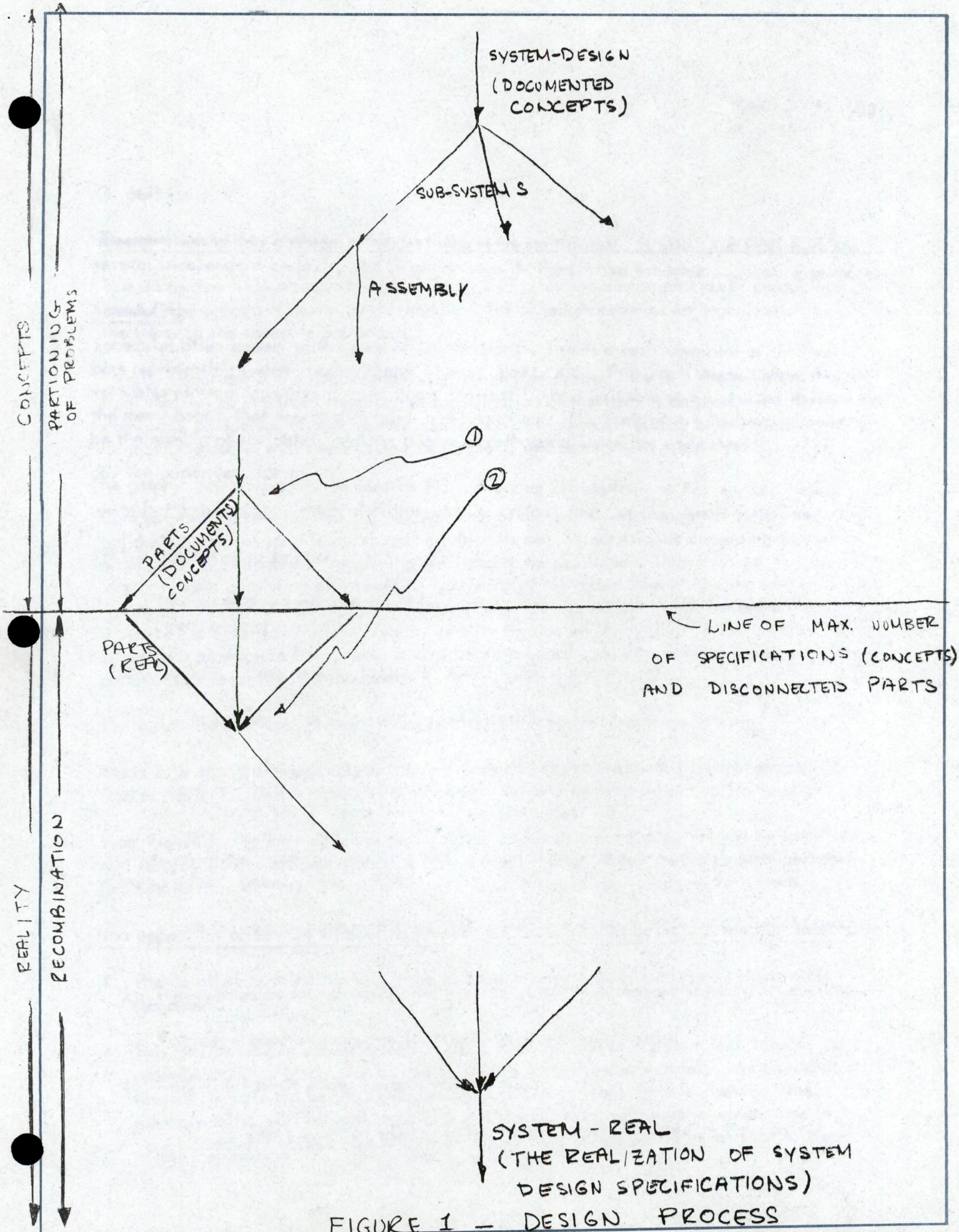


FIGURE 1 — DESIGN PROCESS

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 2, 1962
Page 13

G. Bell (cont'd)

dissemination within a system or project who serve similar roles in other projects, between several independent projects, and to groups outside the process for some accounting purposes.

Scheduling

Schedules often appear in the form of Gantt charts. This is a bar graph plot of time versus bars representing systems, sub-systems, ..., parts, etc. This graph doesn't show that the variables plotted depend on one another, but is still very desirable and useful (as evident by the many boards that depict schedules in this manner). The limit of this technique seems to be the number of variables, and the degree of orthogonality of the variables.

The graphically representation used by PERT (Program Evaluation and Review Technique) seems better suited for Design of Prototype-like systems (the Concept-Reality Process).

PERT is itself used as follows:

1. To decide how long a series of tasks will take. It then serves as the schedule check points.
2. Provides a cost/penalty factor for speeding up a project.
3. Yields probabilities of project completions, based on input estimates.

PERT doesn't schedule all projects, materials, manpower in optimum (or any) fashion. It regards a service of labor or materials to flow according to some flow rate/$'s function. It also can yield "probable," "least likely," etc. schedules.

Although we do not need the complete PERT-Computer system evaluation by machine, the following advantages are very desirable:

1. Forces all jobs of a project to be first listed, and as such prepares a plan of attack for the problem solution.
2. Takes sequence into account, contrary to normal independent variable scheduling.
3. Provides a common language for schedules of various projects.
4. Responsibilities for jobs become more obvious.
5. Allows persons concerned with the carrying out of tasks to observe their action on task completion.

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 2, 1962

G. Bell (cont'd)

The Mechanics of Dependent Variable Scheduling

Every item for project realization is defined by a vector-like line which signifies the occurrence of an event, or the accomplishment of the task. The time required to proceed from the tail of the vector to the head is always zero or positive. A task cannot be completed or even started until all previous tasks entering the tail of the vector are complete. A typical example of this is in the reality or production. Phase is shown in Figure 2.

Figure 3 shows the tasks required for the design of modules for production. Beside each vector the person or material required is specified. Actually, in the case of the module design, a second specification might be required after the model is tested, essentially calling for the reiteration of a sequence. Jobs which conditionally branch appear impossible to schedule. Despite this, the schedule remains important, to enable iterative projects to be followed. Needless to say, the degree of final completion at the branch point should more nearly approach one for every iteration.

Some of the Components of concepts and Reality are:

Concept Components

System Design
Circuit Design (Figure 3)
Logical Design
Mechanical Design
Test Procedure Design
(each item may include other items of a similar nature, but lower degree)

Reality Components

System Interconnections
Module Assembly
Mfg. Panel Assembly
Mech. Assemblies
Testing

From the above discussion, I would like to propose the following projects:

1. Concept-Reality projects handled on a dependent variable diagram.

2. Computer Programming based on these diagrams which would evaluate work load across all projects.

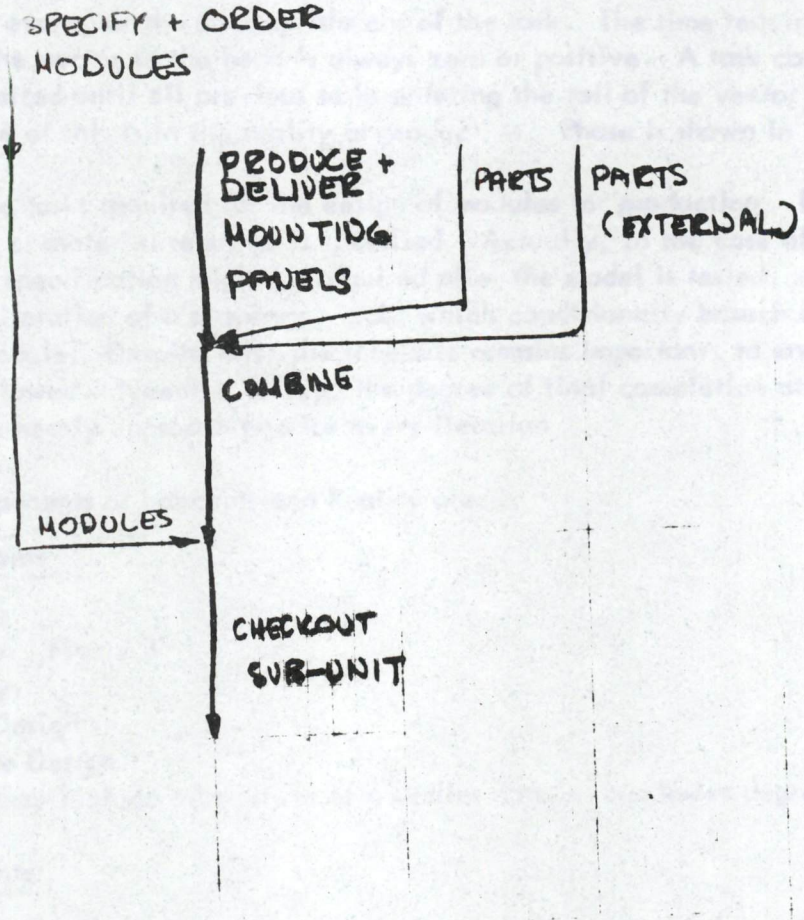


FIGURE 2 – PORTION OF RECOMBINATION PROCESS

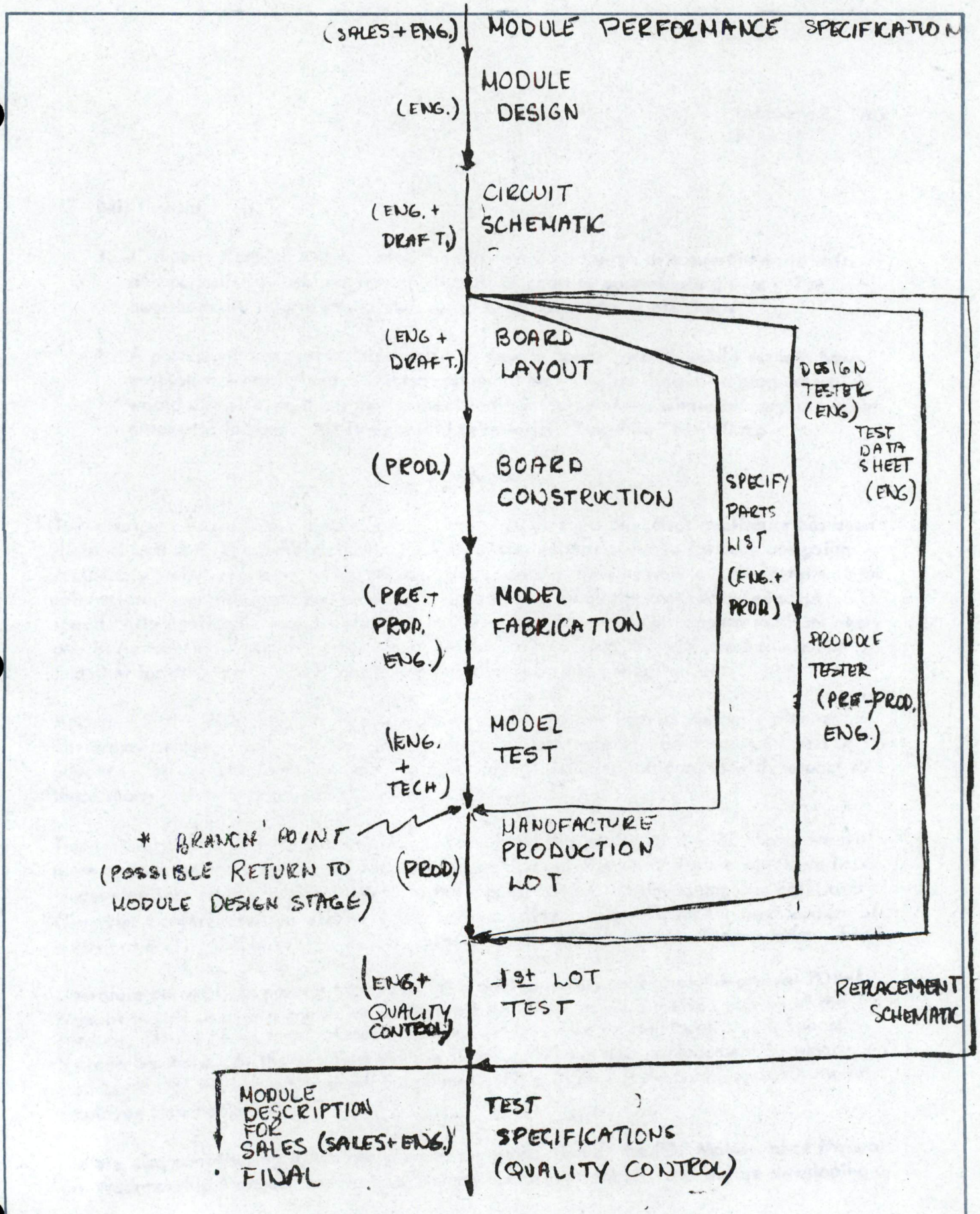


FIGURE 3. SCHEDULE OF MODULE DESIGN TO PRODUCTION

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 2, 1962

G. Bell (cont'd)

3. Computer Program which, using the diagram would serve as a questionnaire writer and periodically ask progress of all units of chart to appropriate groups. The questionnaire returns would then serve to up date state of all charts.

4. A procedure description (especially for new personnel) which would explain how projects are carried out. The manual might be along the lines of a program which would design everything that is specified - thinking of the whole process as a giant automatic factory. All flows would necessarily, therefore, be defined.

J. Atwood

Two changes of note in our operations: (1) the night shift on the offset duplicator has been discontinued and (2) we are well into the cost center experiment. So far both are going reasonably well. However, it has taken a fair amount of time to work out the details of the internal and external forms and procedures necessary to make the cost center concept specifically applicable to our situation. We have had the utmost in cooperation from everyone in Accounting, and I hope the efforts we have all put into this will make the going smoother for other project managers when the plan goes into general effect.

Attached to this Biweekly is a schedule of trade shows for the year as presently planned. There may be one or two additions or cancellations, but these will be announced well in advance. So you can feel reasonably safe in making whatever you care to with respect to those shows which have a bearing on your activities.

Two special booths will have to be designed and built this year. At the IRE Show, we will have a space behind a space, an area directly behind our one-on-the-aisle which we hope to develop into an interesting "annex" to the regular booth. At the Spring and Fall Joint Computer Conferences, we will have four booths in line. This calls for the development of a 40-foot booth, probably with such niceties as a raised platform and an extended overhead.

Literature currently in process includes: (1) a small quantity reprint of the present PDP-1 Manual to tide us over a couple of weeks until we can print (2) a revised version of the Manual, (3) the "long form" Module Catalog, (4) a new Logic Handbook, (5) a Special Systems Brochure, (6) the Training Module Catalog, (7) the new Replacement Schematic Handbook, (8) the Logic Handbook Supplement, (9) a Digital Style Book, and (10) the new Employee Handbook.

We are also contributing in various ways to the production of the PDP Maintenance Manual, the Workmanship Manual, and various Systems operating manuals, and we are developing a

dec BIWEEKLY REPORT

COPY NUMBER

DATE February 2, 1962
Page 16

J. Atwood (cont'd)

general purpose Facilities Brochure for recruiting and miscellaneous public relations applications.

Far and away the most demanding of these jobs is the Module Catalog. This looks at the moment like a 320 pager, and it will require more than the usual amount of planning and coordination and a lot more than the usual amount of luck to get it produced by March 19. We have set up temporary headquarters in the old carpenter shop, and we have a free lance artist and a temporary clerk whose sole assignment is to keep this one rolling.

1962 TRADE SHOW SCHEDULE

Show	Place	Dates	Ship	Products	Booth
Electrical Engineering Exposition (EEE)	New York Coliseum	1/29-2/2	1/24	Modules	Regular 20'
IRE Winter Convention on Military Electronics	Los Angeles Ambassador	2/7-9	1/24	Modules	Self-contained
American Research & Development Annual Meeting	Boston Hancock Bldg.	3/7-8	3/7	Modules	Regular 20'
Institute of Radio Engineers (IRE)	New York Coliseum	3/26-29	3/19	Modules	Special
Southwest Region IRE Conference (SWIRECO)	Houston Rice	4/11-13	4/2	Modules	Wire Rack 10'
Design Engineering Show	Chicago McCormick Place	4/30-5/3	4/23	Modules	Regular 10'
Spring Joint Computer Conference (SJCC)	San Francisco Fairmont	5/1-3	4/17	Modules and Computers	New 40'
National Aerospace Electronics Conference (NAECON)	Dayton Biltmore	5/14-16	5/8	Modules	Regular 10'
Armed Forces Day Exhibit	Bedford L.G.Hanscom Field	5/19	5/17		
Armed Forces Communication & Electronics Association (AFCEA)	Washington Shoreham	6/12-14	6/7	Modules	Self-contained
Military Electronics National Convention (MIL-E-CON)	Washington Shoreham	6/25-27	6/20	Modules	Self-contained

1962 TRADE SHOW SCHEDULE (CONT'd)

Show	Place	Dates	Ship	Products	Booth
Airways Engineering Society	Washington Mayflower	7/16-18	7/11	Modules	Self-contained
Western Electronic Show & Conference (WESCON)	Los Angeles Arena	8/21-24	8/7	Modules	Regular 20'
Association for Computing Machinery (ACM)	Syracuse War Memorial	9/4-7	8/29	Modules	Regular 20'
North Carolina IRE Symposium	Greensboro Coliseum	9/?	9/?	Modules	Self-contained
National Symposium on Space Electronics & Telemetry	Miami Beach	10/2-4	9/25		
National Electronics Conference (NEC)	Chicago McCormick Place	10/8-10	10/2	Modules	Regular 20'
Conference on Magnetism & Magnetic Materials	Pittsburgh Penn-Sheraton	11/12-15	11/6	Systems	Regular 10'
American Rocket Society Astronautical Exposition	Los Angeles Pan Pacific Auditorium	11/12-18	10/24		
Northeast Regional Electronics Meeting (NEREM)	Boston Commonwealth Armory	11/5-7	11/2	Modules, Systems and Computers	New 40'
Fall Joint Computer Conference (FJCC)	Philadelphia Sheraton	12/4-6	11/29	Modules and Computers	New 40'

dec BIWEEKLY REPORT

COPY NUMBER 2

DATE January 19, 1962

S. Olsen

Recent organizational changes in Sales include: the moving of Bob Beckman from Washington to Maynard and the addition of Nick Mazzarese and Jim Burley. Bob Beckman will be responsible for Computer customer relations in the areas of training and maintenance. Nick Mazzarese will be working in Computer technical sales beginning with the responsibilities for our multiple computer users IT&T and Beckman Systems. Jim Burley will be replacing Bob Beckman in the Washington regional office.

Friday evening I leave for Tokyo. The main purpose of the trip being to talk with our potential customers and the U.S. Commerce Department in Tokyo to determine the best way of doing business with the Japanese. Hopefully, I can reach some quick conclusions to be utilized in the follow-up trip by Jon Fadiman 3 weeks later on which he will be doing technical sales.

The week of January 29 we are having the AIEE Show in the New York Coliseum. Dave Denniston will be handling this.

R. Beckman

The following sentence is quoted from my first Bi-Weekly contribution on August 18. "In my opinion, the Bi-Weekly reports are important and certainly deserve a few minutes of conscientious effort once every two weeks or so." Now let's take a look at the record. Of the nine or ten Bi-Weeklies that have come out since August 18, the DC office has managed to get into five of them, and three of these were written by Lora Dunn. Moral: don't do as I do, do as I say. Luckily, very few people have followed my example, and the Bi-Weekly reports have again become valuable and informative. Now that (as the man in the fallout shelter said) things have settled down a bit, I'll try to do a better job of keeping everyone up-to-date on what's going on around here.

The above paragraph was originally intended for the December 22nd Bi-Weekly Report. Things unsettled themselves unexpectedly about then and this will probably be my last Bi-Weekly from the DC office. Starting in February, I'll by working in Maynard and Jim Burley, who has been reping for us in Texas, will take over the DC office. Present plans call for Jim to spend the first part of February in Maynard, so Lora will be pretty much on her own here. It's gotten to the point that most of the customers call for her, not for me anyway, so she shouldn't have any trouble.

My plans for the rest of the month include a trip to Denver the first part of the week of the 15th, and then to Maynard the end of that week. Then a trip to NASA at Redstone Arsenal in Huntsville, Alabama, the following week and probably another trip to Maynard. The last few days of the month will be spent getting the family moved to our new house in Framingham.

dec BIWEEKLY REPORT

COPY NUMBER

DATE January 19, 1962

R. Beckman (cont'd)

It's going to be hard to leave here, with the many interesting customers and the many more, as yet unexplored, potential customers. I'm convinced, however, that Jim Burley will do a better job than I ever could here, and I'm looking forward to a better and more personal acquaintanceship with the many people who have given me so much help in the last half year. You know, when I got out of the Navy my wife and I figured that we would finally be able to settle down for a while. Seven months is settling down?

L. Prentice

Engineering Changes	35%
1053 Computer Cabinet	25%
1073 Quality Control	8%
1026	22%
1064	10%

A Memo will be issued shortly indicating job allocations among Mechanical Design personnel. This should be a help for all to know who is most closely associated with each project. This memo will be issued monthly, bi-weekly, or as required.

We have one good prospect to set up Quality Control Procedures. If he can be hired, this will shorten the time to get this project under way.

All mechanical parts have been delivered for the Geo-Tech machine.

Work is progressing satisfactorily on three Type 31 Display Units. Parts and stock are on hand ready for rework. The first good-looking Tape Catchers have been delivered. Scott Miller has been working to improve our design, and re-design a new model based on a prototype received from Digitronics.

R. Hughes

The last biweekly period has been a hectic one. I have been setting up incoming inspection, inspecting computers, establishing quality criteria, working with Loren Prentice planning an inspection station for mechanical parts and organizing the QC plug-in unit test area. Memorandums pertaining to procedures will be issued shortly. Work is proceeding on getting test data sheets with complete specifications signed by Dick Best. I'm going to make 20 copies of these spec sheets in book form. In general, they will be available wherever circuit schematic books are located. The plug-in unit inspection area will have four of these books and they will be maintained and updated as necessary.

dec BIWEEKLY REPORT

COPY NUMBER

DATE January 19, 1962

H. Crouse

Mrs. Diane Spencer has joined the Purchasing Department as a clerk-typist.

Sub Contracting

Printed circuit modules - Electro Circuits - nearing the 200 a day mark on assembled boards, Veterans Administration - 40 a day.

Bob Blackwood and Ken Fitzgerald visited MacNabb Engineering in Waltham and found them to be a reliable source to produce 1901 mounting panels with the new dies just purchased.

Wiring is presently being supplied from four vendors, all of whom are turning in satisfactory work.

Revision of purchase order forms and requisition forms is now under consideration to cover the new cost system.

The following books are recent additions to the library.

Electronic Maintainability Volume 3 - by F. L. Ankenbrandt - Reinhold Publishing Corp.

A study of the design problems concerning maintainability of electronic equipment used in defense. The three services outlook is prefaced as well as the industrial approach to this new technical field.

5 Sets - 5 Volume Computer Basics - The Bobbs-Merrill Company, Inc.

Volume I - "Introduction to Analog Computers"
Volume II - "Analog Computers - Mathematics & Circuitry"
Volume III - "Digital Computers - Mathematics and Circuitry"
Volume IV - "Digital Computers - Storage and Logic Circuitry"
Volume V - "Computers - Organization Programming and Maintenance"

Industrial Electronics Measurement and Control - by Edward Bukstein - The Bobbs-Merrill Co., Inc.

Complete coverage of the equipment and techniques used in modern day production and processing systems.

Oscillator Circuits - by Thomas M. Adams - The Bobbs-Merrill Company, Inc.

A dynamic approach to the explanation of electronic circuit action, utilizing unique four-color diagrams to help you visualize what takes place inside oscillator circuits. Includes circuit fundamentals, plus an analysis of the nine basic oscillator circuits.

dec BIWEEKLY REPORT

COPY NUMBER

DATE January 19, 1962
Page 4

R. Lassen

We are currently actively recruiting for the following personnel:

Mechanical Inspectors	4
Receiving Clerk	1
Technician Trainees	no limit at present
Female Assemblers	no limit at present
Draftswoman	1
App. Machinist	1
Engineering Writers	at least 2
Programmer	1
Special Systems Engineer	1
Inventory Control Clerk	1
Janitor (Days)	1
Janitor (Nites)	1
Purchasing Expeditor (Female)	1
Applications Engineers	at least 2
Receiving and Inspection Clerks - Qual. Control	2
Technicians - Qual. Control	4
Technical Typist - Qual. Control	1
Tool Crib Attendant	1
Factory Mechanic	1

Since the last report, the following jobs have been filled (some pending physicals):

Female Assemblers (Days)	7
Female Assemblers (Mothers' Shift)	7
Wiremen	4
Technician Trainees	3
Applications Engineer	1
Engineering Assistant	1
Janitor	1
Blue Print Trainee	1
Inventory Control Clerk	1
Engineering Secretary	1
Personnel Secretary	1
Programmer Trainee	1
Mechanical Engineer (Junior)	1
Sales Secretary	1
Computer Check-out Technicians	2
Production Stock Room Clerk	1

dec BIWEEKLY REPORT

COPY NUMBER

DATE January 19, 1962

R. Lassen (cont'd)

The volume of applicants during the past 2 weeks has increased; however, the quality of these applicants in most categories has not been good.

Our personnel requirements are growing steadily in all departments, particularly, of course, in the newly created areas. Requests for people have taken a noticeable turn upward in the past month.

We are extremely pleased to have Margaret Rand working with us. She has already begun to strengthen our administrative and clerical responsibilities - her help is badly needed.

The Personnel Committee has approved the Job Evaluation and Classification Program for hourly technical people. The actual classification will be performed by each engineering department head and will be administered by the Personnel Department. I plan to start immediately on a similar program for Sheet Metal and Machine Shop hourly people.

W. Farr

Color Display 2042	80%
770 Power Supply	20%

It was found that the high voltage (10Kv) output was very poorly regulated at currents of over 400 microamps. This was due to the output impedance and wave form of a Sola constant voltage transformer that fed into the Wabash high voltage transformer.

The color display prototype's mechanical configuration is being finalized and the logic is being designed. In about one week dynamic tests will begin on the focus and deflection characteristics.

Two facts have become apparent from the static tests.

1. Initial set-up will be a painstaking task whenever a display is installed.
2. These initial adjustments are quite sensitive to environmental conditions such as temp., physical location and component values.

Another thing that has come out of the initial test is that the coming DEC Color Display will be at its worst, superior to the CRC RCA Color Display.

dec BIWEEKLY REPORT

COPY NUMBER

DATE January 19, 1962 Page 6

J. Fadiman

Memory Tester Development work	(EN 1018)	20%
Service work on Memory Exerciser 2207	(EN 1000)	20%
Core Tester and Memory Tester Sales	(EN 1037)	20%
Other system sales and proposal work	(EN 1038)	15%
General administration work	(EN 1000)	25%

During the past two weeks, the Core Tester 2113 for Ampex has been completely wired and is now ready for checkout. We have all the modules except for the Slicer Flip-Flops Model 1570, which will be available next week. Checkout will start on this machine on Monday, January 22. The Memory Tester Model 1516D for Ampex International has been completed and mostly checked out. All the modules are in the machine and final checkout is being done now. This machine will be shipped out on Thursday, January 25, to Hong Kong. Wiring work is now being done on the 1516F for Burroughs. All control panels have been completed and we are now waiting for the mounting panels to be delivered.

All front panel controls have been wired for the next three Buffers - Model 2007. The logic for the first buffer will be delivered today and wiring on that system will begin today. Wiring for the next two Buffers 2007, and the Buffer 2009 will be delivered next week.

Wiring drawings for the Digital-to-Analog Converter Model 2311 for MIT have been completed and given to Jack Smith. The necessary controls cabinet cabling, etc. have been designed.

Some maintenance work has been done on the Memory Exerciser 2207 at RCA, Needham.

New Business:

Last week two representatives from the Hitachi Co. in Japan were here, and they have definitely decided to buy a Memory Tester 1516 and an Automatic Core Tester Model 2113. A formal proposal has been sent out to RCA International. They are handling the Hitachi business in this country. The order is 100% certain for these two machines, totaling approximately $80,000. An order has been received from Standard Elektrik Lorenz in Stuttgart, Germany for an Automatic Core Tester 2113. General Electric Company in Phoenix, Arizona has definitely decided to buy an Automatic Core Tester 2113 and this order should come in within two weeks. RCA in Needham is definitely placing an order for a Semi-Automatic Core Tester 2110 at a price of $12,600. This order will come in within the next few days.
A proposal for four Memory Buffer Systems, Model 2010, has been sent to the Dept. of the Navy in Dam Neck, Virginia, and chances of receiving this order are good. Total business, $105,000.

Stan Olsen leaves today for Japan to investigate the selling of our memory test systems there. I will be leaving for Hong Kong on February 3 for one week and then will go to Japan for one week after that, for technical discussions with potential Japanese customers. I expect a considerable amount of business to come from these two trips.

dec BIWEEKLY REPORT

COPY NUMBER

DATE January 19, 1962

R. Savell

1064	35.0	1025	15.0
1027	4.7	1015	3.2
1056	7.8	1024	.15
1020	14.0	1038	4.7
2065	4.7	2042	.15

Considerable time has been spent recently on scheduling production of the computers and peripheral equipment. It looks as if the effort is resulting in a much clearer picture of where we stand than we have had before.

Labels for all computer and peripheral equipment which will be used for serial numbering have been ordered from Advertising. They will be similar to the labels now used on the Systems Modules.

Work is progressing on the Type 31 Precision Display. All parts are being constructed and a working system should be assembled by February 16.

Some work has been done on the tester for checking out reader, punch, and typewriter logic off-line to make it more useful.

K. Fitzgerald

The majority of my work for the past week and a half has been concentrated in the Sheet Metal Shop trying to get the work caught up. I have found that about 90% of the delay in the delivery of parts from the Sheet Metal Shop has been insufficient paper work. In order to clear up this problem, I have devised a program for Joe and his people to follow in the Shop and a program to be followed for other people requesting work from the Shop. I will outline the complete program as it now stands in hopes that everyone will recognize what their part in this program will be.

1. No work will be done in the Sheet Metal Shop without a completed work requisition form and a complete set of prints or sketches to do the work by.

2. These work requisitions and sketches or prints will be submitted to me. I will check them for things such as completeness of prints or sketches, job or EN number, realistic required delivery dates, and completeness of the description of the work required.

3. I will then approve the requisition for fabrication and check off the steps which are necessary in order to complete the work. If the Shop schedule will not allow for meeting the required delivery date, the requisitioner will be notified at this time.

dec BIWEEKLY REPORT

COPY NUMBER

DATE January 19, 1962

K. Fitzgerald (cont'd)

4. The work requisition and sketches will then be sent to the Shop where they will be entered into a Shop log and all pertinent information will be noted.

5. Joe Gill will then assign the first operation on the job to a person to perform it. As soon as he has completed his portion of the work, he will initial the work requisition and enter the date that he completed the work. It will then be sent to the next operation, inspection, chrome coat, etc. The job will pass completely through the Shop in this fashion. Upon completion and delivery, the work requisition will be removed from the job and filed in the Sheet Metal Shop.

6. The job will then be delivered to whomever or wherever it is designated on the original work requisition sheet.

This is basically the same type of procedure that we have been using in the Machine Shop for the past year, and it seems to have worked out well. However, cooperation on everyone else's part is essential in order that this system will work in the Sheet Metal Shop (mainly because of the size and complexity of the Sheet Metal Shop). The most important factor, when requesting work in the Shop, is naturally going to be a realistic required delivery date of the completed work. I don't like to sound repetitious, but again I must stress that everyone try to think as far ahead as possible and allow the Shops ample time to schedule as well as complete the work in the required time. I say this again because in the past month I have had two occasions where jobs have come into the Shop with an A-1 priority to be completed immediately, yet the material had been around for months and the fact that the work had to be done had also been known for at least a month and no effort was made to get it to the Shop to have the work done ahead of time.

Along the same lines, I am also requesting that orders for cabinets for either Systems or Computers be placed immediately upon receipt of the order for the Computer or System. This will give us time to completely fabricate the mechanical components of the cabinets. The cabinets will not be sent out of the Shop until all the mechanical work is done (and not before) to Systems or Production where if it is required they be broken down into smaller parts, they can be done at this time.

When it reaches the point where it is ready to be shipped, we know that it will go back together again and line up properly. This is necessary because the last two or three Systems and Computers that we have shipped have required extensive retrofit on the last one or two days. We have been lucky, so far, that this has not held up the shipping to any great extent, but the day is coming when it will.

dec BIWEEKLY REPORT

COPY NUMBER

DATE January 19, 1962

R. Doane

10 Mc inverter capacitance	30%
Pulse output of 1616, 4410, 1304	10%
Transistor F_t tester	23%
Catalogue information and applications	17%
Test Equipment	3%
Core Testers	5%
VHF	6%

Recently we have arranged for tighter specifications on magnetic cores for pulse transformers. However, there is a basic conflict between a 5 Mc pulse width specification of 70NS ± 14% (60 to 80) and the new permeance specification of ±15%. While pulse width is proportional to the inductance of a transformer winding in most pulse-generating circuits, there are other factors like transistor characteristics and resistor tolerances with an important influence as well. In addition, we usually specify that the width fall within the limits of 60 to 80 nanoseconds over the range from no load to heavy load. Since core permeance specs are at the limit according to manufacturers, one or both of the following steps will have to be taken if the tight specifications are to be held:

1. Component selection and/or matching. We (or the manufacturers) can test cores, resistors, capacitors, semiconductors, before use, and install components whose variations cancel one another, or simply reject components not meeting a narrower specification.

2. Circuit refinement. In the limit, use of an adjustable component for trimming pulse width in final test could be considered. Less extreme measures can probably yield markedly narrower distributions of production pulse widths, but at some cost in engineering time, through changes in geometry. Another kind of limit for this approach is the elimination of inductance discharge as the time reference, and substitution of capacitance discharge.

Since we will soon be setting comprehensive specifications for uniform and permanent use, it is important that the price of tight specifications is firm in our awareness.

A. Falco

EN1017	25%
EN1018	25%
EN1027	25%
EN1000	15%
QC	10%

dec BIWEEKLY REPORT

COPY NUMBER

DATE January 19, 1962

J. Cudmore

EN1026	38%
EN1058	22%
EN1000	17%
EN1010	14%
EN1011	7.5%
EN1016	1.5%

EN-1026 - All tape circuits, testers and test data sheets are being checked and revised.

EN-1058 - A tester for the printer buffer-driver 4700 has been built and tested and the new model has been built.

EN-1000 - Quality control. All test data sheets are being checked for accuracy and consistency.

EN-1011 - The 9 inverter package 4102 model, tester and test data sheet have been made and checked.

EN-1016 - Memory Driver 1973 has been changed to use a diode string of larger (physically) diodes and the layout modified to move the string away from the transistors. The 662 diodes were getting hot enough to burn the board in normal use of this module.

R. Mills

ACCOUNTING SYSTEM:

Cost Center Job Order Manual:

The Cost Center Job Order Manual was completed this week and sent around to the supervisors involved. We have had reports from only one person so far, with suggestions for making changes in the form of the internal purchase order. In order that we can meet our phase-in date for all cost centers on this system of April 1st, at the very latest, it is imperative that we receive your comments as soon as possible. The Advertising Department, this month, has been operating on the cost center system and we are now in the process of shaking out a few bugs. We will let you know in the next Bi-Weekly Report how we made out and will send you a copy of the forms that we are planning to use for the first go-around with your cost center.

Job Labor Ticket Change:

Effective next Monday, the Accounting Department will have the responsibility for picking up all job labor tickets daily, in order to match these with the time cards. A separate memo

dec BIWEEKLY REPORT

COPY NUMBER

DATE

January 19, 1962
Page 11

R. Mills (cont'd)

outlining the procedure, will be sent to you today and we believe this will speed up considerably the entire cost accounting procedure and the operation of the Cost Center Job Order System. Previous to this time, these tickets have been processed in whole weeks with a summary from IBM once a month. This had the effect of throwing a tremendous amount of work at the end of the month when we could least afford to have it.

Raw Material Requisition Procedure:

Effective February 1st, our new Cost Accountant, Ed Simeone, will be responsible for all the raw material accounting procedure. The Company has grown to such an extent that the raw material accounting procedure was throwing an undue burden on manufacturing and the work load had to be reduced.

IBM Room:

We are adding equipment to the IBM Room to handle the increased load of Cost Center Job Order System's, Raw Material Accounting, Job Labor Ticket Accounting, and other applications such as accounts payable and manufacturing job order costing which will be added in future months.

PROGRAMMING CLASS:

Our programming class has been quite busy these last few weeks, and last Wednesday we completed the main payroll program on the PDP-1. This does not include any programming for the in-out equipment, which is considerably more involved than the central processor programming. We look forward to doing some interesting things with our own PDP-1 computer, which will be coming to us around June.

D. Adams

Semiconductors tested since the last report.

Semiconductors	Mfr.	Units Tested	Percent Reject
D-001-1	Clevite	25000	1.5%
D-662-1	"	7285	0.68%
D-664-1	"	2075	6.0%
1N429	Hoffman	100	0.0%
1N645	Tex. Inst.	2210	46.5%
1N748	Tex. Inst.	100	0.0%
1N1220	Westinghouse	1500	0.51%
1N1227	"	1000	2.2%

dec BIWEEKLY REPORT

COPY NUMBER

DATE January 19, 1962
Page 12

D. Adams (cont'd)

Semiconductors	Mfr.	Units Tested	Percent Reject
2N2970B	Dickson	200	12.5%
1N2974B	"	400	3.75%
1N3024B	Motorola	72	0.0%
MA-80	Philco	3519	0.46%
MD-95	Sprague	1000	21%
4JX1C741	Gen. Elect.	100	51%
2N167	"	50	0.0%
2N674	Philco	500	6.0%
2N995	Fairchild	95	2.1%
2N1218	Sylvania	133	0.0%
2N1310	Gen. Inst.	200	5.0%
2N1472	Philco	40	0.0%
2N1754	"	10000	0.34%
2N2173	Tex. Inst.	100	3.0%

D. Dubay

EN 1048 100%

Test Equipment Service

The following instruments have been calibrated since January 8th.

Tektronix Oscilloscope Type 543 - Serial No. 597
524
1167
1478
1643
1171
1946
1543
1763
526
1232
148
599
1182
Type 543A 3422
3390
3423

dec BIWEEKLY REPORT

COPY NUMBER

DATE January 19, 1962

D. Dubay (cont'd)

Tektronix Oscilloscope Type 543A - Serial No.	3383
	3159
	3366
Type 545A	29267
Type 515A	3117
Tektronix Preamplifier Type CA - Serial No.	17317
	3255
	14232
	34779
	34086
	34781
	14231
	1898
	32560
	5238
	144
	20725
	31896
	24601
	33722
	20723
	20724
	29315
Type L	12577
Type M	122
Tektronix Oscilloscope Type 321 - Serial No.	1071

We have a new Tektronix Type 190B Constant Amplitude Signal Generator and a Fluke Type 825, .025% Reference Voltmeter.

We have ordered 25 Triplett Type 630-NA-RM Rack mounted multimeters. These will be used for Production and Quality Control test set-ups. This will release the Triplett meters presently being used in Quality Control for use in other areas.

dec BIWEEKLY REPORT

COPY NUMBER 2

DATE

January 5, 1962

J. MacKeen

2121	80%
2107,8,9	20%

Construction has started on Memory Buffers 2007-4,5, and 6. The first unit (#4) will be ready for checkout in several weeks. These three machines have a shiftable counter register and a clear pulse brought out to the jack panel for use in clearing the MA and MB registers. These are changes from the previous three machines which were delivered to Ft. Monmouth, New Jersey. (MB 2007-1,2,3).

MB 2009 (FAA) drawings have been returned from Drafting and panel construction and logic wiring are under way. This machine will be on time if there are no delays in construction.

As this is my last biweekly before leaving for the Army, I would like to thank all those who made my stay here so enjoyable. I have thoroughly enjoyed my work and the people I worked with here at Digital. See you in 1964!

L. Prentice

1000 Eng. changes	50%
1053	25%
2101	10%
2062	10%

Favorable returns have been received from Frank Armbruster from Vaught Camera as to proposals for camera table layout, also from Precision Mica Company in regards to making up the magnetic shield for the Litton CRT. Drawings for the shield are now complete and should be mailed to Precision Mica not later than today. These are also being forwarded to Mr. Armbruster of the Vaught Camera Company for his appraisal.

New presentations have been made during this period, color renditions of our standard colors and also the proposal for Beckman Instruments Company for their appraisal.

Ronald Cajolet has started to outline standard proposals for inspection of mechanical parts. This is a long and difficult problem and will take several weeks of his time. This requires recommendations for measuring tools with other tools needed in inspection and procedures and recommendations as to method, and required frequency of inspection. This is badly needed due to the amount of outside purchasing now being carried on in the company and it is hoped will be ready in three weeks to a month to be put into operation.

DF633 DIGITAL EQUIPMENT CORPORATION · MAYNARD, MASSACHUSETTS

dec BIWEEKLY REPORT

COPY NUMBER

DATE January 5, 1962

G. Gereids

The Engineering Model Shop is now in operation. Anyone wishing to have models made, large or small, is welcome.

The Model 728 +10 - 15 gnd is finished and ready for test.
The Model 772 Dual 36V is finished and ready for test.
The Model 736 30 Volt is finished and ready for test.
The Model 722 is not completed because of the lack of an 8 ⏦ 25 watt and a 20 ⏦ 25 watt resistor.

J. Fadiman

General Administration work	(EN 1000)	20%
Proposal for Ampex Tape System	(EN 1038)	25%
Core Tester Proposals	(EN 1037)	15%
Core Tester 2113 Design	(EN 2103)	10%
New Memory Tester Development work	(EN 1018)	20%
Memory Exerciser 2211C Checkout	(EN 2087)	10%

During the past two weeks the Memory Tester 1516D for Ampex International has been almost completely wired. Check-out of the logic will be started in the middle of next week. All production drawings have been completed for the new Core Tester Model 2113 for Ampex and the wiring is being completed in production. Front panels have been delivered and are being wired. Checkout of the Memory Exerciser 2211C for Ampex was completed this week and it was shipped on Wednesday, January 3, 1962.

New Business:

A bid is being prepared for the Systems Division of Ampex for a tape system exerciser which will be priced in the neighborhood of $5000. We have submitted a bid to RCA, Needham, for a Semi-Automatic Core Tester Model 2110, which is somewhat like our Model 2108. Price of this is $12,600 and we are sure that we will get this job.

Mr. Dick Hill of Remington Rand, Blue Bell, Pennsylvania, is interested in the purchase of an Automatic Core Tester Model 2113. It appears that Remington Rand has expanded their core manufacturing business and needs test equipment. I am going there this Friday to discuss the matter with him.

We have received a letter from the Standard Elektrik Lorenz Company (an ITT affiliate) showing considerable interest in our Automatic Core Tester Model 2113. A formal proposal has been submitted to them and I think the chances of making this sale in Stuttgart, Germany are very good.

dec BIWEEKLY REPORT

COPY NUMBER

DATE January 5, 1962

D. Adams

Semiconductors tested since the last report.

Semiconductors	Mfr.	Units Tested	Percent Reject
D-001-1	Clevite	25000	0.9%
D-662-1	Clevite	38642	0.2%
1N750A	Motorola	100	0.0%
1N758A	Transitron	88	0.0%
1N762	Motorola	40	0.0%
1N762	P.S.I.	3	0.0%
1N2974B	Dickson	100	0.0%
1N2974B	Motorola	5	0.0%
1N3005A	Motorola	25	0.0%
1N3024B	Motorola	28	0.0%
1N3209	Motorola	50	0.0%
1/4 M6.8Z5	Motorola	110	0.0%
1/4 M8.2Z5	Motorola	100	3.0%
FSP-2	Fairchild	61	0.0%
FSP-24	Fairchild	30	3.3%
MD-93	Sprague	1518	1.7%
MD-94	Sprague	4271	4.6%
2N398A	Motorola	20	0.0%
2N674	Philco	980	83.5%
2N711A	T.I.	5000	0.7%
2N744	T.I.	54	0.0%
2N995	Fairchild	30	0.0%
2N1146A	Clevite	255	1.6%
2N1218	Sylvania	132	4.5%
2N1301	R.C.A.	200	0.0%
2N1305	T.I.	10000	4.27%
2N1306	T.I.	130	0.77%
2N1308	T.I.	130	1.5%
2N1494	Philco	75	1.3%
2N1496	Philco	50	4.0%
2N1499-A	Sprague	1500	0.47%
2N1613	Fairchild	61	3.3%
2N1754	Philco	1131	0.34%
NS628	Nat. Semi.	342	1.2%
S1188A	T.I.	250	6.0%
T1796	Philco	3	0.0%

dec BIWEEKLY REPORT

COPY NUMBER

DATE January 5, 1961

D. Dubay

EN 1048 100%

Test Equipment Service

The following instruments have been calibrated since December 26th.

Oscilloscope	Type 543A	Ser. No. 3317
Oscilloscope	Type 543	Ser. No. 1479
Oscilloscope	Type 543	Ser. No. 1947
Oscilloscope	Type 543A	Ser. No. 3384
Oscilloscope	Type 543A	Ser. No. 3162
Preamplifier	Type CA	Ser. No. 14231
Preamplifier	Type CA	Ser. No. 34087
Preamplifier	Type CA	Ser. No. 29307
Preamplifier	Type CA	Ser. No. 146
Preamplifier	Type C	Ser. No. 18433
Preamplifier	Type C	Ser. No. 12319
Preamplifier	Type CA	Ser. No. 1899
Preamplifier	Type CA	Ser. No. 17316
Preamplifier	Type H	Ser. No. 10384
Preamplifier	Type R	Ser. No. 1468
Preamplifier	Type G	Ser. No. 7311
Preamplifier	Type E	Ser. No. 3339
Square Wave Gen.	Type 105	Ser. No. 5724
Time Mark Gen.	Type 180A	Ser. No. 6315
Time Mark Gen.	Type 181	Ser. No. 5159
LC Meter	Type 130	Ser. No. 6838

We received the following instruments during the past month.

1	ESI Capacitance Bridge	Type 270
1	Boonton R.F. Voltmeter	Type 91CA-R
1	John Fluke Differential Voltmeter	Type 825-A
1	Utica Power Writer	Type UA-300

M. Sandler

Orders for modules have indicated the need for 8000 units per month. I personally have set 8000 units per month as a goal. The need for and the setting of the goal is beyond us now. We must produce the units now.

dec BIWEEKLY REPORT

COPY NUMBER

DATE January 5, 1962

M. Sandler (cont'd)

To increase our production:

1. We have set a new standard for the amount of solder on our circuits. Thanks to Bob Hughes, we should save 1-2 hours per lot on this operation.

2. We have spoken personally with supervisors and people of the pressing need for good attendance.

3. Ken Olsen is investigating stepping up our Final Test procedures.

4. Shortly we will train girls on the Mothers' Shift to test units (Inverters and Diodes).

5. The Dyna-Sert machine will arrive next week and we will begin setup on that operation.

To augment our production:

1. We will be procuring 4000 units with components inserted within two weeks.

2. Shortly an outside vendor will add plugs and solder-dip modules.

R. Doane

1607 Pulse Amplifier	25%
Preparation of catalogue information	25%
Re-evaluation of inverter input capacitance	35%
Test Equipment	8%
Miscellaneous	7%

Elimination of transistors Type 2N711A from the 1607 5Mc triple pulse amplifier and replacement by MD94 and 95 transistors provides from 2.0 to 2.3 volts into 15 ~ load at a 2.5Mc rep. rate, a simulation of 18 direct flip-flop inputs. The first production lot made this way had marginally narrow pulse widths but will, no doubt, provide consistently adequate reset pulses in the computers.

Since we have tightened and improved the specifications on transistors used in our 5Mc and 10Mc lines, a reduction in capacitance needed to drive bases might be possible. I have built a box that allows 3 or 4 gates in series to be driven by a burst to make the investigation.

dec BIWEEKLY REPORT

COPY NUMBER

DATE January 5, 1962

J. Smith

The ITT #2 and ITT #3 systems have been given top priority. Computer checkout has been supplied with completion dates of the basic system and related options.

We are continuing to work as rapidly as possible on Special Systems. Delivery dates of wiring and panels have been supplied to this group and have been found to be satisfactory.

J. Cudmore

EN 1058	33%
EN 1010	32%
EN 1026	25%
EN 1011	8%
EN 2061	2%

EN-1058 - A tester for the Buffer Element 4700 has been designed and the most recent model is being checked out. One more change was necessary to reduce clear input sensitivity and this change has been completed by drafting.

EN-1010 - Test data sheets for various modules have been corrected and a tester for the 1689 DEC to 7090 converter has been designed.

EN-1026 - The 4517 Mag. Tape R/W Sw. model has been built, tested, heat checked and the tester checked out.

EN-1011 - A new 500Kc inverter package has been released. The 4102 contains 9 grounded emitter inverters with internal jumpered clamped loads. Pin connections are the same as 1669 Indicator Driver.

The etched wire layout for this module is completed, as is the tester and test data sheet.

EN-2061 - The first two memory stacks from Ampex were received and tested out. Both stacks had the Inhibit Windings wired backwards, but after this was changed and a minor short removed from one stack, both checked out fine.

D. Denniston

I am sure this is beginning to sound redundant, but it is the various Bell Laboratories that are keeping the NYO very busy these days with their end-of-the-year-delivery orders. I feel we have them all pretty much satisfied, at least temporarily.

dec BIWEEKLY REPORT

COPY NUMBER

DATE January 5, 1962

D. Denniston (cont'd)

I also made a trip over to Republic Aviation in Farmingdale, L.I., as a result of a reply card request from Mr. M. Davis. They are interested in lab modules that will be used by two groups there, each with their own application.

I also got down to Ft. Monmouth to hand deliver duplicate invoices of the ones we had mailed and were somehow lost by the people there. I visited with the people in the radar school also, while I was there.

W. Farr

2042 Color Display	80%
Transients in the reader punch and typewriter	10%
812-1 Punch Control	5%
Digitronics clutch, break, and motor failure	5%

Noise trouble has been investigated in the ASAP Flexowriter in the computer room. I have been trying to find the reason and the cure. It was found the high frequency pulses were on the 110vac ground line in the computer room.

Trouble was found in the Digitronics reader when the new brake was added. The brake transistor was found to overheat and leak, thus locking the brake and stalling the reader. Digitronics is working on the problem also.

The color display is now in operation. Static measurements are now being made to determine the parameters which will effect the design. Detailed design can proceed when these parameters are known. The project is about two weeks behind the intended schedule.

E. Harwood

The JPL Machine

The JPL machine is in its final checkout stages. The two areas remaining to be checked out are the Mag. Tape 52, the 18 bit clock and the 7 bit shift register. The last two items are waiting for plug-in units.

ITT Production No. 1

The ITT machine is also in the final stages of checkout. All the options have been checked out on the machine. The second memory is on the machine and is now being checked out. The sequence brake system has been checked out. The Mag. Tape 52 is being plugged in and checkout will start this week end. The line units have been checked out off line but

dec BIWEEKLY REPORT

COPY NUMBER

DATE January 5, 1962

E. Harwood (cont'd)

have not been plugged into the machine yet.

Geo Tek Machine

The Geo Tek machine has been under test for the past two weeks. There is still some mechanical work to be done on the Geo Tek machine and the Mag. Tape 51 has yet to be checked out with the computer.

The status of the modifications to be done at BBN in order to add the additional memory, drum and Mag. Tape 51 are as follows:

We have completed items 1, 2, and 3 on the memo describing these modifications. This includes the -1 to program counter, new in-out halt system and the need for a completion logic. These have all been completed and checked out and they all seem to be working well.

Items 4 and 5 will be done a week from Monday, on January 15. These items are, changing the time pulse on the shift gates, and adding the check status modifications.

While I was at BBN, I met Dr. William Holloway, who is in charge of their West Coast Office where we have shipped the computer. He told me the computer was running fine and that everyone there was quite pleased with it. They are using all the features of the computer system including sequence brake, relay register, Mag. Tape 51, etc. and he said we should feel proud and happy that we have delivered such a fine machine to them.

K. Fitzgerald

1000	40%
2061	30%
2063	10%
2104	10%
2133	10%

Much of my time for the past two-week period has been spent in liaison work between Donnelly Mfg. and ourselves in order to facilitate the construction of the three ITT console units which they are building for us. As of Friday, January 5, the first of these units will be completed and will be shipped to us on Monday morning ready for the addition of the punch and reader brackets and installation on ITT Production #2. Our repair and re-fit problems on the ITT console from Colonial Engineering have been time consuming and extensive. However, as of this date, it is 95% complete, ready for shipment; last remaining details will be cleaned up on it no later than Monday noon (January 8).

dec BIWEEKLY REPORT

COPY NUMBER

DATE January 5, 1962

K. Fitzgerald (cont'd)

The Machine Shop has rebuilt the die for punching 50 pin buss sockets which are now being used on all PDP's, built a small bending jig for Special Systems, and is presently working on a new transistor shear in order to facilitate production of Mag tape units. The shop is presently working on drill jigs and fixtures for the cabinetry. Also in the past two-week period, they have layed out and fabricated a few special panels for experimentation purposes.

R. Lassen

We are currently actively recruiting for the following personnel:

Mechanical Inspectors	4
Blue Print Trainee	1
Receiving Clerk	1
Engineering Secretary	1
Sales Secretary	1
Draftswoman	1
Apprentice Machinist	1
Computer Check-out Technician	1
Technician	1
Wireman	1
Engineering Writers	at least 2
Programmer	1
Special Systems Engineer	1
Inventory Control Clerks	2
Accounting Clerks	2
Female Assemblers	no limit at present
Technician Trainees	no limit at present
Applications Engineers	at least 2
Janitors (day and nite)	

Our methods of recruiting include schools, colleges, newspapers, radio, employment agencies and personal scouting. In many cases, personal scouting or "passing the word along" has brought us some excellent leads. Therefore, we urge you to review our employment needs, which are outlined in each biweekly, and to carry this information to people who may be interested in our new opportunities.

The number of hourly technical people continues to grow. Since our levels of work are becoming more and more diversified, we feel that it is time to evaluate and classify all hourly technical jobs. The principal reason, of course, is to better organize our job and wage structure especially in the light of the continuous growth of this group. The first

dec BIWEEKLY REPORT

COPY NUMBER

DATE January 5, 1962 Page 10

R. Lassen (cont'd)

proposal of this plan has been submitted to the Personnel Committee.

Interviews are getting back to normal after an expected slump during the Holiday Season. Several prospects are "in tow" and I hope they will be joining us before the next biweekly. We are anticipating large numbers of applicants starting January 8th; therefore, the Personnel Office will remain open for interviews until 6:00 P.M. until some of the more urgent jobs have been filled.

I will be visiting Industrial Technical School on January 9th looking for additional Technician Trainees. This will also give me a chance to look over the school to see if it is a reliable source.

On January 10th a group of young men from Worcester Boys Trade will visit us. Quite possibly there may be 2 or 3 good mechanical or electrical trainees in the group.

Since the last report, the following jobs have been filled:

1 Sales Engineer
1 Purchasing Expeditor
1 Mechanical Draftsman

Lora Dunn

Everyone is no doubt familiar with the Eastern Joint Computer Conference held here in Washington last month so I won't go into detail. General Electric in Bethesda, Maryland called to get the price of our PDP-1. They had seen it at the show and were quite interested.

Mr. Beckman has an appointment next week with Mr. Favret to go over his "shopping list" of equipment for Georgetown University. Seems they will be placing another order in the near future.

NSA at Fort Meade, Maryland has inherited some of our modules from a previous user and will be ordering more equipment soon. There is a rumor around the NSA Labs that they will possibly be standardizing on one company's equipment. Since we already have equipment there, this should be an asset to us in the event of standardization.

We also have high hopes of getting an order for equipment at Catholic University.

To everyone at DEC from the Washington, D.C. office, best wishes for a very, very happy new year! Along with this wish comes a great big THANK YOU for the assistance given us since the opening of the office.