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102750017

dec BIWEEKLY REPORT

COPY NUMBER 2

DATE December 21, 1962

R. Doane

VHF Test System	35%
Transistor F_t Tester	25%
Miscellaneous	40%

The test system operates without errors at 25 Mc, makes an error after an average of a few hundred thousand pulses at 30 Mc, and works intermittently at 35 Mc. I expect that more work will improve its performance, and allow wider margins at higher frequencies. At present, the operating pulse width is 15 usec at 25 Mc, decreasing to 7 to 11 usec at 35 Mc.

The F_t tester is nearly ready. It uses resonant cables cut to ¼ wave length at 10 Mc (3/4 at 30 Mc, 5/4 at 50 Mc) to provide a 3000Ω source impedance for the base and a 2½ ohm collector load by transforming a short circuit to a high impedance in the first case, and an open circuit to a low impedance in the second. With this system, only the oscillator settings will have to be changed when the frequency of measurement is changed.

J. Cudmore

EN 1073	60%
EN 1098	40%

During the week of December 10th we were visited by Charles Shade of Johns Hopkins Applied Physics Lab. He brought about 100 modules with him to be retested. I spent the entire first day describing the tests of each module type that he brought. He worked the next day and a half with Arthur Parks observing the actual testing of each module type. He was particularly impressed by the thoroughness of our retest procedures. Mr. Shade also spent some time learning the various functions of the 2309 Burst Generator and thinks that APL will probably buy one.

Q. C. has taken over the handling of the second copy of the test data sheets. Only 10% of the sheets from each lot are filed. When these sheets are 6 months old, 90% of them are discarded. We will always retain at least one sheet from each lot time unit. All first lot test data sheets will be retained; 90% of these sheets will be discarded after 6 months. This system will allow us to obtain the desired historical data and also minimize storage space.

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R. Grey

Last week we had another problem with our Amphenol plugs on system modules. It seems that since we started using washers as spacers the plug tended to tip in the opposite direction. There were less rejects per lot than before, however. Actually this was not due to the washers but to a plate added to the riveting machine to keep the plug parallel to the board. Removing the plate solved the problem.

R. Gaboury

During the past two weeks Mechanical Inspection has had the final and intermediate inspection on machines:

Intermediate	Final
DEC PDP-4	IBM Memory Tester 1520
DEC CRT Display 30A	
DEC PDP-1	
IBM 2114 Core Tester	

A comparison between our shop and vendors for the time 12/5 to 12/19 gave the following results:

Shop	Vendors
2.2% rejection	2.3% rejection

These figures are based on sheet metal work, paint, and finishes.

R. Winslow

Semi-conductors tested since last report.

Types	Manufacturers	Units Tested	% Reject
MD114	Philco	6488	0.43%
SDA1	G.E.	2	0.00%
SJ 1071	T.I.	7	0.00%
SP 390	T.I.	65	9.3%
T 1796	Philco	50	4.0%
2N744	T.I.	1	0.0%
2N1184B	R.C.A.	150	11.0%

R. Winslow (cont'd)

1N 764	Transitron	280	0.00%
1N1217	G.E.	2	0.00%

D. Dubay

Test Equipment Service

The following equipment has been calibrated since December 10.

Description	Type	No. Calibrated
Oscilloscope	543/543A	14
"	541	2
"	545	1
"	187B	1
Curve Tracer	575	2
Preamp.	CA	13
"	S	2
"	D	2
"	K	2
"	L	1
Meter	260	1
"	630NA	21
"	630NA-RM	8
"	980	2
"	931	4
"	433	1

The Type 545A oscilloscope, which has been at B. B. & N. since last January, is back in the plant. It has been recalibrated and checked out to Bob Beckman.

We have a Hewlett-Packard Type 175A oscilloscope on loan from Yewell Associates. This is a general purpose scope with a rise time of less than 7 nsec. Several types of plug-in vertical amplifiers are available as well as plug-in horizontal time base units. At present we have a high gain (5mv/cm) single trace vertical plug-in unit with a sweep delay horizontal time base plug-in unit. We will have a dual trace vertical plug-in unit within a few days. This scope has been placed in module test to give it an appreciable amount of use while it is here.

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R. Gagne and D. Adams

EN 1098 100%

Within the last two weeks the second Automatic D.C. Tester has been changed from relay control to D.C. logic control. It has been checked out and calibrated and has been running for production for the last week.

In the last week we have had a lot of trouble with the Automatic A.C. Tester, especially with the 567 scope. One time we had trouble with the upper and lower limits controls. This was traced to a bad relay in the tester itself. We then had no readout in the 6R1 plug-in on all the X2 time per division scales. This was traced to a bad transistor in the scope. The latest problem has been in some part of the scope's power supply.

I have also had to replace a couple of the 22 pin module sockets on the A.C. tester boxes because of one or two pins breaking off. This was a rather difficult job because when these were originally made they used a taper pin socket and taper pinned all the Magnicraft relays to it. In replacing the socket, I used the new AMP socket and soldered the relays to it.

We are now working on some special units to improve the Automatic A.C. Tester--both in reliability and dependability.

P. Greene

The first system for Western Electric, North Andover, has been built and the second one is well on its way.

Contact has been made by telephone with the University of Chicago concerning their "Spark Chamber" experiments. It appears that they have experimented with 80 mill storage cores and got them to switch with 100 nanosecond pulses of 1 amp magnitude. After making these experiments they have contacted us to find out if we could switch cores at a 1 Mc and then a 5 Mc and later on at a 10 Mc rate. These speeds are well beyond the rate at which we can switch cores. After a little investigation I found out that they are using an EH pulser which has 8 nanosecond rise times. It looks as if Mr. Bounin of the University of Chicago is willing to compromise and perhaps he will be able to use the techniques

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P. Greene (cont'd)

already developed by us.

We are planning to bid on a job for Photon of Wilmington by the end of next week. The job is for a reader that will write paper tape from mag. tape and vice versa. We will have to buy a Potter tape machine and paper punches etc. to do the job.

K. Doering

Twenty ohm trimpots from Bourns had been leaking (with a green mess) on two returned 1566 modules, as mentioned in the last biweekly. From a Bourns representative we learned that these trimpots are not of a sealed type and that they were never designed to be dipped into trichlorethylene. The sealed type trimpot is considerably more expensive (34%). Final determination has not been made yet; as for now, these modules are not dip-cleaned any more, just brushed with trichlorethylene.

Production had difficulties assembling classroom modules onto their brackets. A stock reinspection showed approximately 10% of the boards off on assembly holes. These modules had by-passed mechanical inspection.

The spacers for the Amphenol connector plug on system modules finally came in and are being used successfully after some temporary difficulties. These resulted from a block that partially took care of previous difficulties. This block did not get removed so that the blue connectors now tipped over the other way.

Some printed circuit layout difficulties were discovered when we realized that all our system module boards are 1/32" narrow. On one especially crowded layout, the circuit was very close to the handle so that it could not be approved. Our stock of approximately 40,000 boards has this error, which has to be calculated at a crowded circuit layout. Our board suppliers manufacture these boards with an old die. It never got modified to our latest print, because we made a die of our own to take care of this business of breaking out boards ourselves.

Our die has not been put in use yet--the stock has to be used up. We have one die that punches the two locating holes into a panel

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K. Doering (cont'd)

with 8 boards; a second one that breaks the boards out of this panel one at a time, and a third one that punches the 22 holes for the Amphenol connector plug for one board at a time. These dies were made by Burgess Brothers some 6 months ago.

Acceptance inspections of these dies revealed that several dimensions were beyond tolerance limits. We have never accepted them, but the disposition of these dies has never been decided on. After we had the die inspection forms and drawings made up, reinspections were done and properly recorded.

The people connected with this business should now get together and make a decision. There are some things involved that make a discussion necessary.

Representatives from Components Mfg. Company visited us last week pertaining to our problems with banana plugs (those with colored plastic molding around). Ucinite supplies them with the metal portion of the plug and Component puts the molding around. Some two months ago we found difficulties withdrawing these plugs from each other. Ucinite at that time partly solved the problem by increasing the I.D. of the receptacle end. Two thousand other parts were reamed out. Now the old problems have come up again - one can't pull the plugs apart. As Ucinite obviously is either not willing or not capable of solving a single engineering problem, Component Mfg. people are thinking of manufacturing the metal parts of the plug itself. They have a die maker who needed some detailed information which we discussed with Loren Prentice, M. Sandler, and F. Kalwell. Before this project will start, months might pass. In order to solve our immediate delivery difficulties on these plugs, we agreed on Component's reaming out the receptacle end of the plug, which means additional unnecessary, but at this moment, unavoidable costs.

I am leaving on a winter vacation today and shall return on January 3.

J. Fadiman

Today we finally shipped the Memory Tester 1520 off to IBM, Owego. Checkout has been nearly completed on the Core Tester 2114, also for IBM, Owego and an engineer from IBM has been down here inspecting it. The system will probably be shipped the first week in

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J. Fadiman (cont'd)

January. Construction has been proceeding rapidly on the Memory Tester 1521 for Ferroxcube and this will be ready for checkout in about one week. Delivery on this system should be made the third week in January. Other systems under construction are the Core Testers 2113 I and J for E.M.I., the Memory Buffer 2010 for the University of Connecticut, and the Memory Exerciser 2212A for Western Electric.

New Business

The following new business is expected shortly.

1. Core Testing system for NCR; probability for getting this order 95%.

2. Memory Exerciser 2211D for Ampex Computer Products Co.; probability for receiving this order - 80%.

3. Memory Tester Model 1516 for Siemens in Germany; probability for receiving this order - 95%.

4. Memory Tester 1516 for Mobara Works of Hitachi; probability for receiving this order - 70%.

5. Core Tester 2113 for Mobara Works of Hitachi; probability of receiving this order - 70%.

6. Spark Chamber Analysis System for Harvard University; probability of receiving this order - 95%.

We have also made bids to Raytheon and to Daystrom on two different Memory Exercisers and we are preparing a bid for Photon for a magnetic tape to paper tape and vice versa converter. We have spoken with two people from Dupont Co. who visited us last week concerning the possibility of supplying them with specialized Digital equipment for processed control work. This might turn out to be a very large and important business but as yet we are still at the talking stage. However, they are already starting to use our modules in small quantities.

The manual for the Memory Exerciser 2207 for RCA is finally being completed and the re-written copy is now being typed.

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A. Blumenthal

EN 2253	40%
EN 1016	60%

Installation of the United Aircraft machine (PDP-1C-24), was carried out on December 5, 1962 thru December 7, 1962. The acceptance test on the basic machine went off without a hitch and was completed on the afternoon of the first day. In checking the special options a couple of bad 4213 modules turned up in the D to A output buffers. These were replaced with spare units the customer had on hand.

A fair amount of readjustment was necessary on the Packard Bell A to D equipment mostly to get the offsets back in line. Curves were then plotted on each channel individually to check the jitter and linearity through a +120 to -120 volt range. At some parts of the range the total error exceeded the $\pm$32 mv accuracy we wanted (4 times the LSB), notably around 80v input. Another chronic problem on the multiplexer is the poor resolution of the gain controls for the individual channels. These circuits were modified by Packard Bell to accommodate a $\pm$128 volt range using the same gain pot as the original circuit. This caused a drastic change in the resolution.

United Aircraft has agreed to accept the computer with the understanding that our responsibility to improve the Packard Bell equipment continues. After the installation crew had left, United Aircraft made a quick lashup between the PDP-1 and their analog computer and reported that the performance was excellent in spite of the anomalies in the A to D system.

I have arranged a meeting on January 4, 1963 with the local Packard Bell representative and a factory engineer at which time we will determine the means by which these problems will be corrected.

A concerted effort is under way to reduce the cost of our memory systems. It is felt that considerable PDP-1 and PDP-4 business can be salvaged if expanded memories can be supplied at lower cost, as well as opening the door to the sale of memories themselves. A considerable saving can be realized by using the same driving and selection circuits for several 4K stacks instead of the completely independent systems we now employ. We hope to make this

A. Blumenthal (cont'd)

possible for memories up to 16K registers. A new addressing scheme has been devised which reduces the selection circuits by a factor of 4. A number of circuits for driving and field selection have been designed but not yet tried. Side savings are in power supplies and rack space necessary to house the systems.

A memory tester similar to the one used by production is being assembled to test these systems and should be complete within a few days.

D. Wardimon

EN 1016 100%

For a long time there has been a need to improve the existing 1973 memory driver. The circuit failed whenever a multiple selection or a short output (of the circuit) occurred. A new module has been constructed which is designed to withstand multiple selection and shorted output to ground.

A protecting resistor has been incorporated in the circuit which limits the current to safe values whenever the output is loaded above normal and thus eliminating the possibility of output transistor failures. This resistor has to dissipate a substantial heat and therefore has to be mounted somewhere outside of the module.

This fact and also rearrangement of pins assignments on the module will make the new circuit incompatible with the present scheme; therefore, a new wiring will be necessary in the future memory systems or whenever a necessary change is made on existing systems.

The introduction of this new memory driver (1989) will be accompanied by a change on the 735 memory power supply. The unit has been released for production and hopefully will cut down the failure rate of the 1973 memory drivers that occurred during testing and checking new installation as well as in existing systems on the field.

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L. Prentice

Security	10%
Linc Tape Drive Project EN 1136	10%
EN 1000	80%

Dyke Associates (Mr. Mike Cridland and Mr. Paul Rawson)

Mr. Rawson spent one day here during the period and Mr. Cridland two days. These days were December 11th and 12th. We have a report from that relating to the styling of the Linc Tape Unit and also some general areas relating to our trademarks and product identification in general, and most particularly with a revamping or updating of PDP-4. This report has been discussed with Scott Miller, Ken Olsen, and Roland Boisvert. The report will be made available to any interested party and several will be contacted directly. Their suggestions on the Linc Tape Unit will probably arrive too late to influence the first eight units to be made. Some of these suggestions may be incorporated into the units made after that. Eight motors have been received for the Linc units and four heads are on order. The decision has been made to build two engineering models, plus two to four models to be exhibited at the show in March. A design will be submitted on paper to interested parties on a single unit housed in such a manner as to be set on a desk top or a computer table. This will be kept to the minimum size of 12 to 13 x 20 x 12 1/2.

We are losing several people in our shops. Most of these people are terminating in the near future, either shortly before or shortly after the first of the year. Advertising for replacements at this time of year is almost useless, so advertisements for replacement people will probably not appear until the first week in January.

Quite some time has been spent with Henry Crouse and Klaus Doering going over the drawings for the proposed new plug-in plugs and receptacles. Some discrepancies were found and the company has been asked to indicate changes to correct these for us. The plug seems complete as of today. Calls were made to them indicating that if they will update their drawings we can approve the plug. Some questions still remain to be answered on the receptacle. Also time was spent with Component Mfg. Service, Inc. (Mr. R.E.Owens) discussing designs for the miniature banana jack plugs that are used in their patch cords. They plan to investigate building dies,

L. Prentice (cont'd)

etc. and manufacturing them in their own area rather than procuring them from Unicite. This was discussed with Mr. Arthur Healy of the same company, who is their die man, as to various methods of securing the spring element on the jack and more precise forming and the possibility of electro-polishing the spring before it is attached to the screw-machined part of the jack.

Sgt. Bushman of the Pinkerton Detective Agency has been moved to the Worcester area and up-graded to a lieutenant and if satisfactory after 30 days will be promoted to captain with full surveilance over that area. We are very fortunate to have a man of his stature here on our guard force. He is being replaced on a temporary basis by Mr. George Gault.

K. Fitzgerald

EN 1023	50%
EN 1027	10%
EN 1000	40%

Carpenter Shop

The carpenter shop is still running behind on its scheduled work load. However, if we don't get too many emergency rush jobs we could have the back log cleaned up in approximately two weeks. Preparations for the annual Christmas party threw another big crimp in the schedule of the carpenter shop, as do all of these last minute unplanned for work requisitions.

Machine Shop

The machine shop load is about average but will soon be very heavy, due to the need for manufacturing special jigs to be used when assembling 1901 Mounting Panels. If this jig is successful, others will have to be made for all the different sizes and styles of mounting panels that we normally manufacture. We are also planning to be pretty busy in the machine shop as soon as the design and material for the Linc Tape Reader is finalized. A great percentage of the parts used in the assembly of these Linc Tape Units is manufactured in the machine shop and if all goes according to predictions, one man will be tied up on this work for at least a month on the preliminary go-around.

K. Fitzgerald (cont'd)

Cabinet Assembly

The cabinet assembly shop is more or less keeping even with its load because we have been able to juggle personnel back and forth between the cabinet shop and the sheet metal shop.

Sheet Metal Shop

The load is presently down and it looks like it may stay down for two to three weeks according to the word from the production control department. This will be very fortunate for us if this does happen as we are expecting to lose four people during the month of January. Most of these people are planning to fulfill Armed Forces obligations.

I have been spending quite a bit of time lately on designing the jig to be used for the assembly of our 1901 Mounting Panels. As mentioned earlier, if this jig is successful, we will have to build them for all SPU Mounting Panels.

We have been getting many complaints lately that the mounting panels have been too tight and modules could not be inserted or withdrawn easily. In every instance where this has occurred, we have been able to rectify this simply by loosening all the fasteners on the whole mounting panel, spreading the two side plate retainers and retightening. This has shown us that it seems that the biggest problem with mounting panels is method of assembly. The new jig is designed to properly space all parts and clamp them in position before any of the screws, nuts or bolts are installed. This jig will also facilitate the assembly of these units, using the new style Amphenol plug. At this time, we do not know whether the best way to have these Amphenol plugs is with a threaded insert in the end rather than the threaded stud, which is presently on the new design. However, information is being gathered pertaining to machines that will feed and drive a screw automatically and machines that will feed and drive a nut automatically. At first glance it seems that a threaded insert would be better in the event that any time or any place a plug is found to be loose on the mounting panel because of a stripped thread, it is a simple matter to drill through the insert and insert the regular nut and bolt, whereas with a threaded stud it would become most difficult to make a repair.

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K. Fitzgerald (cont'd)

When the jig is completed, dummy plugs simulating threaded inserts and some of our new plugs with threaded studs will be used to make an evaluation as to which method is best in assembly. Vendors who handle the machinery for feeding and inserting these nuts and screws will be asked to bring their equipment in and demonstrate it under regular assembly conditions.

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J. Smith

Effective December 3, 1962, all systems paint touchup responsiblity will be transferred from Silk Screening to Cabinet Assembly. Gerry Bouthiller has turned over all supplies and information to Ed Mayall. Ed will require some help from Silk Screening on his first couple of systems.

G. Rice

Recently there has been considerable interest in a new tape control unit and/or tape transport. What the customers are looking for are systems with any or all of the following characteristics:

1. High reliability
2. Automatic control for the PDP-4
3. Two density units 200 and 556.

R. Hughes

In the 1538 sense amplifier modules and in the 1567 display pre-amplifier module, we use SDA-1 transistors. This is a differential amplifier which has two silicon planar transistors in one can. These transistors have matched beta and V_{BE} specifications.

Out of the SDA-1's we started to select what we called SDA-1 red transistors. These had an emitter to base breakdown voltage rating of 11 volts. We were using these in the 1572 module, which is a DC difference amplifier. Then we discovered that as used in the 1572, this transistor had to have a beta greater than 100 at 100 microamperes, and we started getting a 6% yield of SDA-1's which would meet this requirement. This is very poor, so we asked Texas Instruments to supply us with a device called the SDA-2, which would have an 11 volt emitter to base breakdown voltage rating, and a beta of 130 at 100 microamps.

They will not sell us this device as a device but will sell it to us on a basis of a certain percentage of SDA-1's. We are in hopes of being able to buy SDA-1's and SDA-2's in a ratio of four to one respectively.

Amphenol sent us 70 of the new mounting panel connectors which they have been designing especially for us. Inspection of the samples

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R. Hughes (cont'd)

disclosed that the contact had 0.053" float in them. This was one of the problems which we had hoped to eliminate with this new connector design. The maximum float was specified to be 0.016" so we sent these connectors back to Amphenol and they are going to solve the problem again.

J. Cudmore

EN 1073	80%
EN 1098	20%

The Contronics automatic diode tester was finally delivered on Wednesday, December 5th. This machine measures the forward peak and reverse recovery of diodes. It has the capability of being connected to the Terradyne DC tester to enable all the tests to be performed at one pass. The machine appears to work by itself but doesn't work with the Terradyne. There are some logic changes that must be made before the two machines will operate properly together. This machine was originally scheduled to be delivered by June 22. The final machine is radically different from the original design.

The machine performs these measurements using the principle of the Tektronix "S" unit. Forward current can be programmed up to 40 ma and reverse current up to 20 ma. The recovery time range is 10 NSEC to 10 µsec with an accuracy of 2% or 2 NSEC, whichever is greater. Forward peak voltage may be measured up to 4 volts with an accuracy of 2%. The test time for one unit is presently 3-4 sec. This time can be halved if the motor-driven cam unit is speeded up. Completion of the installation of this machine will be accomplished by the end of next week.

Carl Moberger of the Liberty Mutual Insurance Company has visited us twice. The first time he was accompanied by Al Dowden, an electrical engineer. The subject of these visits has been Digital's liability to its customers. Several recommendations have been made and a memo will be published when I receive the final report.

Our module test specifications are being re-evaluated and will be updated as more complete data becomes available. Some of our specifications haven't been updated since 1959.

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K. Doering

An instruction chart was sent out last week which spelled out where certain screw finishes are to be used. Now there is something to go by, but nobody is happy about it. We are going to check future assemblies against these criteria. There will be many questions, such as what part is "exposed to view after assembly" etc. What we mean by that is mainly a part like an operator control or other front panel that has screened lettering on it or is clearly defined as a "front panel".

We have worked out a correlation record form for semiconductors and components which will gradually be put into use. The vendor sends in 10 samples of every shipment coming in with his readings on his test equipment. Before we test the shipment, we first check out whether we correlate on these 10 samples. If the result is positive, test will be performed; if negative, the vendor has to be notified first.

Last week we also sent out--to the people involved--a chart with electrical assembly inspection criteria that spells out in detail what the inspectors are checking. We have had such bad experience in the past where we found improper solder connections at final inspection, which should have been found at intermediate inspection, that we rigidly tightened up at intermediate. A vendor complaint forced us to reinspect some machines very rigidly in the final stage. This caused some friction because the people in charge of the machine felt that all this should have been done earlier. They were right, but we still had to get a good machine out which we finally succeeded in doing, and that was the important factor.

The intermediate electrical inspection on a PDP-1 took 4 hours yesterday.

There is a publication about good soldering practices, with many illustrations, which we ordered. We hope to use some of these pictures to help our people improve their work quality.

One hundred seventy one lab modules that were in the production process when the new drill jig and inspection gage for the back panels were issued were reinspected. Thirty four of them were rejected and replaced by proper back panels. They are now

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K. Doering (cont'd)

continuing in the electrical test process.

Trimpots from Bourns have a pocket in them which can store trichlorethylene. We received some modules from a customer which had green gunk on them. It appeared to have come out of the pot and we suspect that trichlorethylene sealed itself off, but under elevated temperature conditions (we assume) leaked out and started to dissolve the insulation on the green pot wire. Two 1564's were sent back from a customer. We agreed with production not to dip these trimpots into trichlorethylene any more until this problem is solved. Bourns is going to send a representative. The modules, in finished goods, with trimpots were just put into an oven for 8 hours at 60°C and did not leak at all. A trimpot has been put into tri. and we will check the results of this test.

Mechanical assembly inspection criteria are being worked out. An improved form for recording the checkout date of the die inspection has been issued today (DF22-19).

R. Grey

An electrical assembly inspection criterion for all units has been distributed. It should be of considerable help in the assembly area.

Most of our time in the last two weeks has been consumed by assembly inspections including a trip to ITT by Dave Adams and myself for an inspection of ADX-5. This trip proved of value in that it gave us an idea of the condition of a machine in the field.

D. Adams and R. Gagne

EN 1098 100%

Roger Gagne started working in Automatic Module Test this past week. For the past few days I have been bringing him up-to-date on the operation of the Automatic D.C. testers, and he is now in the process of converting the other motor-driven tester to D.C. logic.

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D. Adams and R. Gagne (cont'd)

We have finished the logic drawings of the automatic A.C. tester, which makes it a lot easier to trouble shoot. I am in the process of making a few logic changes so that it is possible to test the rise and fall times of inverters twice as fast as we are now doing them. A switch panel has been added to the tester which enables it to advance and stop on any combination of tests without having to rewire or change plugs.

We hope to make up some new tester boxes and plugs for testing binary-to-octal decoders and as many others as we can.

D. Dubay

EN1144 100%

Test Equipment Service

The following equipment has been calibrated since November 27th.

Description	Type	No. Calibrated
Oscilloscope	543/543A	13
"	545A	2
"	551	2
Preamplifier	CA	18
"	L	2
"	O	1
"	E	1
"	H	1
"	K	1
Multimeter	980	7
"	630NA	16
"	260	1
D.C. Milliammeter	428B	1

The following equipment has been received since November 27th.

1 Boonton Model 95A Sensitive D.C. Meter
5 Tektronix Type P6016 current probes with passive termination. Three of the current probes were ordered for Bob Beckman. The other two current probes were ordered for Ed Harwood.

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D. Dubay (cont'd)

The Boonton D.C. Meter was purchased to provide some relief for the Fluke meters. It is a center scale meter with full scale sensitivities of ± 10 microvolts to 1,000 volts and ± 1.0 microamperes to 1 ampere. Input resistance is 10 megohms.

R. Gaboury

During the past two weeks Mechanical Inspection has had the following final and intermediate inspections on machines:

Intermediate		Final	
DEC	Display CRT 30G	DEC	PDP-4
DEC	Display CRT 30	DEC	PDP-1
IBM	Memory Tester 1520	DEC	Mag Tape 50-51 Control
ITT	ADX 8	ITT	ADX 8
MIT	Drum	MIT	Drum

The PDP-1 had its marginal check waived, also the display CRT 30 - they were being shipped to a show.

A comparison between our shop and vendors for the time 11/26 through 12/5 gave the following results:

Shop	Vendors
3.03% rejection	1.51% rejection

These figures are based on sheet metal work, paint and finishes.

A new dial indicator from Federal has been ordered; the one we have in use read inaccurately and has to be sent out for repair. It reads to .0001 of an inch. It is used for surface plate work on our die and jig inspection program.

A micrometer for checking the crimp height of the taper pins has been ordered.

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DATE December 7, 1962

R. Winslow

Semiconductors tested since last biweekly.

Type	Manufacturer	Units Tested	% Rejection
SDA-1	Texas Instrument	31	90.0%
2N-744	" "	200	0.0%
2N-1309	" "	1000	4.2%
2N-1600	" "	16	6.3%
1N1217	Westinghouse	791	0.25%
1N3316B	Dickson	155	0.0%
SW 1250	Transitron	250	2.8%

E. Towle

Interoffice Communication

The telephone bill in recent months has been reaching proportions that has caused us much concern. It's difficult to lower telephone cost without disrupting or hindering communication. However, in order to at least maintain a more reasonable rate of increase, the following steps have been taken:

1. Removal of unnecessary phones
2. Restriction of several phones
3. Requesting information on calls from restricted phones
4. Closer examination of phone bills

Because our sales department depends to a large degree on the telephone as an important tool in expanding the sales program, it would not be feasible to reduce expense in this area. Therefore, the suggestions that I would like to consider concerns communications between the home plant and all branch offices. It is not possible for me to decide whether a $20.00 or $30.00 phone call is necessary to coordinate our activities. Since there is a definite need for immediate communication at a particular time, thought should be given to the method of conversing (phone or TWX) and also topics to be discussed. Timing of the call is an important factor and should be considered when you find it necessary to contact a particular person. Calls have actually been received during the lunch hour as well as after hours. Needless to say, the person to be contacted is seldom available and the advantage of using the

E. Towle (cont'd)

phone has been lost. Schedules may seem a little cut and dried at times, but for routine consultations with the Sales and Engineering Departments, it may be advantageous for all of us to actually plan our daily communications. Time schedules could be worked out for the teletype and the telephone so that people desiring to talk to a particular office could be notified by our operator prior to the time of contact.

Our recent phone bills have pointed out several unusually long phone calls. The length of the conversation is extremely important and thought should be given to each topic of discussion prior to the conversation.

The above suggestions have not been intended to reduce the effectiveness of the telephone but rather to increase the efficiency of our interoffice communications while keeping an eye on needless expense.

I would be interested in comments from anyone regarding my suggestions especially from our branch offices since they are directly affected.

F. Kalwell

I've been working with Klaus Doering on setting up various specifications on material used in Production and also compiling and gathering literature, prints, and MIL standards on units presently used by Production.

Our new Segal Eyeleting Machine arrived on Tuesday and is presently operating in Production, setting 5938 USMC eyelets.

This week I circulated four sets of eyelet prints used in our four applications. These prints are available from Klaus Doering in Quality Control or myself, and are used in the following areas.

A1733 Eyelet - Used on our laboratory modules.
A721 Eyelet - Used to fasten Amphenol Connectors to our modules.
A1090 Eyelet - Used to fasten printed circuit boards to the handle.

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F. Kalwell (cont'd)

A1527 Eyelet - Used on current drivers printed circuit board.

R. Blackwood

Within the past week we have received ten etched panels from Metal Etching Corporation in Long Island. Although two panels were subsequently sent back, these rejections were not a part of the etching process, but the fault of Metal Etching's shipping department in not properly packaging the panels and allowing the studs to scratch the face of the two panels. One panel is now mounted on a PDP-4 in the computer assembly wiring section for anyone interested in its appearance.

Since the last bi-weekly, I have taken over from Dick King the buying of all tools and all office supplies and furniture, including both purchasing and rental of typewriters.

R. King

Recently there has been a problem with our blister packages. The blister was varying in size and pulling apart after being sealed. I have talked to the vendor about this problem, and steps have been taken to correct this in future orders. We also have made arrangements to send back the faulty blisters for replacement.

We have added to our maintenance department's equipment by purchasing a 13" polish and scrub Hild floor machine for Building 5.

Bob Blackwood is now purchasing all tools and the complete line of office supplies, which now includes all furniture and office machines. All requests for typewriters or adding machines as well as repair work on leased machines should be directed to Bob.

J. Fadiman

During the past two weeks final checkout work has proceeded on the Memory Tester 1520 for IBM. We have discovered new methods of termination which involve a variable resistor for each line. This allows us to compensate for the different drops across the silicon control rectifier in the Read-Write Switches 1986. However, it is

J. Fadiman (cont'd)

still necessary to have matched pairs of SCR's, since there can only be one control for both the positive and negative pulses going through the SCR's. All of these details have finally been taken care of and we expect to ship the machine next week.

All wiring has been completed and modules inserted on the Core Tester 2114 for IBM, Owego. Checkout was started today by Ed de Castro.

All redesign has been completed on the Memory Exercisers 2212 for Western Electric. Drawings have also been completed and wiring of the mounting panels is well on the way. All front panels are in construction. Work on this machine is being done by Lee Butterworth and myself.

We are designing a new -10 reference supply to be used in Core Testers and Plane Testers. Circuit design is just about completed under the direction of Dick Tringale.

Inter-panel wiring is now proceeding very rapidly on the Memory Tester 1521 for Ferroxcube. Three technicians are spending full time doing this wiring and we expect to complete this in about one week. Checkout on this machine will not be so difficult as we have all the experience behind us from the 1520. Dick Whipple will be in charge of checkout of this machine as he has been in charge of the 1520.

We have received purchase orders for a Decoder-Test Set and an Encoder-Decoder Test Set, both for Western Electric in Andover. Pat Greene is taking care of this and construction is already being started.

We have also received orders for two more Automatic Core Testers, Models 2113, I and J - both for Electronic Memories, Inc., in Los Angeles. The first machine is due at the end of January and the second one in the middle of March. These machines involve a special program for testing transfluxors which I have already designed into the machine. Jim Hogan has already done all of the wiring changes and the mounting panels are already being wired by production. All front panels have also been ordered and these will

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J. Fadiman (cont'd)

be fabricated shortly.

Possible New Business

We feel quite confident that we will get the job from Harvard University for the Data Reader for a spark chamber gap. Pat Greene has already done most of the design on this. I have made a quotation to the Mobara Works of Hitachi, Ltd. for an Automatic Core Tester 2113 and a Memory Plane Tester 1516. This is a new plant near Tokyo which is being started to produce Memory Cores and Memory Planes for Hitachi. Inasmuch as Hitachi already has three of our systems, our chances of selling two more systems to this new plant look very good. TDK, which is the largest core manufacturer in Japan, is also interested in purchasing a Core Tester and Plane Tester. Mr. Hata, one of the Chief Engineers of this company, will probably visit DEC within the near future to view our plant and discuss this test equipment. Chances of making this sale are probably about 50%.

We have recently submitted a bid to Raytheon in Sudbury for a small Memory Exerciser. Chances of making this sale, however, are only about 30%. I plan to submit a bid to the Photon Co. in Wilmington, Mass. for a system to translate magnetic tape into paper tape. We have decided not to bid on two jobs for Philips Petroleum. One involves a memory, which we feel that Ampex can probably provide more cheaply and more rapidly than we can and the other involves a very complicated A-D converter system which we feel that we are not in the position to manufacture at the present time.

There has not been any considerable activity in the European field recently. Siemens is still interested in a Memory Tester but have made no concrete plans for purchase. The president of Cofelec visited us about a month ago and showed considerable interest in our Automatic Core Tester. However, I gather that at present he does not have the money to purchase this equipment. Chances look good for selling another PEPR project to the people at CERN in Geneva, Switzerland. If and when the opportunity for this arises, Dick Tringale will take care of it. Arrangements have been completed for Mr. Gunter Heuve, who will be our European engineer. He will spend the month of April in our plant here in Maynard learning about Systems, Modules and Computers. We will then open

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J. Fadiman (cont'd)

our office in Munich on May 1st. Plans for the office and for hiring a secretary will be made in January.

P. Greene

EN 2446	10%
EN 2447	10%
EN 1057	80%

Since the last biweekly two purchase orders were received from Western Electric, North Andover for test sets for their manufacturing plant. The total quoted price of these orders is $13,600. It is expected that these machines will be delivered in 5 and 6 weeks respectively.

After submitting the bid to Harvard University, I have since found out that Computer Control Corporation and Epsco are our competitors for this segment of business. It appears that the job will be awarded to us in a couple of weeks.

An inquiry has come in from the University of Chicago about our current drivers from the Sales Department. Fred Gould has been communicating with them, but after talking it over with Dick Best, the inquiry was referred to me. The experiment that is being planned in Chicago is identical to the one being done at Harvard with one exception. The Chicago people plan to use an "on-line" computer whereas Harvard is going to write a tape for permanent storage and then process these records in a computer.

After a telephone conversation, Jurgen Bounin of Chicago University has agreed to send me a block diagram of their proposed system in order that we may make a quotation for a complete system to do the job. The job will be approximately 30K, if we should build it.

Some very interesting problems have been showing up in the 1520 Memory Tester. It appears that SCR's (Silicon Controlled Rectifiers) have to be matched quite closely to meet the $\pm$ .5% current amplitude spec laid down by IBM. Quality Control, Engineering, Systems and Vendors people have been in close communication to get to the root of the problem. DC tests were made by Quality Control, after being requested to do so, but they proved to be inadequate.

P. Greene (cont'd)

A pair of test sockets were mounted on a 1986 module and SCR units were matched to each other on a dynamic basis in the system. The method worked extremely well. As one can see, we have two goals in mind in conducting this research with SCR's: (1) To fill up the 1520 memory tester with enough modules so it can be shipped and (2) Learn enough about SCR's in order that we may clearly define the method for their testing. Progress is being made, however, and the problem is now under control even though it is difficult and tedious to get the units matched.

L. Prentice

Linc Tape Units

Detailing the various parts for the linc tape units is under way. Drawings and specifications for the head should be completed today. It has been agreed with Roland Boisvert to make him up a blank chassis for the first actual working model to be delivered to him. He will punch all holes and mount components, etc. Several details should be released to the pattern makers and the machine shop this coming week. Scott Miller has completed line layouts of a single cabinet, dual cabinet, and a single unit with control panel. Display 31 drawings are nearly complete. These represent the complete unit as presented at the Eastern Joint Computer Conference. Work is under way to reduce as many drawings as possible so they can be cast. Approximately 6 patterns and 6 drawings are involved. Ron Cajolet is working on a scheme for locating printed circuit boards on the Dynosert machines. Some work for the shop should be released this coming week.

I have spent several hours gathering information in regard to requests made by insurance brokers in regard to fire alarm systems tied into the sprinkler system in our buildings and paint spray booth requirements to meet underwriters' specifications and insurance company recommendations.

Some time was spent with Bob Lassen discussing the forthcoming Christmas party, December 16, to provide sufficient guards and protective measures for the large number of people expected at the Christmas party.

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K. FitzGerald

EN 1000	70%
EN 2289	15%
JN 1901-7661	15%

Carpenter Shop

The Carpenter Shop worked 83 man hours of overtime preparing for the Eastern Joint Computer Conference last week and as a result of this it is running quite far behind schedule. It will take approximately 1½ to 2 weeks to get caught up.

Cabinet Shop

The Cabinet Shop is working about 75% to 80% capacity and filling in the other 20% to 25% handling small assembly jobs for the Production Department. Also, whenever a man is free in the Cabinet Shop, we have been utilizing him as a spare man in the Sheet Metal Shop.

Machine Shop

The Machine Shop is running about 85% to 90% capacity with the remaining 10% to 15% being used on small experimental rush jobs that always seem to crop up. The jigs for the 901 mounting panels and laboratory modules have been completed, inspected and delivered to the Production floor and are in operation. The second set, for back up of these jigs, has been ordered and work will commence on these on a very low priority basis.

Sheet Metal Shop

The Sheet Metal Shop is currently operating on very close to 100% capacity with delivery dates being promised in the order of six to eight weeks. This shop seems to have its ups and downs on work loading regardless of how much planning we try to do simply because of unpredictable loads from Engineering and Special Systems. A good percentage of our load in the Sheet Metal Shop at this time is 1901 mounting panels and 1903 mounting panels. The Production Department has been experiencing difficulties lately with the modules being too tight in some of these mounting panels so we are presently trying to devise a method of bending these flanges 1/2° less than we previously specified which should cause

K. FitzGerald (cont'd)

the sides of these units to fold out slightly and therefore insure a better fit of the SPU unit. However, this is not the complete answer to the problem, as the method of assembling these is still not good. We feel that a jig or fixture of some type is necessary to hold the side plate retainers and end panels while the plugs are being installed and the complete unit assembled. In other words, our present method of manufacture allows us to actually have a discrepancy between opposite ends of the mounting panel of as much as 3/16". This is allowed by the size of the hole which fastens the side plate retainer to the end panel. The size of this hole is extra large in order to compensate for a possible build up of tolerances in the regular fabrication process. We have also discovered a mechanical interference in the design of these two units whereas the width of the SPU unit is specified as 4½" and the inside diameter of the mounting panel is also specified as 4½". It seems that it would be quite costly to rectify this problem at this time because of the amount of money we have tied up in tooling that was designed around these dimensions. However, it is still possible not to change this tooling and assemble the units correctly and allow approximately .030" clearing between the mounting panel and the plug-in unit. A jig for assembling the mounting panels will be developed very soon. The new Amphenol plugs with the built-in safety stop and threaded insert should help to solve the whole problem. The first shipment of these is due in February.

S. Olsen

The Fall Joint Computer Conference in Philadelphia seemed to be quite a success with many people commenting that our booth and demonstration were the best at the show.

The module business continues to smash right along and December promises to be another record month like October. After some slim months in computer sales, things are beginning to pick up with a blanket order for five machines from Foxboro and an order coming shortly from JPL for three machines.

In the next week Allan Titcomb will be joining us here in Maynard and Ron Colman out in Los Angeles.

S. Olsen (cont'd)

We have been pretty active in real estate lately and will be moving into new offices in Los Angeles and in New Jersey in January.

In the second week in January I plan to go to Munich to meet with Guenter Huewe to arrange the opening of our European office.

G. Bell

THE COMPUTER GUIDANCE COMMITTEE

Purpose:

Provide direction for marketing efforts, and to coordinate the development of equipment and software on both a short and long term basis.

Function:

1. Up-date Sales Plan
2. Review/Establish Projects
   a) Schedules
   b) Pricing
   c) Requests for personnel changes (prior to Works Committee Appeal)
3. Generally review hardware projects prior to discussion in the Engineering Committee.
4. Short Term Sales Discussions
   a) Review requests for quotations from written abstract of quotation.
   b) Review final proposal drafts.
   c) Approve pricing for non-list price items.
5. Examine Various Product Lines.

Membership:

Present members are the following: K.H. Olsen, H.E. Anderson, S.C. Olsen, W. Hindle, G. Bell, H. R. Morse, and N. Mazzarese.

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G. Bell (cont'd)

Working Arrangement:

The secretary of the committee should forward the minutes of the meetings to the chairman of both the Works Committee, and to the Engineering Project Evaluation Committee, and to committee members.

A meeting may be called by any of the members, although a regular meeting time will be established. The committee may cancel any following meetings. Three persons plus a secretary shall constitute a quorum.

Immediate Reviews:

1. Sales Plan
   a) Formation
   b) Progress review
2. Development of PDP-1 system in light of sales plan (equipment & software).
3. Development of PDP-4 system in light of sales plan (equipment & software).
4. Advertising & Technical Publications Plan Review
5. Hardware Developments
   a) Peripheral Equipment
   b) Magnetic Tape
   c) Displays
   d) Magnetic Core Memory
   e) New Computers
6. Software
7. New Systems Line
   (eg. Establishment of a Data Transmission Group)
8. Specific Proposal Review
   a) Proposed Monsanto system design and sales plan.
9. Medical Market Review

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G. Bell (cont'd)

10. Development of the Link Computer Project

11. High School Market Review

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A. Blumenthal

Difficulties with the Packard Bell A-D equipment are still keeping the United Aircraft machine here. The sample and hold circuit failed early last week and was sent back for repair. We expect to have it back this afternoon. The defective multiplexer cards have already been repaired and returned.

Packard Bell is still working on a solution to the problem of oven switching noise.

Investigation of the troubles in the ADX-0 system led to the up-dating of the machine with respect to terminate and clamp diode installation. An intermittent MA flip-flop was also uncovered. A timing change was made to create more favorable conditions for address and data set-up to memory during high speed channel trans-fers.

Because of the extremely low rate of failure (about every 20 hours), the absence of meaningful clues at the time of failure and the extremely complicated and little understood program, it was impossible to attack the problem in a manner that would accurately pinpoint the trouble. At the time we left, however, the system had been operating continuously for about 100 hours.

F. Kalwell

Wood Electric Corporation in Lynn, Mass. will be quoting us on cir-cuit breakers. They have recently been licensed by Heinemann to produce the same units Heinemann has supplied us in the past.

The Sales Department has requested information on a deeper tape tray for storage of fanfold paper tape. A unit being 1½" deep is available at a cost of $1.10/ea. in quantities of 500. A four to six-week delivery is required. I'm presently working on a special tray cover to prevent the tapes from falling out. I've recently placed an order for 500 deep trays, to be delivered the week of December 17.

Our new Segal NRGM Eyeleting Machine which will set USMC 5938 eye-lets will be shipped the week of November 26.

Our new capacitor clamps have arrived and have received favorable comments. This should eliminate the problem we've had in the past

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F. Kalwell (cont'd)

with our 35,000 mfd capacitors falling off while our units were in transit. I've recently placed another order for 2000 such clamps, which are somewhat modified. These units will be received the week of November 26. A new bracket used on the 9300 mfd capacitor is presently being evaluated by the model shop.

R. Blackwood

A Blanket Order has been placed with Eastern Metal Mill Products for 10,000 lbs. of 5052-H32 aluminum sheet. As this material is ordered on a 130-17 account, please direct all requisitions to Maynard Sandler for approval. I have found it advantageous to use blanket orders in my area with the quarantee of continuing supply at the lowest economic cost.

R. Doane

VHF Clock	50%
VHF Test System	10%
8201 and 8103 Models	15%
Test Equipment	15%
Miscellaneous	10%

The third-try clock module circuit and layout are finished and a model will be ready soon. Changes include revising the remote range-change to reduce multivibrator loading and polarity reversal of the multivibrator section to allow larger voltages, keeping transistors out of saturation better. (So far operation has been limited to 40 Mc).

A VHF logic module was used in the Magnetics Show special system, and performed adequately. It provided a narrow strobe pulse.

The VHF test system will be demonstrated to the Engineering Projects Committee on December 3.

VHF problem areas at present:

1. Transistor and diode specifications
2. Temperature measurements and possible packaging changes

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R. Doane (cont'd)

3. Final clock design

The International Solid-State Circuits Conference has formally rejected "Interconnectable VHF Logic" (along with about 100 other papers out of 150 offered). We will soon submit elsewhere.

P. Greene

EN 1038	85%
EN 1057	15%

The final details of the Harvard Cyclotron Lab Project have been completed and an official two-part bid has been submitted. A price of approximately $30,000 was quoted for the complete system and $22,000 for the partial system. The only difference is that the partial system is wired completely, but all of the modules are not included. Original design of the system allowed the removal of these modules for the operation of the system with a minimum of wiring changes.

It appears that the bidding is only a formality to keep the government regulations in order. At least this is the impression left with me by Prof. Miller.

Work is being done with R. Whipple on the 1520 Memory Tester to alleviate certain noise problems. It has been shown that the electrolytic capacitors used in our power supplies do not have a good high frequency characteristic. A small (.39 uf) paper capacitor across the voltage input to the module racks (especially the rack containing the sense system) reduces the noise markedly. Further work will be done to assist in the earliest possible shipping date for the machine.

E. Harwood

The computer test floor was practically cleaned out this week with the shipment of three machines. These are the JPL machine, which was loaned to Raytheon, the Atomic Energy machine which was shipped out Wednesday, and ADX 8 which, incidentally, is the last of the current ADX orders and will be shipped out before the first of the month.

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E. Harwood (cont'd)

The installation at Raytheon went smoothly, although we found three bad packages and a pair of crossed wires. The total time for the installation was under three hours including lunch time. I am sure this impressed the Raytheon people with either the proficiency of our installation people or the ease of trouble-shooting the PDP-1.

The Atomic Energy of Canada machine which was shipped on Wednesday, November 21, is the first machine to go out into the field with the new Punch Panel -- that is, the Punch folding mechanism, which necessitated a change to the looks of the machine. This, we hope, will solve all of the paper tape folding problems which we have had with the punch.

The ADX 8 machine, although it has left the test floor to be crated, probably will not be shipped much before the first of the month, the reason being the ITT people will not be able to fit it into their building until they ship their ADX 6 & 7 to their customer, which is Eastern Airlines, New York City.

The computer which we had checked out to be sold to the Sales Department was loaned temporarily to Customer Relations, so that their machine can be used for the FJCC. This machine was delivered to the Customer Relations Department on Tuesday, November 20, and starting with the 21st, we should have full use of their former machine.

K. Fitzgerald

EN 1000 100%

Most of my time for the past two-week period has been spent in working out problems and details concerned with the laboratory modules and 901 cases. The jigs made in the Machine Shop have been completed and sent to the production floor via the Inspection Department. The new jigs utilize air for the holding and clamping of the boards while drilling which has necessitated adding additional air lines on the production floor, which also has been accomplished. A duplicate set of these jigs will be made as soon as the back log, created by the setting aside of many jobs while these jigs were being run, is cleaned up.

K. Fitzgerald (cont'd)

The Sheetmetal Shop is currently experimenting with trial samples of the zinc phosphatizing treatment by Amchem Chemical Corp. This is a treatment to increase corrosion resistance and paint adherence on our painted steel components. It seems quite possible that we may have to set up a complete processing unit for this treatment.

The Carpenter Shop worked 24 man hours overtime last week getting ready for the Eastern Joint Computer Conference and as a result some of the regular carpenter work which had been scheduled for this week has more or less been slowed up. However, the show work is just about complete and we should be able to get back into our regular schedule very soon.

The Cabinet Shop has finally managed to get all of the component parts which we had in storage in Building 5 into vertical standing cabinets, correctly labeled, and numbered. As a result of this some interesting figures were compiled. These figures might not be 100% accurate, as many times a work requisition for cabinet work is placed and then the unit is either changed or, in some cases, cancelled but the paperwork remains open in the cabinet shop, but nevertheless here is a rough rundown of work outstanding in the cabinet shop.

14	PDP-1's
4	PDP-4's
5	Mag Tape 50's
1	Mag Tape 52
1	Drum System
1	Display 31
2	Memory Testers (3 bay)
1	Memory Tester (2 bay)
1	Core Tester
1	Special 3 Bay System

This makes a total of 94 bays somewhere in the building for which we are storing parts preparatory to final inspection and shipment.

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L. Prentice

EN 1000	90%
EN 1136	10%

Most of my time during this period has been spent in evaluating and correcting the causes and vagaries of removal forces of the laboratory modules in the 901 Mounting Panel. This, at last, is bearing some tangible results. We have finally accepted a jig for drilling the chocolate blocks that conforms to the necessary tolerances for the rear chocolate block and also a jig for the back panel of the 901 Mounting Panel. The eleven chocolate blocks and six 901's have been delivered to Klaus Doering for his evaluation. The first of these has been tested out and while figures are not available as yet on the amount of tension required to remove the unit, Klaus has just called me and said these ran from 10 lbs. to 14 lbs. to remove the unit. We just discussed the possibility of running further tests to determine if rework of the banana pins would lower this figure appreciably.

Link Tape Units

These overall design characteristics of the link tape unit have been discussed with Tom Stockebrand. His recommendations will be incorporated in the final design. Two prototype models are being built to our own design for evaluation purposes and it is hoped that sketches, drawings, etc. can be released to drafting on the 26th of November, so that drafting can be started on the final model or production model. Scott Miller has made drawings of both the link tape unit and the proposal for the styling of a Burroughs tape unit. These were presented before the Works Committee.
Ron Cajolet is proceeding with the 31 Display details. These should be complete and ready for installation by November 25. He is making a valiant effort to find out whether or not we will receive the shield for this unit. If not, a temporary support unit will be built to replace the shield for the show. Ron Cajolet also supervised the installation of the first Burroughs unit into our standard cabinet. This is a rather crude set-up, made to test the unit and also to be used as a prototype for further design.
Ken Fitzgerald has under way a project to look into various types of phosphate coatings for steel to improve the adhesion of paint. These would be applied to end panels and doors of all our computer and special systems cabinets. This will improve the quality of the product for the consumer. As there are several types of this

L. Prentice (cont'd)

phosphate coatings available, considerable evaluation work might be done before one can be selected.

R. Tringale

1022	40%
1018	35%
2409	15%
Misc.	10%

In the past two weeks I have been devoting most of my time on a precision -10V power supply module which will replace the 1562. This new power supply will have, resolution in the order of less than 0.5 mv, ripple will be less than 0.5 mvpp, load regulation less than 0.2 mv, temp. stability less than 0.16 mv/C°, and the current limits will be ± 100 ma.

J. Fadiman

Checkout work is finally being completed on the Memory Tester 1520 for IBM. Some new methods of termination have been devised in order to obtain a better waveform and these are now being incorporated in the machine. We should be ready for shipment in about a week. The other two large machines that we are working on, the Core Tester 2114 for IBM, Owego and the Memory Tester 1521 for Ferroxcube, are now being wired together and are proceeding approximately according to schedule.

The construction of the Memory Exercisers 2212 for Western Electric is behind schedule due to some required logic changes in the pattern verifier. The original specifications were a bit ambiguous and it appears now that some fundamental changes in the pattern verifier have to be made in order to satisfy the timing requirements for Western Electric. All front panels have already been completed but there will have to be changes made in the wiring of the mounting panels.

The Core Tester 2113H was delivered and installed at RCA, Needham. It appears to be working perfectly, although RCA has some questions on accuracy of banding.

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J. Fadiman (cont'd)

New Orders: We have received the order from the University of Connecticut for another Memory Buffer system. This will be due March 1 and we are already starting construction on it. We expect to receive an order soon from E.M.I. for another Core Tester 2113. We have also been informed from our West Coast Office that we will definitely receive the order from the National Cash Register Co. for a three-station Core Tester for a price of about $40,000. This system will be due in about 12 weeks. We also plan to start building another Core Tester 2113 for stock which Lockheed Electronics will possibly buy. We are almost certain to receive the job for Harvard University, Cyclotron Lab, which Pat Greene is taking care of.

We have also been asked to bid on a job for the Observatory for Harvard University on a proposal for manufacturing a system to accept data coming in on radar sets from meteors, digitizing and multiplexing this data, and putting it on magnetic tape. A large number of analog-to-digital converters of 8 bit accuracy are required here. The bid is due on December 10, if we decide to bid on this system. The only other person bidding on it is Epsco.

I also went up to Wilmington, Mass. to the Photon Co. to determine if we should bid on a system for them which is essentially a magnetic to paper tape converter. The system would require a simple tape unit (read only), some buffers and shift registers, a Tally Punch, and possibly a small memory. It is also possible that additional buffers could be used instead of the memory stack if a magnetic tape unit of sufficiently slow reading speed can be found.

J. Cudmore

EN 1073	75%
EN 1098	25%

The test data sheets for all mounting panels have been just about completed. These sheets will fulfill two requirements; the first of which is a formalization of the electrical test and inspection procedures; the second is the wiring instructions to the customer. These instructions were originally included with each mounting panel as a separate sheet. Somehow this sheet has faded into obscurity. These instructions will be updated and clarified before

J. Cudmore (cont'd)

being printed on the back of the test data sheet.

The subject of test data sheets comes up once again. Perhaps the concept and the use of test data sheets should be re-evaluated. None of the computer people want them. The Special Systems group sends them out to the customer with each machine, but maybe this is just another way of throwing them away. The time and work involved in the making, correcting and updating is getting oppressing. Perhaps only one sheet for our files is sufficient. If a customer requested a copy, we could furnish it very easily. The handling of our copy of each data sheet is very fouled up at the moment. QC will take over this responsibility and rid Sales of this cumbersome project. Test Data Sheets will be sent from the inspection area to the QC department for filing. We start this project on December 3.

K. Doering

The difficulties on the 901 mounting panels seem to have come to an end. The "back panel" jig has been released to production and the "terminal board" jig is going to be released within a day. A last inspection has to be done here.

We had the 901 mounting panels as well as lab modules drilled by the new equipment. The modules plugged into the panels move easily and retention force was between 10.5 to 13.5 lbs. These values look rather good because even at 13.5 lbs. the module can be pulled out easily.

We kept current orders going by always reworking the parts needed.

We had a nice pin gage made up by the machine shop with which we can check the hole location on the lab module back panels. All modules in finished goods were reinspected; 73 modules were rejected, ten of them for reasons other than hole location. Six had the old package used in 1960, which is not as attractive as our present one. Production is now reworking these lab modules.

Approximately 110 mounting panels (901's) were sized on their banana pins. After that the lab modules could be inserted and removed much more easily. Five pins were broken on five mounting

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K. Doering (cont'd)

panels and were replaced. The mounting panels are now being returned to finished goods.

It looked as if the sizing operation made up for the mislocation of holes.

All inspectors and testers in our company have been assigned inspector's or tester's stamps. This is done for reasons of clear identification, which was a difficult task on handwritten initials. Any stamp number can only be assigned once. If the person leaves the company or gets transferred, his or her stamp goes back to Q.C. Thus we keep up with current military requirements. The supervisors are responsible for notifying and returning the stamps to Q.C. because keeping track of them is difficult. An updated list about who has what number will be issued to the responsible supervisors periodically. This business is going to be taken over by Bob Grey in Q.C.

Defective module tags can be picked up from Q.C. We have quite a few in stock, but hope they do not have to be used very often.

D. Adams

EN 1098 100%

The last two weeks have been spent tracing out the wires of the Automatic A.C. Tester and getting a logic diagram drawn up from the wiring. We have also added a Start-Continue Synchronizer to the tester. With this synchronizer it is easier to start the testing and it eliminates skipped tests due to someone pushing the continue button at the wrong time.

Both 567 scopes were calibrated within the last two weeks. The two D.C. testers are working properly with the exception of a drift in the testing of lower level. This showed up in units that were rejected on the first run of tests. The second time it was tested, it passed all the L.L. tests. I will trace this down as soon as I am through making a few more changes on the A.C. tester, and getting the drawings completely up-to-date.

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R. Grey

In the process of roving inspection, two things were noticed. (1) The center rivet on the system module handle was very loose on a good number of units. This was corrected by proper instructions to the operator. (2) The taper pin crimping machine was out of tolerance and had to be readjusted.

The two Muffin fans and one Pamotor fan being life tested have passed two thousand (2000) hours without failure.

R. Gaboury

During the past two weeks mechanical inspection has been checking jigs for the back panel of the lab modules and the 901 mounting panel. We have also checked out approximately 400 lab modules in the finished goods stockroom and found that 73 modules were rejected mainly for hole misalignment in the back panel.

An inspection of 1901 and 1903 side plate retainers was necessary when a customer wanted the pieces to an obsolete print. A material thickness of (1/16) instead of the present (3/32) was of importance to the customer, also a few dimensions. We had to manufacture the 1901's to an obsolete print.

We had five final inspections of the following machines:

Corning Glass Works	PDP-4
DEC	Display 30A
J.P.L.	PDP-1
R.C.A.	2113 Core Tester
United Aircraft	PDP-1

Also three intermediate inspections:

DEC	PDP-1
DEC	PDP-4
DEC	Display 30

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D. Dubay

EN 1144 Test Equipment Services 100%

The following equipment has been calibrated since November 12th.

Description	Type	No. Calibrated
Oscilloscope	543/543A	8
Curve Tracer	575	2
Oscilloscope	567	1
"	541	2
"	321	1
"	515A	1
Preamplifier	CA	8
"	S	2
"	Z	2
"	R	1
"	L	1
Digital Unit	6R1	1
Sampling Unit	3576	1
" "	3T77	1
Current Probes	P6016/131 Amp.	7

Starting November 19th we began a new calibration schedule. All scopes used in production testing will be calibrated on a six weeks basis. This includes all scopes in Module Test, Quality Control Test, Transistor Test, and Memory Test. All other scopes will have a 3 months calibration interval. The more popular types of special purpose plug-in units will be calibrated on a six weeks schedule. This group includes Type L, Type Z, Type D, and Type E. Preamps which are not used as frequently, such as Type O, Type R, Type K, and Type M, will go on the three months calibration schedule. We will continue calibrating meters every 6 weeks and generators every three months. This leaves us with the following calibration schedule:

Oscilloscopes	1.6 per day
Preamplifiers	2.1 per day
Multimeters	3.5 per day
Misc. equipment	1 per 3 days

The time clock in building 3 has been replaced by one of the new synchronized clocks. It is tied in with the master clock system

D. Dubay (cont'd)

and agrees with the rest of the clocks in the plant.

R. Winslow

Semiconductors tested since the last report.

Type	Manufacturer	Units Tested	% Reject
MD-114	Philco	10981	1.9
2N-494	"	64	0.0
2N-1204	"	63	7.9
SW-1250	Transitron	650	1.5
1N-3316B	Dickson	106	0.0

R. Lassen

Two Personnel Committee meetings during the month of November resulted in the following decisions:

1. The Personnel Office will have authority to review and approve both Transfer and Tuition Refund requests. Questionable cases will be brought to the attention of the committee.

2. L. Prentice and R. Lassen will develop a plan for employee evacuation in the event of fire or other extreme emergency. The proposed plan will be submitted to the Works Committee for approval.

3. The Personnel Committee will periodically review all open personnel requisitions for the purpose of determining whether or not further study of individual requests is advisable.

4. The proposed 1963 Company paid holiday schedule was approved and will be submitted to the Works Committee this week for final approval.

5. Plans for our annual DEC Family Day were reviewed and discussed. We are now forming the necessary committees and work is already under way. The success of this large undertaking will depend greatly upon the cooperation and work of many people, and we

R. Lassen (cont'd)

are optimistic that it will be a most enjoyable day for all who plan to come.

6. The Committee agreed that we should improve and systematize our present job and wage classification program for hourly employees.

Basically, the improved program will allow the cost center manager to automatically reclassify an hourly employee according to job responsibility. The principal purpose of the program will be to provide a more uniform and up-to-date hourly job and wage structure.

Job and wage classes will soon become a part of the employee's overall personnel record, which together with other historical data will provide a much better tool for evaluating and reviewing hourly people.

After the first of the year we will conduct an area wage and benefit survey--the wage portion of which will be used in conjunction with the hourly wage program.

7. It was also decided that the Personnel Office will work with the cost center managers in reviewing and discussing the progress of hourly employees, particularly with respect to a continuous follow-up of quarterly merit ratings.

Because of the size of our hourly employee group, it is now advisable to record individual personnel data on IBM punch cards. Fred MacLean has been very helpful with respect to designing an employee data card for each hourly employee, and Dick Mills and I have discussed the type of reports that would be most helpful in administering our personnel programs.

The improved Job and Wage Classification program, Wage and Benefit Surveys, and Personnel History recording (including IBM recording) are major projects which will require a great deal of initial leg work; however, the net results will be most beneficial.

The December Quarterly Merit Rating for hourly employees is under way. Barbara Charnock will be responsible for administering these ratings. We have outlined a procedure to eliminate the guesswork

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R. Lassen (cont'd)

in the hope of making quarterly ratings a routine part of our overall personnel work. We will appreciate your cooperation in meeting deadlines and following the procedures as we have outlined.

Recently we sent out a memo to all cost center managers outlining appropriate procedures for departmental transfers, terminations, tuition refunds, personnel requests, etc., and indicated the necessary forms to be used. Although we all rebel at the use of forms and paper work in general, we again remind each and everyone to follow our administrative procedures in the interests of good business practice.

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R. Oakley, WCO

PDP AT SEATTLE WORLD'S FAIR

It was unfortunate we didn't get all that we expected in publicity from the use of the WCO PDP-4 used by JPL at the Fair. The number one reason is, of course, the national crisis regarding Cuba which prevented President Kennedy from attending the dedication ceremony and secondly, the fact that most newspapers were not covering news in this medium at that time.

There were six people at the Fair working with the PDP-4; three from JPL, (Bill Scholey, Don Sparks and Bob Stiver) one from DEC, WCO, (Bob Oakley) and two from DEC, Maynard, (Dit Morse and Steve Lambert). The use of the computer was not defined completely until we were about one day from the actual ceremony. The only thing we were sure of was that the PDP-4 absolutely had to work in order that the effort would be effective. The whole effect was to be such that the JPL Mariner Spacecraft would be of specific significance in the dedication. The plan we had was to use the actual Mariner signal to keep track of the distance traveled from earth and some of the scientific data which was to be printed on teleprinters immediately following the dedication initiation supposedly performed by President Kennedy and actually performed by Senator Magnuson of Washington State. The Mariner Telemetry signal was to be transmitted over the World's Fair P.A. System for five minutes following the dedication. Everything was checked out and the telemetry signal was coming from the Goldstone Tracking Station loud and clear just an hour before the ceremony. The Gold Nugget Key circuit to the computer had been checked and we could all say with satisfaction at that point "all systems are green." Then - - - - it happened: The telephone company stepped in. It seems that they decided to put in some additional public address system amplifiers so that the speaker stand would operate separately from the Fair's normal system, probably to handle the Mariner II audible signal and the speakers simultaneously. They evidently used a phone-line circuit with the grounded input amplifiers causing crosstalk in the phone system trunk at the fair grounds. Furthermore, the additional power required by these amplifiers caused a line drop to the speaker's stand which in turn caused the teleprinter on the stand to become unreliable. Also during the installation of this wonderful public address system, someone accidentally broke one of the wires from the Gold Nugget Key. Sometime during all this we were

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informed that we could not switch the Mariner signal by way of the computer because we were causing crosstalk. Actually the crosstalk was there as soon as the P.A. Amplifiers were hooked up. I was told later by a NASA official that he could hear the Mariner signal on several telephones he had used (crosstalk). In fact, the crosstalk was so bad that he thought the ratio was about 1:1. We didn't realize why the Mariner data input to the PDP-4 was intermittent until we realized it failed only when the band was playing, someone was dialing a phone nearby, or a speaker was talking into the P.A. System. We then promptly hooked up a tape recorder with the Mariner signal on it to the PDP-4 input. It was very interesting to note that we had a tape recorder along in case we encountered this type of problem. Dr. William Pickering, Director of JPL, had suggested that we bring a tape recorder.

Then, when the Gold Nugget Key was set by Senator Magnuson, nothing happened. The Senator did a magnificant job of describing that the delay was due to the fact that the Mariner was presently over nine million miles from earth. Meanwhile, we got the computer to do what it was supposed to do when the key was struck. The teleprinters printed away the historic message and the Senator read the message, (very accurately considering the fact that the teleprinter on the speaker's stand was not working too well and the message was a bunch of black smears).

After the ceremony, most of the officials concerned with the success of our project told us we did an excellent job and were very pleased with the results. The people from JPL were very grateful and basically felt that they could have done very little for this demonstration without the PDP-4. They also realized the flexibility, reliability and ease of programming of the PDP-4. This should help the possibility of a number of sales of PDP-4's at JPL.

L. Prentice

EN 1000	90%
EN 1136 Tape Unit	10%

On October 16th an investigation was started to try to determine the cause of non-alignment between the laboratory modules and the 901 mounting panel. On October 31st reports from the Inspection

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L. Prentice (cont'd)

Department indicated considerable misalignment of the jigs. An examination showed that the jigs for drilling the chocolate block on the back of the laboratory module was considerably worn and needed replacement, and considerable misalignment existed, up to approximately .050, in the jig for drilling the back boards for the 901 mounting panel. The program was begun immediately in the Machine Shop to provide new jigs for both of these items. Difficulty has been experienced in getting drill bushings for the back board panel, as these did not arrive until November 8th. They had been promised for shipment and arrival here November 5th. The first jig producing the chocolate block panel appears to be somewhat less accurate than we had hoped for. We will immediately start producing another one.

Meanwhile, investigation had gone on to determine if the banana jacks and plugs were in some degree at fault, and tests were run on these which indicated the 3 1/2 to 5 lb. pull-out for each individual banana jack, which in itself, even though there was no misalignment, would cause a removal pull-out tension on the unit of around 25 lbs. Aid was enlisted from Joe Gill from the Model Shop, and an investigation was begun to find out if a tool could be made to reform the banana plugs themselves to reduce the pull-out pressure. It was found after several trials that a tool could be made to reduce the pressure to approximately 1 1/2 lbs. to 1 3/4 lbs. Plans are now under way to pursue this further to see if the back panels in the 901 mounting cabinets can be reworked to reduce the pull-out to somewhere around 12 to 14 pounds. A change order will be initiated to include the 1/8 by 1 3/4 roll pin in the front top section of the laboratory modules to assist in their removal. As soon as the Machine Shop has finished the work on this tooling (which at the present time is an all-out effort), tests will be made of the miniature banana jacks to see if improvement can be made in their method of manufacture.

Another small item under investigation is the misalignment of the 22-pin connector on the SPU units, first brought to our attention by Jim Burley. This problem was attacked in three ways.

1. As a new plug is being molded for this, a boss is being added to the plug to replace the material cut off at the bottom of the printed circuit board. This should have a tendency to hold the plug in proper alignment.

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L. Prentice (cont'd)

2. Specifications were drawn up for a washer made of brass, cadmium plated, to provide some kind of support.

3. The following improvements were made in the tooling. A platform was attached to the air staking device with supports to hold the plug in alignment and a new staking tool was made up with adjustment in small increments so that the squeeze on the eyelet could be controlled. (The last mentioned method was regarded only as a stop-gap and apparently a cut down on the reject rate to a reasonable figure.)

Link Tape Unit

Investigations have been under way in the use of Martin or other types of hard coating to be used on the tape guides and panel for this unit. It was found on the first prototype models that it is extremely difficult for the plater to control the throw and buffing operations required to produce the tape guides. Two-prong approach is being made here. A set of each type of guide will be made up, one to try to find better methods of plating to maintain the proper tolerances and two, a set of aluminum parts of the proper alloy for hard coating will be made and hard coated and tried out to find out if this is a proper manufacturing method.

Proposed Changes to Punch Mounting in PDP-1

As our company becomes larger, apparently it becomes more and more difficult to communicate changes that are proposed or pending for different units already in production. I would like here to recite a little history to show how this happened....This office received a request from Mr. Ed Harwood dated 5/11/62 to make changes in the punch to increase the ability and reliability of fan folding of punched paper tape. A thorough investigation was made of the project by Mr. Ron Cajolet and Joe Gill in the Model Shop and quite a few hours were put in before a formal proposal was made to Ben Gurley on 8/10 of this year. Mr. Gurley approved the changes and work was started immediately on a prototype and to make the necessary ECO's to change the parts. At the same time a program was initiated to find out what a retrofit kit would cost. This was reported in the biweekly report by Mr. Cajolet and also by myself on two separate occasions. This evidently failed to reach the

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proper people and so it became a surprise to the Systems service people to find the first prototype model on the floor. I regret very much that these people were not notified in a more formal manner than the biweekly so that they may have had a chance to contribute their ideas to this project. We are initiating changes to the drawings to make the change compatible to the service personnel's request and we are producing a prototype of their suggestions for their tryout for a simplified retrofit kit.

K. FitzGerald

EN 1000	50%
EN 1030	50%

Most of my time for the past two-week period has been spent in the design and fabrication of special jigs and fixtures for drilling the back panel for the Educational Building Blocks and the terminal board for the mounting panel for Educational Building Blocks.

It was discovered that the jigs that have been used in the past to build these units were dimensionally incorrect as much as .007. This, we feel, was causing a mechanical interference between 901 case and the Educational Building Block. New jigs have been designed which we feel will not only drill the pieces more accurately but also hold them while drilling. I hope to have the new jigs back on the production floor by Monday, November 12th, if all goes according to schedule.

Because of the urgent need for getting these jigs and fixtures made, all work in the Machine Shop, with the exception of the Precision Display 31, has been more or less set aside, and jobs in the shop at this time may be late on their promised delivery dates.

I still don't have a definite answer as to whether the small, black defects on our SPU handles were caused by inclusions in the stock or not. However, we have over $600 worth of this stock on the floor which the aluminum company has agreed to take back and give us credit for even though they will not admit that the pieces do have inclusions of some foreign material. I have had four or five complaints recently about the paint adherence on painted steel pieces as well as complaints that the CRC machine seems to be show-

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K. FitzGerald (cont'd)

ing rust through the paint on the steel surfaces. We haven't had a chance to do any investigating on these yet, but I do have samples of a zinc phosphate coating material in the mail that should solve these problems. It seems very likely that we may have to set up tanks in order to zinc phosphoratize all of our steel pieces before they are painted. However, our cabinets do not lend themselves very well to this treatment; therefore, they will probably have to be treated the same way that they have been in the past.

J. Fadiman

During the past two weeks final checkout has been completed on the Automatic Core Tester 2113H for RCA in Needham. The CH70 Handler came in and the required modifications have been made. The entire system will be checked out by RCA personnel on Monday and will be shipped toward the end of next week.

Final checkout is also proceeding on the Memory Tester 1520 for IBM, Owego. IBM personnel have been here all week and we are working hard trying to solve the problems of getting good, clean current drive pulses with the required rise time and linearity. All of the logic appears to be working perfectly, but there are still problems in cleaning up the wave forms. We plan to ship the machine in about two weeks.

Machine construction is proceeding on both the Core Tester 2114 for IBM, Owego and the Memory Tester 1521 for Ferroxcube. We have received wiring and some panels but are held up by lack of more front panels and the Mossman switches to go in them. However, when all panels come in we expect to proceed very rapidly with the wiring with the help of an extra technician from Production.

Design work has been completed on the Memory Exerciser 2212 and the mounting panels are now being wired up. Except for a few minor changes, the drafting work has also been completed on all front panels and these will be manufactured shortly.

New Business

Unfortunately, we did not get the job for building two Memory Exercisers .2 microsecond cycle time for Bell Labs. in Murray Hill; the order was given to another company. However, chances are about 90%

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J. Fadiman (cont'd)

that we will sell another Core Tester 2113 and Ramsey Handler CH70 to E.M.I., who were here last week. Also, we expect to sell another Core Tester and Ramsey Handler and another Memory Tester 1516, both to Burroughs Corp. in Philadelphia. In addition, it is almost certain that we will receive the order from Harvard University for the Spark Chamber Test Set that Pat Greene is designing. Equally certain is the order from Western Electric for two Decoder Test Sets and the Encoder Test Set, which Pat Greene has also designed. A bipolar repeater test set for Western Electric, North Andover, will probably materialize in a couple of weeks. Preliminary negotiations are now being carried out by Pat Greene.

On Tuesday I attended a bidders conference at Harvard University, Observatory Lab, for a system which would put radar information from eight test sites on a magnetic tape. This system involves peak detectors, sample and hole circuits, a large number of analog-to-digital conversions, probably a small core memory and an automatic tape transport. We have not yet made a decision to bid on this unit. However, several other bids have been submitted, such as a Memory Exerciser for Kearfott, a Memory Exerciser for Raytheon in Sudbury, a three station Core Tester for National Cash Register Co., a special time measurement test set somewhat similar to the Astronomical Clock for Texas Instruments, and another special Encoder Decoder test set for Western Electric in Andover. We are thinking of getting involved, in the future, in some systems for converting magnetic tape to punch paper tape.

Manual work is proceeding more rapidly. The 2108 manual has been completed, the 1516H manual is being typed, the 2010 manual is being printed, and the 2207 manual is being written. Still to be produced are the manuals on the Memory Tester 1521, the Core Tester 2114, and the Memory Exerciser 2212.

A. Blumenthal

The transfer of computer checkout responsibility to N. Mazzarese was completed this week with the delivery of the Adams computer to checkout.

The United Aircraft machine is still with us. Random errors on the A to D converter have been the cause of the delay in completing the

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A. Blumenthal (cont'd)

job. A couple of days ago we discovered it was caused by transients generated in the switching of the chopper ovens which operate on 110 V.A.C. We are trying to filter the noise out with LC networks. Packard Bell has been notified and is also working out a solution.

Our first look into the problems of designing a 2 usec memory indicates that cores and planes of this speed can be difficult.

Our present approach to selection will probably not be applicable to the new memory because of its speed limitations. The new approach may make use of switch cores to drive the x-y lines.

J. Cudmore

EN 1098	60%
EN 1073	40%

During the past two weeks, the test department has tested approximately 4200 modules. There are about 500 modules that have been tested but not inspected, and about 3900 modules on the shelf waiting to be tested.

The latest modification to the automatic DC tester has been completed and checked out. The time required to make a DC measurement is about 200 ms. for this machine.

Monday, November 5, sampling inspection of the finished goods stockroom was started. Units are drawn out, reinspected and retested. This inspection will include all items.

Our module repair department is becoming bogged down as a result of testing a large number of modules that have no defects. These modules are usually returned in a large group and represent the "overages" of several computers. Either too many modules are ordered or sloppy checkout results in a large number of modules whose status is unknown. I realize that the checkout crews are under the pressure of meeting a delivery date, but a little more care could be exercised in the handling of these units and would permit the repair department to fix the defective units more rapidly.

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J. Cudmore (cont'd)

Before the NEREM show I requested the sales department to deliver all the modules and loose pieces of equipment that would be on display to the Q.C. department for inspection. This equipment included a 901 mounting panel, a 722 power supply, and an assortment of laboratory modules and patchcords. All this equipment was inspected and tested. New housings were put on several of the modules and a new cover was installed on the 722. The patchcords included were checked for continuity and for ease of interconnection. I would like to see all equipment going to any show reinspected before leaving the building. This inspection and testing should save us from any embarrassment in the future.

K. Doering

We have had considerable difficulties on the 901 mounting panels. In some cases it was impossible to pull the lab. modules out. First, it was difficult to grab them because there was not much to hold onto. Second, one had to tip the module in order to pull it out. This caused additional friction. Third, there was misalignment of holes between the back panel of the module and the terminal board of the mounting panel. Fourth, there had been a modification made on the male as well as on the female part of the banana pin.

Back panel and terminal board drill jigs were drawn up and inspected immediately. The jigs were used by production in between, which caused some delays.

The results of the jig inspection were so disappointing that engineering had new ones made up. The new back panel jig has already gone through inspection and shows good results. Ten out of 14 holes were off nominal dim. by .003" to .009"; the worst of the other four was off by .0038". The tolerance on the back panel itself calls for ± .015". This new jig is of a relatively superior quality. If we could only get more of this kind! The new terminal board drill jig is now being made.

Our models are in rather bad condition. We pick up as many as possible and get them brought up-to-date. They go through Q.C., are retested and reinspected, and get a green approval sticker signed by Jim Cudmore and me, like any new model does. We have to cover quite a bit of ground to get this situation in control. On

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new models we are rather well off, because they automatically go through the required tests and inspections.

Approximately 3500 patchcords came to us recently and passed through inspection rather easily. Component Manufacturing Service, the company that molds the plastic around the pins, reamed the holes in the back end of the banana pins to remove burrs, brass chips, and excess plating (at our expense). Future shipments will have a bigger hole diameter.

The patchcord banana pin problem is not yet straightened out. Component Manufacturing Service supplied samples (gold plated) with a contact retention force from 2 to 4 pounds. A test showed that it actually was between 0.5 and 1.5 pounds. This partially resulted in our trying the pins out, so they slightly wore. We asked for new samples to get a true idea whether 2 to 4 lbs. is acceptable. (This is the range they can supposedly stay within). These pieces were still good and a recent shipment of 310 #2 patchcords (brown) had only one reject.

When I passed by the booth at the NEREM show this week, I found boxes with patchcords to go with the 901 mounting panel, which I could not plug into each other. They did not come out of finished goods. Now I wonder if there is another source where we can get these patchcords in our company? We would like to check them in order to prevent defective items from getting to a show.

Our PDP-4 at the same show had paint touch-ups on the long doors which showed up rather strongly. A considerable amount of paint touch-up is always done on these doors, and this job cannot look as good as the original paint job. Therefore, I would like to suggest that we put these doors onto the machine at the very last moment, especially on units that go to a show. Thus, we can eliminate the possibility of the doors being scratched up in the process of assembly, checkout, and other handling within our place.

The 22 wires that come from the Amphenol connector pin and go into the board circuit usually look out of the board by approximately 3/32". The girls in final module inspection clip this wire end off, thus leaving the wire end uncoated with solder. This is considered to be a poor solder connection.

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K. Doering (cont'd)

We talked with Cy Kendricks and he is going to make sure that either the wire does not stick out or has been clipped before soldering.

N. Fitch and D. Adams

EN 1098 100%

In the last few days we have been tracing out the wiring of the automatic switching time tester so that we will have a complete drawing of the tester as it stands now. In the past there have been many changes and additions to this tester, and the drawings have been falling behind. As N. Fitch, who has been doing most of the work on this tester, is leaving next Friday to go back to school, this gives me a chance to learn more about this tester as well as bring the drawing up-to-date.

The switching time tester has been modified to test rise and fall of inverters. We have found a few minor problems in automatically changing the 567 scope sync. polarity and test limits, but these will be cleared very shortly.

The 6202 burst generator has not been added to the tester yet, as we have had to make the inverter modifications first so as to keep up the flow of the modules that are now in test.

The D.C. control logic of the automatic D.C. tester has been completed and is now in use for production test. In converting this tester to logic control, we came upon a few unusual problems, but with a little trial and error we corrected them all and it is now running properly.

After the newly converted D.C. tester has had a production test run for a while to see if there are any bugs, we will convert the second D.C. tester to logic control.

R. Grey

In the past two weeks we have spent considerable time in the "Finished Goods" stockroom. We have inspected the systems modules for any defects they might have had and are presently checking lab

R. Grey (cont'd)

modules, power supplies and mounting panels.

The use of the new inspection forms has greatly increased the effectiveness of electrical inspection. With the addition of a procedure for possible rejects on computer wiring techniques, etc., we will be in good shape. If this form with instructions is given to the wiremen and other groups involved in the computers' construction, there will be less corrections to make at the intermediate and final inspections.

D. Dubay

Test Equipment Service

The following equipment has been calibrated since October 29th.

Description	Type	No. Calibrated
Oscilloscope	543/543A	16
"	581	2
Preamplifier	CA	16
"	80	2
"	81	2
"	82	2
"	0	1
"	D	2
"	K	3
"	E	1
"	H	1
"	G	1
"	M	3
Oscilloscope	567	1
Digital Unit	6R1	1
Sampling Unit	3576	1
" "	3T77	1
Preamplifier	Z	1
Meter	630NA	21
"	630NARM	25
"	980	11
VTVM	412A	1
Meter	931	4
"	433	1

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D. Dubay (cont'd)

The type 3576 sampling unit, serial #172, has excessive noise on channel A. I found the trouble to be a faulty diode in the sampling bridge. The replacement diode has to be shipped from Portland, Oregon, so it will be a few days before this trouble is corrected.

R. Winslow

Semiconductors Tested Since Last Report

Type	Manufacturer	Units Tested	% Reject
MA 89	Sprague	1000	1.2
MA 90	"	1000	1.2
MD 94	"	2369	0.42
2N1204	Philco	490	2.9
2N1494	"	50	0.0
1N1217	Westinghouse	163	1.8
1N1217	G.E.	2000	0.1
1N1220	Westinghouse	1000	0.5
2N1600	Texas Instrument	35	31.5
1N825	Transitron	50	6.0
1N3156	Motorola	35	0.0
1N825	"	10	0.0
1N758A	Texas Instrument	31	12.9
1N648	Clevite	100	2.0
1N3316B	Dickson	44	0.0
1N3209	Motorola	200	0.0
D662	Clevite	18216	6.4
D664	Continental Device	2928	1.3
D664	Texas Instrument	5939	28.0
D001	Transitron	107300	1.5
D001	Clevite	51695	0.58
Q5100	Int. Diode	17	5.9
D003	Transitron	477	0.92
D003	Clevite	5000	0.32
D007	National Transistor	5460	1.98
D007	Transitron	675	49.7

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R. Gaboury

The Mechanical Inspection Department has been busy during the past two weeks. The main bulk of work has been intermediate, final, jig, and first piece inspection.

Patchcords* and S.P.U. handles**, which two weeks ago were being rejected, are now almost perfect.

* Here the hole diameters were reamed out by the vendor.

** An appearance standard review resulted in loosening up on the inspection criteria.

R. Doane

VHF Clock	58%
Circuits for cheap NPN transistors	7%
NEREM	15%
Miscellaneous	20%

A 5 microsecond piezoelectric glass digital delay line has been ordered from Corning to work with 10 usec pulses or equivalent. Delivery will be probably late in December. I hope to design circuits to provide Manchester recording in such lines. There appears not to be any severe limitation on the shortness of such a line in the 1-10 microsecond range, and since its electrical characteristics are almost entirely determined by the transducers, circuits optimized for a given delay line should work optimumly with any similar line in this range of delays. The ability to store VHF data in such a line should be a valuable resource for future computer design.

R. Savell

1000	40%
2440	10%
1034	18%
1152	11%
1024	3%
1027	5%
Misc.	13%

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R. Savell (cont'd)

The advertising brochure for Precision Display Type 30 (note the new name) is almost completed. The hardest part of the job has been rounding up suitable applications photos to be used.

Technical Publications did a great job in practically zero time getting out a "stop-gap" brochure on the Type 30 to use at NEREM. There was quite a bit of interest in the display and having specifications and descriptive material to hand out may result in a couple of sales for us.

The simpler of the two character generators under development is ready to wire. We hope to have it installed in a Type 30 and running by November 16. It works as follows:

Thirty-five bits are transferred to a shift register from the AC and IO. The generator begins to scan digitally a 5 x 7 dot matrix while simultaneously sensing the bits in shift register. Bits holding a one will cause the associated location to be intensified for a period of about 5 microseconds. Bits holding a zero will cause the scan to move immediately to the next location without the 5 microsecond delay. In this manner average characters of about 16 points will be formed in about 100-120 microseconds as against the milliseconds required at present.

Other features are hopefully 4 sizes, automatic indexing in the X axis to the next adjacent character location and subscript positioning. If it all works, you can see it at EJCC.

The special counters and pulse height analyzer inputs for the AECL PDP-1 were completed, installed, and checked out on schedule.

The special Tektronix display logic for the MGH PDP-4 was completed ahead of schedule, but could not be installed due to the absence of the 4. It has travelled to a few shows.

A Fast Block Transfer instruction modification is presently being installed in PDP-1C-3 (CRC) for Itek Laboratories. Itek has sold CRC a flicker-free display (ours, Type 30-B) along with logic which they supply and programs to run it. They are able to generate 500 to 1000 linear inches of information flicker free this way.

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R. Savell (cont'd)

The main drawback of their system is that it takes lots of storage.

Speaking of flicker-free display, we are very interested in finding out what is needed by our customers along this line. We have some ideas, but the sales offices can be a big help if they will let us know (me directly, preferably) what's needed such as - line drawing, curve drawing, flicker-free, light pens, film-reading, character generation, fast point plotting, etc.

How about a display 30 to work from a 7090? We're pushing ahead on this one, so tell us if it sounds good. It will probably work through an IBM or one of our own "Display Adapter Units".

Is there interest in any other type of peripheral equipment we don't now offer such as a medium speed printer, etc.?

H. Crouse

An order for 100,000 male connectors has gone to Amphenol Connector Co., Fairlawn Division. This connector will replace the 133-022-21 now used on the system plug-in units.

The connector is of DEC design with the following characteristics; one piece contacts rather than split, wide blades replacing the guide pins, two bosses on the side touching the board to fill the void between the handle and board, a solid block rather than two-piece, and DEC's name on the top side. The unit price is $0.89. We expect to receive first runs in February.

Philco has offered us the last of the 2N1754 transistors for $0.75 each. The total quantity is 60,000 pieces, 18,000 of which we have ordered earlier at $0.90. Credit of $0.15 each will be applied against the 18,000 pieces received. The devices can be scheduled over a period of time.

Three model 2500 readers from Digitronics and one 28C Printer from Teletype have been ordered for PDP-4 production.

The major components i.e., Soroban typewriters, Digitronic readers, and Potter tape handlers, will have deliveries extended to April.

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H. Crouse (cont'd)

They were to begin tentatively in January.

A major portion of the transistors in obsolete stock will be sold into the surplus market place.

R. Blackwood

The ten etched PDP-4 Operator Control Panels rejected to Metal Etching Corp. of Long Island for various reasons are due to return here on or about November 16. Since this order was placed, we have found several local sources that are equipped to do this type of work, and if this source in Long Island does not work out, we would consider using the local sources.

Since the last biweekly, we have acquired another vendor for Silk Screening, namely, Revere Metal Products Corp. of Jamaica Plain, a subsidiary of Aluminum Anodizing Corp. of America. Their quality exceeds, in most cases, those of Precision Screen Process and their price in all cases is considerably lower than that of Precision Screen. When practical, we will try to divide the work between these two vendors in order to have either ready for immediate use.

An order has been placed with the Kirk Moulding Co. of Clinton for 1000 reels to be moulded from ABS #710, a high impact material containing rubber. These reels are due for shipment on or about December 21. An order has also been placed for 1000 labels, labeled "Digital-Linc". Delivery on these should precede the delivery of the reels by a few weeks.

R. King

I have recently placed an order for some 10" x 12" paper trays. These trays should be available in the cafeteria in the near future. These trays are disposable and can be taken from the cafeteria. ($16.68/M)

I have received quotations in regard to the installation of bulk storage tanks for our Trichlorethylene. This, of course, will replace our ordering tri in 55 gallon drums. These tanks would be installed with no cost to DEC, other than using the vendors tri.

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R. King (cont'd)

These tanks have a 275 gallon capacity and would flow via gravity or with pumps directly into our degreasing facilities. Maintenance of this installation will be the responsibility of the vendor and the tanks will remain the property of the vendor at all times. Decision is still pending on this matter.

I have also received quotations for our reception areas in Building 5 and Building 12. Our quotations are based on furniture manufactured by Howell Company.

J. Atwood

The cooperation we have received the past few weeks from Production has been most welcome. With as many as seven major manuals, three large mailings and miscellaneous house printing jobs being processed simultaneously, we would have been hard put to meet our deadlines without the help the girls have given us. Nan Bickford, who does a consistently superior job of handling our binding and mailing operations, is quite pleased with the spirit the girls have shown, as well as with their ability to maintain very satisfactory production rates on widely varied assignments.

The October general mailing to over 21,000 prospects has been completed, and the November mailing is in process now. A mailing next week to computer prospects culled from our list and a variety of other sources will extend an invitation to see our demonstrations at the Fall Joint in Philadelphia. This show should be one of our best, judging by present progress on demonstration programs and booth arrangements.

There is quite a batch of literature in the works. Jon Fadiman's Systems Brochure is ready for the final press run (1,000 were printed for the Magnetics Show in Pittsburgh this week pending a decision on the total we wanted to have). Proofs on the PDP-1 Programming Manual should be in late this week, with final copies due the week of the 26th. The CRT 30 Brochure is complete with the exception of a few additional scope-face photos to show what the unit can do. Also in the final stages are preliminary bulletins on Current Drivers 53/63 and Current Calibrator 72.

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J. Atwood (cont'd)

The PDP-4 Programming Manual is ready for the typesetter, and the new PDP-1 Brochure is going together quickly. These are both among the items we would like to have ready for Philadelphia. Among the product bulletins in preparation are the CRT 31, Color Display, Tape Transport 50, Tape Controls 51-52-54, Line Printer 62, Card Punch Control 40, and Card Reader 41. Work has also begun on a PEPR bulletin, and we will get going on a final VHF Modules bulletin as soon as we get an okay.

We are now running the last chapter of the PDP-4 Maintenance Manual, and the rest of the job is being collated and bound. The PDP-1 Installation Manual will be ready to go with the completion of the last few drawings, and the MAINDEC 1 Manual is nearly through printing. The CRT 30A Manual is complete except for the cover, which is on its way to press. The CRT 30C Manual will follow close behind. In the works are manuals on the CRT 31, Card Punch Control 40, Card Reader 41, and Line Printer 62. The BCD Application Note (Appendix A of the Module Catalog) is being packaged like the Pulse Train Techniques Application Note for general distribution, and the new PDP-4 Programming Cards are all set for printing.

Lots of other things are going on around the shop, but these are the highlights.

T. Johnson, WCO

Our top customer in this area, JPL, assumes top priority attention with their current evaluation of PDP-4 for three projects: TPS (Telemetry Processing Stations), Digilog (Data Recording Systems) and Videcon (Program for transmission and recording of Lunar photographs taken starting at 2500 miles from the moon). PDP-1 and our systems capability will be up for another round soon on a spacecraft checkout system. The competitor for the PDP-4 is the SDS 910. All signs are good for PDP-4. We should have something definite to go on in a week.

Several groups at Boeing-Seattle have been investigating the PDP-1. Astrodata finally received their P.O. for the JPL Windtunnel System (the red-tape will probably delay our delivery of PDP-1). Ron Colman is working on a wire list printout application for North

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T. Johnson, WCO (cont'd)

American. We are discussing an experimental Dataphone link from our PDP-4 to the Western Data Processing IBM 1009 at UCLA. This experiment was initiated by Dr. Lusted at the Oregon Primate Research Center. He wants to connect with the recently acquired UCLA Biomedical Center's 7094. Dr. Dixon at UCLA is a key figure in medical center data processing at this point.

Our staff will move to new quarters (1½ blocks down Sepulveda Blvd.) in approximately three weeks. The new offices will be significantly more prestigious (and this area is collecting quite a number of computer company offices: Computer Sciences, IBM SBC, Control Data Corp.), will provide an opportunity to place the PDP-4 demonstrator in a proper setting, and will give the staff some much-needed elbow room.

K. Larsen, WCO

Three engineers from Systems Development Corporation visited our office and I talked with them about using our Visual Display Scope in conjunction with a memory drum which will receive info on their Philco 2000 Computer. This equipment will be used in one of their "man-machine" studies and will include 15 to 20 displays. The Philco 2000 computer will be constantly monitoring the operator's response to display patterns. They are making preliminary studies using a Tektronix scope and some loan modules. If these studies prove the feasibility of this system, they may ask us to bid the displays installed in their consoles.

Ron Colman and I visited Telemetrics to clarify their request for quotation. They are one of the major suppliers of PCM Telemetering equipment and they wish to be able to offer an off-the-shelf system utilizing their equipment and a computer for on-line data monitoring and engineering tape preparation.

Collins Radio Corporation called us in to talk to them about a memory tester to test the memory stacks at the receiving inspection station with patterns from and under control of an existing memory exerciser unit. They need to use more precisely controlled current pulses so they can correlate their tests with those of the vendors. (This is the same group that designed the system to compete with ITT's ADX).

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K. Larsen, WCO (cont'd)

We received some help from Dit Morse and Steve Lambert at a recent seminar held at JPL. One phase of JPL's program has evolved to the point that Ron Colman and I are submitting to them three hardware and software approaches utilizing the PDP-4. Other areas at JPL will soon require that similar information be submitted.

National Cash Register is presently evaluating our proposal for the magnetics test system. I assembled a demonstration kit using our x10 sense amplifier and a slice amplifier to demonstrate the amplitude discrimination and the strobe timing technique used in our magnetic core testers. We tied it to their testing device and found that it worked out quite well. It would perform the accept and reject functions on a thin film strip with known defective areas. They seemed quite pleased with the outcome of this demonstration.

R. Mills

Capital Equipment Purchases - Month Ended October 31, 1962

Date	Vendor	Qty.	Amount	Description
10/1/62	IBM	1	$ 700.	Typewriter
10/29/62	Botwinik Bros.	1	4,065.	Surface Grinder
			$4,765.	

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D. Denniston, NYO

The ISA Show consumed a considerable portion of our time for this biweekly period. My opinion is that the show was quite good and that there can be a lot of follow-up work done on the potential customers we talked with there. The reply cards gathered at the show are already returning here from Maynard.

Since the last biweekly contribution, my visits have included the following:

Bell Telephone Laboratories, Murray Hill and Whippany, N.J.
Computer Products, Belmar, N.J.
IBM, Yorktown Heights, N.Y.
United States Military Academy, West Point, N.Y.
Western Electric, Allentown, Pa.

I might mention that there has been a fairly good exchange of sales leads lately between the offices and the Sales Department in Maynard. Many of these have been quite worthwhile, and I'm sure that we are all open to suggestions from everyone.

Our "fantastic" delivery has eliminated many of our daily headaches, with the possible exception of some of the uncommon accessories such as 922 Power Cables.

Technical complaints have been few, but have included our patchcord problems. Also, IBM has had some trouble with 6401 clock jitter, and Western Electric has experienced a few minor difficulties, such as a taper pin mounting panel with both "E" jacks filled with solder in one connector and a current driver with a banana jack undrilled.

K. Fitzgerald

EN 1000 100%

This is a four-week report due to a couple of <u>real</u> busy days two weeks ago getting things ready for the shows in Chicago and New York.

<u>Carpenter Shop</u>

For the past couple of months the carpenter shop has handled all of the plant carpentry work, display building for shows, crating, and

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K. Fitzgerald (cont'd)

has made many special shipping containers for handling fragile items that are fabricated or worked on by outside vendors. These have included such things as: special cases to ship our SPU handles from the plant to the anodizer and back, and boxes for housing the Plexiglas display shields from the outside vendor to our plant. These boxes will be used for shipping as well as storage in the stock room. If anyone else has any items of a delicate or fragile nature that they feel should have a special container made for storage and handling while they are in transit or in the stock room, please let me know and we will see what we can do.

Our method of crating computers and systems has also changed in the past four-week period. At the present time we are working on an experimental design which is simply setting the machine on the skid, covering it with the plastic shroud, putting a wooden cap on the top, and vertical one by four wood strapping on the corners and sides. This has the effect of a skeleton type crate where the unit is visible through the plastic shroud. If this meets the approval of all concerned, we will do more design work on it with the possibility of incorporating foam rubber or polyethylene foam corner protectors to keep the crate from chafing through the "Kim Pack" and rubbing on the machine. Also we feel that we have had wires breaking off in the unit due to the road vibrations transmitted from truck to the machine while in transit. There is a possibility that we may be able to design a molded semi-rigid polyethylene cushion for the whole machine to sit on while it is on the skid. This would go a long way toward eliminating the transmission of these road vibrations.

Machine Shop

The machine shop has increased its staff by one new apprentice machinist. The shop is presently working on fairly large orders for memory stack mounting hardware, tilt turn mechanisms for displays and re-work of plenum door latch pins. Also in the shop is an experimental focus coil and yoke adjustment assembly for Display 31, special jigs and tooling for silk-screening and blanking of printed circuit boards and we have recently completed two special dies for the new type switches being used in special systems.

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K. Fitzgerald (cont'd)

Assembly Shop

The assembly shop has had its ups and downs in the past four weeks. For about four days they were practically without work and now they are operating at about 90% capacity. For the period when they were without work they were used for handling the overload that we had in the sheetmetal shop. Since all of the people in the cabinet shop are transfers from the sheetmetal shop, it makes it very easy for us to send over work whenever they are slack. Also during the past four-week period they have retro fitted all cabinets in the plant with the new plenum door latch pin and replaced all of the mag tape door push button fasteners with a longer one which seems to work better. Recently the cabinet assembly shop has also taken upon itself to do a little of the paint touch-up that is necessary before the cabinets are OK to leave the shop. This should take some of the load off Jerry Bouthiller's people and insure that the cabinets get out of the shop sooner.

Sheetmetal Shop

The sheet metal shop has had to bring back one of the contract workers from Labor Pool in order to try to get ahead of the production demands for SPU handles. For the past week I have spent most of my time running down problems that have arisen with the SPU handles. These problems were in the nature of small, black marks and etched areas on the handles after they were anodized. These were so serious that at one time we had a reject rate of over 75%. As a result of this, production demands used up all of the back log in the stock room and at the present time they are working more or less hand to mouth. As the units are received from the anodizer and inspected they go right on to the floor. At this time I think we have been able to lick the problem although we still are not certain exactly what the problem was. The only thing that we have proven so far is that the small, black marks, which accounted for about 10% of the rejects, were caused by inclusions in the raw stock. We have contacted the supplier who has sent us a new batch from a different mill order which we are running now. We hope that this will eliminate the black spot problem. However, the small etched areas are still giving us some trouble. If the handles are shipped immediately after sanding, kept wet, and anodized immediately, we don't seem to have

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K. Fitzgerald (cont'd)

any trouble, but as soon as they dry out these etched areas appear. At this time it looks as if this problem is being caused by electrolytic action between the pieces or caustic etching from the coolant in the sanding machine while they are being shipped. However, we have not proven this conclusively yet. If this is the case, we will contact the supplier of the cooling solution that we use in our sanding machine and see if he can devise a new coolant that will prohibit electrolytic action or caustic etching. If that doesn't work, probably our only solution then will be to thoroughly wash and dry each handle before it is packed. This is a rather expensive operation and we hope that we will not have to resort to it.

The paint department has been painting samples for us every day for the past three to four weeks and we are about to get together with Quality Control, so that we can set up a maximum and minimum of paint textures and finish that can be reasonably expected. However, out of approximately 75 samples we did not get the range in texture that we expected to get. However, I do feel that our paint quality has improved just due to the fact that we are examining samples every day. This does have a tendency to keep the painters on their toes.

Now that our new tool crib is in semi-operation I don't think it will be too long before we will be ready to administer the engineering technicians' and engineers' tool boxes, which were started sometime ago. An order for replacement tools for these tool boxes will be sent out this week. As soon as these tools are received, the tool crib attendant will start calling in tool boxes in order to bring them up to the standard list. If after this is done people are still not happy with the quality or quantity of the tools, contact me and we will see what we can do about changing the standard list.

R. Doane

BTL Memory Exerciser bid	30%
VHF paper	20%
VHF clock	20%
Calibrator 72, VHF logic and flip-flop, and other miscellaneous	30%

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L. Prentice

General Eng.	90%
EN 1136 Link Tape Unit	10%

Our greatest problem during the past two weeks has been the high rejection rate of SPU Handles. This matter has been handled by Mr. Fitzgerald and will be covered in his biweekly report.

Security

More locks have been installed and we are now approximately 90% complete on installation of locking and securing various areas. It must be realized that with our changing and moving about of various departments in the company, that lock system is never complete. We have changed the heating system about the shipping area platform, installing two blower heating units. These should be checked out and ready for use in the coming week. This necessitated the change of some 16 to 20 sprinkler heads. These have been purchased and will be installed by Maynard Industries as soon as they can free men for this work.

Last week a tour was made of the plant with Mr. Hugh B. Huntley and Mr. Carl G. Moburger, Supervising Engineer and Senior Safety Engineer at Liberty Mutual Insurance Company. They called to our attention a whole series of hazardous practices and conditions. I noted down the most serious of these, approximately 12 in number, and work orders have been issued for correction of approximately half of these. More work orders will be issued as soon as people's time becomes available to correct these conditions. They said very little about our general housekeeping conditions, so I assume that they are as good or better than they have found elsewhere. However, I noted several areas where fire escapes were blocked and material is placed in front of switches blocking off the ready access to these units. These should be carefully controlled by supervisors in each section.

Getting quality work from our outside vendors in regard to finishes and plating is still a problem. This problem is going to be under a considerable amount of attention in the next few weeks because of the development of work necessary on the Link Tape Unit.

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L. Prentice (cont'd)

Paint samples within our own shop have been kept on an every day basis for the past month. These are now ready for evaluation by the Quality Control people to establish standards for painting.

Work on the 31 Display by Ron Cajolet is reaching the period where a trial setup can be made of a new focusing device, and drawings for the shield of the latest design is now ready for release to the vendor. Tests have been completed and tooling has been made up for the installation of the new type of stud for all our aluminum panels. Change orders will be initiated in the near future for all panels requiring studs. These new studs do not penetrate completely through the panel and hence if one is loosened, or even entirely torn away, the front panel will probably not be damaged. This should cut down on the rejects in this area which in the past have been extremely expensive for the small number of items involved.

Scott Miller is working on a new front end design for the PDP-4, labels for the tape units, artist's conception for several possible layouts of the new tape units and labels for some of our other equipment. He has also completed the design for a cover for the 31 Display Unit.

P. Greene

EN 1038	60%
Special System for Harvard University	
EN 1057	40%
Core Tester Development	

Work is still being done with Professor Miller of Harvard University for the development of a data reduction system for the Cyclotron Lab. Finalization of the specifications is now being completed by Professor Miller with our help. Some internal "red tape" is being encountered at Harvard because the project is so new not many people know about it. Therefore, it is anticipated that initially a smaller system will be built and put into operation. After some preliminary data is collected and processed in a computer, Professor Miller feels confident (because of a similar successful experiment in Europe) that the "red tape" will be cut and the "go ahead" for a larger system will be given.

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P. Greene (cont'd)

A 2108G Core Tester is being built for the Magnetics Conference next month. The "G" model indicates a modification of the original 2108 System to include some of the new 30 mc logic. VHF Module 8103 is being used in conjunction with our regular 1000 Series line to develop added flexibility to test the extra fast cores now being manufactured.

K. Doering

This week we met with Ken Fitzgerald, whose paint shop had collected a number of color chips which are a representative production sample of the last three to four weeks. There was a considerable variation in the tweed texture. On an arbitrary basis, but supported by past experience rather than scientifically, we selected standards for an upper (heavy texture) and a lower (flat texture) quality limit. These limits are wider than our present standards have been, which we then adjusted to the new limits, effective October 26. While these samples were run, the shop people experienced a number of variables being responsible for the texture variation (a) varying line air pressure; (b) different mixing methods; (c) humidity; (d) temperature; (e) the human element.

According to Ken Fitzgerald, there can be very little done about point "a". Point "b" has been solved; points "c" and "d" require a prohibitive amount of money to build and maintain special facilities; and point "e" is only controllable to a certain degree.

Our paint quality has definitely improved; on the other hand we learned that our quality requirements have been unreasonable. We have not had any customer complaints as yet, which is a remarkable point. The paint shop shall continue to make color samples of their production runs which will be a basis for a possible revision (either relaxing or tightening of our paint standards). It also has a psychological effect on the painter who shall be more conscientious about what he is producing.

On our SPU handle problem, we have also achieved a remarkable quality improvement due to the very fine cooperation we got from Ken Fitzgerald. He detected that our vendor did not etch the handles long enough.

K. Doering (cont'd)

Also, the stock we bought already had imperfections. Ken's people are now using a different cutting compound, besides a cleaned rinsing solution in the sanding station, as well as a more frequently renewed sanding belt. In addition to this, we re-evaluated our appearance standards. We plan on re-evaluating standards frequently so that inadvertently we won't reject good material with arbitrary standards. The D-007 diodes from Transitron are giving us difficulties, because their marking is not adherent and comes off even if one rubs it with his hand. I have contacted Transitron about this problem and they are already working on it. We hope that the cause can be located soon and the problem solved.

R. Gaboury

Last week another girl joined the mechanical inspection department. Her time will mainly be devoted to the inspection of finishes such as: chromicoat, paint, anodize; also visual and simple electrical inspection of resistors and capacitors. This takes the strain from the boys who can spend more time for surface plate work such as: dies, jigs, and gauges, and all other intricate inspection.

D. Dubay

Test Equipment Headquarters

The following equipment has been calibrated since October 15th.

Description	Type	No. Calibrated
Oscilloscope	543/543A	24
"	581	1
Preamplifier	CA	24
"	D	1
"	82	1
"	80	2
"	81	2
"	0	1
Multimeter	630NA	12
"	980	10

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D. Dubay (cont'd)

The machine shop has been completely rewired for speakers--the shop had been remodeled so many times that speaker wiring ran in all directions.

R. Grey

Taper pin patchcords have given us trouble the last week. Because some bad ones were found in "finished goods," all are being re-inspected. In one batch of 3400, 299 rejects were found.

Some bad taper pins were also found on machines. Instructions have been given to correct these faults, and on-the-spot checks will be made on production runs.

We are working on an electrical inspection procedure for computers which will be distributed to the various groups. This will give the groups an idea of what may be rejected on their machines and they will have a chance to remedy these things.

Of the counters that are being life tested, the Elgin, of the National Watch Company, failed at 175.7 hours.

N. Fitch and D. Adams

Automatic Module Test Development 100%

Since one of our type 567 readout oscilloscopes has been made available to circuit design, we are now converting the automatic switching time tester so that we will be able to test inverters and diodes on this machine. This entails the addition of calibrated logic and another 50 pin taper pin plug so that we will be able to program the tester.

David Adams has completed the control logic for the Mark I automatic D.C. tester. This will speed up this machine by approximately 10 times. He has completed the mounting of the necessary equipment and is now checking out and calibrating this machine. Conversion of the Mark I should be completed shortly, thus making this machine available to production test early next week.

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N. Fitch and D. Adams (cont'd)

The 4201 Burst Generator for the switching time tester has been completed and checked out. Also, the 6202 burst generator design has been completed.

J. Cudmore

EN 1098	75%
EN 1093	25%

Work is proceeding on the modifications to the DC Automatic Module Tester. The logic has been checked out and the necessary calibration checks are being performed. The flip-flop switching time tester is being modified to enable it to perform as many functions as possible.

The MD94W transistor testing procedure has been investigated. The measurement techniques have been refined so that we can make a VBE measurement with some degree of consistency. This transistor was originally specified to be used in the 1570 slicer flip-flop. Every time this unit reached test, it created a lot of trouble. The VBE match called for in this circuit was added to improve this situation. No significant improvement in ease of testing resulted. A lot of 1570's is now being tested using carefully tested and tagged MD94 transistors and the results of this lot should prove very interesting.

The most recent delivery date on the Contronics diode tester is November 12. This tester will perform forward and reverse tests on a go no-go basis.

In the past two weeks, approximately 3,500 modules have been tested. There are approximately 800 modules that have been tested but not inspected. About 5,000 modules are on the shelf waiting to be tested.

R. Winslow

The following semi-conductors have been tested since the last report.

Type	Manufacturer	Units Tested	% Rejected
2N 398A	RCA	5	80.0
2N 398A	Motorola	26	0.0

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R. Winslow (cont'd)

Type	Manufacturer	Units Tested	% Rejected
2N 456A	Texas Instrument	300	0.33
2N 656	" "	50	12.0
2N 709	Fairchild	250	2.4
2N 744	Texas Instrument	400	0.25
2N 813	Raytheon	10	0.0
2N 994	G.E.	250	5.2
2N 1146A	Texas Instrument	1000	0.7
2N 1304	" "	3000	1.0
2N 1305	" "	25000	0.76
2N 1305	G.E.	3500	0.6
2N 1494	Philco	86	3.5
2N 1499A	Sprague	2000	0.75
2N 1719	Texas Instrument	50	0.0
2N 1754	Philco	18500	0.31
2N 1796	"	250	4.4
GA 212	Texas Instrument	3000	1.1
GA 439	" "	3000	0.73
MA 89	Sprague	1426	1.5
MA 89	Philco	2000	1.3
MA 90	Sprague	10663	0.68
MA 90	Philco	8000	0.76
MD 114	Sprague	696	1.3
MD 114	Philco	10874	0.52
SJ-1071	Texas Instrument	1000	0.7
SDA-1	G.E.	181	1.1
SP-390	Texas Instrument	100	6.0
IN 825	Transitron	50	6.0
IN 825	Motorola	10	0.0
IN 1217	Westinghouse	163	1.8
IN 1217	G.E.	2000	0.1
IN 1220	Westinghouse	1000	0.5
IN 3156	Motorola	35	0.0
2N 1600	Texas Instrument	35	31.5
D-001	Transitron	57300	2.1
D-001	Clevite	51695	0.58
D-662	"	18216	6.4
Cores:			
T-1	Indiana General	34013	0.0
O-3	" "	11728	0.0

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H. Crouse

The ITT cancellations have raised problems we in Purchasing had not experienced previously. The major components commitments had to be rescheduled and reduced creating with our vendors kindred production problems. Most vendors accepted our rescheduling in stride; i.e., Teletype, Soroban, Digitronics, and memory stack sources (RCA, Ampex, Ferroxcube and General Ceramics). Potter Instrument, however, responded with our initial cancellation of twenty handlers ($131,500) with a cancellation charge of $24,000. Obviously, the charge equal to four handlers prohibited direct cancellation. Potter's option to reduce the quantity to ten with no charge other than increasing the discount rate to the published 5% from 10% was more in order.

Ampex has delivered a new FR-400 Tape Handler to Roland Boisvert for evaluation at no charge.

A Burroughs Model 546 Tape Handler has been ordered for Roland Boisvert at a cost of $6,000.00. Delivery expected December, 1962.

Tally Register is providing the latest design paper tape reader for Bob Savell to evaluate. It s expected in next week.

MD-1143 Transistors. Sprague and Philco have supplied this device for the last eight months, and until the last several weeks quite successfully. Industry demand for MADT transistors in a smaller package and competition caused both sources to adopt a TO-18 configuration as a standard with more automatic production and testing techniques. The TO-18 MD-114 does not meet the high frequency parameters and is not a direct replacement. Sprague's contract was ending and they were preparing a complete line to supply us a TO-9 package when Philco with 30,000 units to deliver on a contract notified us they were no longer producing a TO-9 package and were, in fact, to supply the TO-18 type to complete the order.

Sprague will begin shipments on a new contract the week of October 29. Philco with 20,000 outstanding will ship in on a hand-to-mouth basis as they have with the last shipment of 870 pieces.

2N1499's and 2N1754's will replace the MD-114 for the next several weeks until Sprague begins regular shipments.

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H. Crouse (cont'd)

The cafeteria is making progress with an expanding food line - please note the better grade of doughnuts now being served. A formal cafeteria committee has been formed and will meet regularly until the cafeteria is well under way and running as a smooth operation.

Recent major orders have been placed as follows:

Vermont Research	Memory Drum	$ 7,800.00	Ted Johnson
Packard Bell	A/D Converter	$ 66,500.00	Ed Harwood
Sprague Electric	MD-114	$125,000.00	Maynard Sandler
Burroughs	*Tape Handler	$ 6,000.00	Roland Boisvert
Elec. Associates	5-117 assembly	$ 1,630.00	Ed Harwood

*Tape handler - complete is $7,405.00

$6,000.00 handler
$1,200.00 head
$ 205.00 under tape sensing devices (IBM)

R. King

Due to recent problems with our present vendor, we have decided to re-evaluate our present Microfilm Program. Roger Melanson and I recently visited Graphic Microfilm of New England, Inc. to have a first-hand look at their facilities. Graphic has also submitted for our evaluation a proposal containing three various programs for us to consider. We are presently studying these three programs to determine which one will best meet our needs here at DEC.

I have recently been pricing various equipment for our new cafeteria in Building 5. With the addition of this equipment it will afford the cafeteria personnel the opportunity to present a wider and more diversified menu. It should also help to speed up the dispensing of food and allow employees more time to enjoy their lunch.

We have added recently to our list of maintenance equipment by purchasing a 6 horsepower, 26-inch Snow-Bird power snow remover. With this addition we will be able to keep our shipping and receiving departments running smoothly in the winter weather, as well as

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R. King (cont'd)

keeping paths open for guests, salesmen, and employees.

F. Kalwell

I ve recently ordered 1000 special capacitor clamps to be used on our electrolytic computer, 35,000 mfd capacitors. This should eliminate the problem we ve been having with the capacitors becoming loose while in transit. These clamps will be shipped the week of October 22.

R. Blackwood

During the last two weeks, I have been working almost exclusively on the pricing of the various components which are used on our modules. Using a list supplied by Ed Simeone of 675 various components, we went through Cliff Fuller's production control records and listed the last three purchase orders on each particular component. We then made up a list covering each of the components, consisting of:

1. The three purchase order numbers
2. The vendors to whom these purchase orders were issued
3. The quantities bought on each of the purchase order numbers
4. The price of each item

When you consider that there was in the vicinity of 2000 purchase orders to check, you will appreciate why this job took the time it did. As of this moment we are still checking the last of the prices on these purchase orders and will probably be finished by the 12th. After this phase of the work is done, we will make a quantity judgment on each and every component and list the price at which it can be bought in that particular quantity. This list will then be forwarded to Ed Simeone and using it as a basis his people will then affix a standard cost to these components.

As of today, I have the following jobs outstanding with subcontractors:

200 Computer Cabinets
200 Plenum Doors

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R. Blackwood (cont'd)

200	Long Computer Doors
5	Other small sheet metal jobs
12	766 Power Supplies
12	Panels being silk screened
1	Set of Sequence Break for ITT 256 Channel

This list is approximately one-third to one-quarter of the amount of work outstanding six months ago.

G. Rice

This past week has been quite busy for PDP-4 personnel. Two machines were completed. One for a customer and the second will be a DEC machine. It has been sent to Chicago for The National Electronics Conference Show and during the week of October 15th it will be at the ISA Show in New York City.

Two problems have plagued the PDP-4 delivery recently. First, there have been faulty modules coming out of Test. There were seven bad modules found during the checkout of PDP-4-5 and an associated A-D converter. The field offices have also found this problem with some of their customers. The second problem concerns delivery. The module delivery has greatly improved, in fact, it is now possible to obtain modules from off-the-shelf. However, in every system there is usually one module which isn t available. There aren't many systems that will work if one of the modules is not available. It is anticipated that this problem will be eliminated in the near future.

For those people presently or planning to use Packard Bell A-D equipment, they may be interested to know that Texas Instruments has a complete line also. The outstanding feature is the .1 micro-second aperture time. T.I. also has a complete line of multiplexer equipment. T. I. will have a man here and will display their equipment at the up coming NEREM show.

A. Michaud

Memory Checkout

In the past two weeks, the memory stacks have been coming in at a rate which is enough to have 5 or 6 stacks always on hand in stock.

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A. Michaud (cont'd)

This is a great improvement to the speed of testing memory systems without waiting for stacks.

Every stack which comes in is first tested to see if it is reliable for a system and a schmoo test is made on each one. If it is not acceptable, it is sent back.

The fact that the 1538 DC Sense Amplifier is now being used has increased the margins of the system greatly. Margins have been $\pm$5 volts with 1540's but now can be $\pm$10 volts with 1538's. The 1538's seem to be working very well.

The other day I received a 1538 DC Sense Amplifier with A and B shorted by a solder on the board. This caused a loss of time in tracking down as it locked the +10 voltage of the power supply together making the error seem in the supply.

Also, a 1972 R/W Switch came from finished goods with a GA212-235 transistor missing. The switch worked almost perfect except the wave form had a small difference. It is unexplainable why it still worked.

Upon receiving the Ampex stacks, it was found that a change had been made in it which made it work much better, but it requires R/W currents of 210-230MA and inh currents of 200-225MA. With this increase of current, it is found that the 1973 Drivers will not stand up to the new current. They seem to blow transistors after becoming warm in the system. This might lead to trouble when the system is in a computer.

The memory system is now being put under a heat test to see if it has a great affect on the packages. If it does not affect the operation, it will be discontinued. The OK of this test will be made final by R. Hughes.

J. Fadiman

During the past two weeks, the only system shipped out was the Astronomical Clock, Model 2315, for Mitre.

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J. Fadiman (cont'd)

Systems under construction include the Memory Tester, Model 1520, for IBM, Owego, due November 1; the Memory Tester, Model 1521, for Ferroxcube, due December 27; the Semi-Automatic Core Tester, Model 2114, for IBM, Owego, due December 27; the Automatic Core Tester 2113H, due November 21; and two Memory Exercisers, Model 2212A and 2212B, for Western Electric in Hawthorne, due January 4, and February 1, respectively.

The Memory Tester 1520 is now being checked out by Dick Whipple. Wiring diagrams are being completed on the Core Tester 2114. Final inter-panel wiring is now being done on the Core Tester 2113H and this should be ready for checkout in approximately one week. The block diagrams are nearly completed for the Memory Tester 1521 and we are at present drawing the block diagrams for the Memory Exerciser 2212A.

Russ Doane and I have been preparing a bid for a Memory Exerciser, Model 2213, for Bell Labs in Murray Hill. This is an exerciser which will test memories down to .2 microsecond cycle time. It will require use of a considerable amount of new VHF equipment; price is in the neighborhood of $42,000. Pat Greene is working on bids for other special systems, which are described in his Biweekly. It looks as if we have a good chance of getting these systems. In all, it looks like a very busy time for the systems group at least through February. By that time I expect to receive orders for another Memory Tester and Core Tester in Japan and also, hopefully, a Core Tester at Burroughs. Autonetics is interested in a special kind of memory test system which Ted Johnson and Ken Larsen have worked out for them. Also both RCA and Indiana General are interested in our new Memory Testers, Model 1521. Some new business should be coming from these firms in the early spring-time.

P. Greene

At the moment there is a bid out for a special system to Western Electric Co., North Andover, for an Encoder-Decoder Test Set for approximately $6,000 or $7,000. This is a two-price bid which terminates October 31, 1962. Another bid is in the process of being formulated for Western Electric, North Andover, for a Decoder Test Set. It is expected that the bid will be in the

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P. Greene (cont'd)

neighborhood of $5,000. Liason work is being carried out with the Harvard University Cyclotron Lab for the design of a data reduction system concerning one of their experiments. Although a specific purchase order has not been received, we have a good chance of obtaining one. The desired system must have enough built-in flexibility to grow at a later date in an orderly manner to accommodate the increased number of bits of data.

R. Tringale

PEPR Controller 2310	35%
Voltage Calibrator 2114	30%
Current Calibrator 2114	30%
Miscellaneous	5%

The past two weeks were spent primarily on cleaning up all the PEPR drawings, before they are sent to MIT in book form.

The rest of the time was spent on design of a special voltage and current calibrator for the IBM Core Tester 2114. This will be a one of a kind type deal. Therefore, the calibrators will be built and tested by Special Systems, in order to reduce the time and cost in producing the calibrators.

R. Whipple

The vacant look on the Special Systems assembly area is really very misleading. In fact, we are still snowed under with work but almost everything at the moment is of completely new design. I attribute this to our becoming known as reliable special systems builders by such companies as IBM, Western Electric, G.E., etc. compared to last year when we were essentially building just our standard systems for some of the more specialized companies. All of this new design has necessitated the expansion of our group to 5 persons with systems design experience. So what does this prove? The next time you think of, or hear of some small or odd ball system that some one might be interested in, please let us know because we now have enough design people to consider more diversified types of system.

If I look a little happier to passersby, now, than I did a few weeks ago, it is because the MT1520 is beginning to take shape and

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R. Whipple (cont'd)

even operate, almost properly. I think I am safe in saying we're becoming very familiar with systems that are programmable from plug boards. The MT1520 is the first of three we have designed, using plug boards so far (the other two being CT2114 and MT1521) and I am sure there will be more.

R. Lassen

A proposal for a more consistent wage administration program has been adopted. Basically the plan will provide a more uniform method of assigning wage categories, especially with respect to new employees. It will become effective January 1, 1963.

We will resume our quarterly merit rating for all hourly employees (including clerical and secretarial people) as soon as a new IBM employee list is run off. We plan to administer the program on a regular September, December, March and June schedule. The Personnel Office will provide the necessary back-up including, quarterly reminders, rating forms, employee lists, scoring, recording, filing etc.

Although we will continue to have a formal job classification review for hourly employees once a year (during the annual review), I plan to work more closely with each department to keep a continuous watch over our hourly rate structure. In conjunction with this, I am going to outline a wage, policy and benefit survey which we plan to conduct in January. We are now setting up a large loose leaf survey binder that will include wage, policy and benefit information from several sources, including our own surveys. Barbara Charnock is also compiling labor laws and is preparing a loose leaf binder that will provide much needed reference material.

One of our most immediate projects is to prepare a historical personnel record of each employee. I am designing a folder that will contain not only the historical personnel record of the employee but also related papers. This will be used in place of the present personnel folder. The new record will enable us to review an employee much faster and with more accuracy.

Jack Atwood and I recently reviewed the draft of the new employee handbook. Jack plans to make a final draft incorporating some

R. Lassen (cont'd)

changes proposed by the Personnel Committee. The Personnel Committee will take one more look at the handbook before it goes to press. The committee also recently reviewed a draft of a new employment application blank. The new form will be more comprehensive and will help in evaluating job applicants.

It was agreed at a recent meeting that I should periodically meet with our supervisors. The prime objective of these meetings is to establish an effective line of employee communication. We hope to learn where our problems exist before they become serious and in turn we plan to communicate with our supervisors so they will have a better understanding of company problems and philosophy. I plan to ask for the help of some of our managerial people as the need arises. I am not sure when this program will begin, since a great deal of planning must be done initially.

R. Hughes

Components

We are looking into the possibility of using one passivated planar, epitaxial silicon diode to replace the D-001, D-003, D-664, D-662, and D-007. These are very rugged diodes which have a big "S" shaped strap which makes contact with the semiconductor material instead of the little curved whisker wire which our present diodes have.

We are also looking into PNP passivated, metallized, epitaxial, silicon planar transistors. Actually we have been using epitaxial, mesa and planar transistors for over a year but we want to keep our eye on the future, and indications are that of all the various techniques, i.e. alloying, meltback, grown, drift, mesa, madt, or planar, we feel that planar will be the surviving technique, and it is a good idea to get early indications of this so that it may be included in the company s plans.

National Semiconductor Corporation and Texas Instruments, Inc. are both making dual emitter chopper transistors, and we have been thinking of using these in our new A to D conversion equipment. These are very expensive devices, and cost $25.00 each in 1000 quantities, and we may not use these at all, but simply use matched

R. Hughes (cont'd)

pairs of choppers which we can buy for about $12.00 each in quantities of 1000 with an improvement in performance.

J. Cudmore

1098	60%
1073	40%

Dave Adams has joined the Automatic Test area and will be the only technician in this area when Norm Fitch returns to school on November 10th. Dave is presently working on the logic necessary to replace the mechanical stepping switch and motor that have been one of the biggest headaches in the reliability of the DC tester. Norm Fitch has constructed the necessary equipment to connect the 2nd comparator to the existing tester. This will eliminate the meter relays and greatly speed up the testing rate.

Klaus Doering and I went to Clevite on Friday, the 5th, in order to clear up a correlation problem on the reject diodes. Previous to our trip Clevite had visited us and brought along some tagged diodes. Their measurements did not agree with ours and yet our measurements agreed on both the Teradyne and the curve tracer. We brought tagged diodes with us to Clevite and remeasured all the parameters. All the measurements correlated beautifully. The only point of conflict was in comparing the results of their Teradyne vs. our Teradyne on reverse leakage. If the leakage was 50 μa, our Teradyne would measure it as 50-60 and their Teradyne would measure it as 40-50. We also noted that we measure reverse recovery with a different time zero reference point. This means that we measure a 110 NS, by their measurement, recovery time as 100 NS and should therefore have a very low reject rate. We have kept one-half of the tagged diodes and Clevite has the other half. These samples will be used if any difficulty arises again.

Recently an experiment to test a new form of packing was conducted by the sales department. A 722 PS was packed using a new type of filler and then shipped to New Jersey and back. The package was then opened and examined. There was no external damage to the power supply, but the insides were a mess. One capacitor had pulled out of the clamp; one was half way out, but the remaining two were still in their clamps. Of these two in the clamps, one

J. Cudmore (cont'd)

was rattling around loose because the screws holding the clamp to the chassis had fallen out. Two of the front panel screws were loose. These screws were both along the bottom edge of the panel. A suitable clamp has been found for the capacitors that will hold. These clamps should be used in all power supplies which contain the large electrolytic capacitors. The problem with the screws loosening up will be solved by using the proper size screw and by using a larger nut and a larger lock washer. As soon as a new unit embodying all these changes is made, the shipment will be repeated.

K. Doering

In the past two weeks we have had our assembly inspection system working. The people responsible for having these inspections performed and all others, whom we know of being involved with the problem, received a full set of procedures and a sample of the forms being in use. In some cases, everything worked excellently; in others, however, people did not even read the procedures concerning them. However, things are improving now.

The Amphenol connector pin on our modules is usually not parallel to the board. Jim Burley drew our attention to this fact. A few days ago we even got two modules back from a customer, who claimed due to this fact that it was hard to plug the modules in. Cy Kendrick adjusted the riveting machine, but still did not get the desired results.

Loren Prentice is working on a modification of the blue connector pin. They are getting a boss on it which will rest on the SPU handle and not allow the pin to bend into the space between board and handle.

N. Fitch and D. Adams

Automatic Module Test Development EN 1098 100%

Correlation of the 1201 Automatic switching time tester with production test has now been favorably completed by Dave Adams, and we are now ready to use the tester in production test. This will greatly speed up the testing of 1201's.

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N. Fitch and D. Adams (cont'd)

The design of the 4201 burst generator has been completed and should be in use within the next few days, enabling us to also test 4201's on the automatic switching time tester.

Dave Adams has completed design of the logic to replace the stepping switch on the Mark I automatic D.C. tester. This will not only eliminate the mechanical difficulties of the stepping switch, but also speed up the machine so that it will take approximately 300 msec for each test.

Another Reference panel and Isolation amplifier and Contronics adaption panel have been built, so that we will be able to use the Contronics dual voltage comparator in the other DC tester, instead of the control meters, thereby speeding up this machine.

R. Grey

No major problems in electrical inspection have occurred since the last biweekly report.

The two Gold Seal muffin fans and the Pamotor fan that are being life tested at 62°C, have passed a thousand hours. These fans are on 24 hours a day.

We also are life testing time meters of four different manufacturers.

Lock washers are being used on all capacitor brackets. This may help somewhat to hold the capacitors down.

D. Dubay

Test Equipment Headquarters

The following equipment has been calibrated since September 29.

Description	Type	No. Calibrated
Oscilloscope	543/543A	15
"	545A	2
"	551	2
"	185A	1

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D. Dubay (cont'd)

Description	Type	No. Calibrated
Preamplifier	CA	20
"	187B	1
Meter	630NA	18
"	980	10

We have received the following new equipment during the past two weeks.

1 Hewlett-Packard Oscillator	Type 200 CD
1 American Electronics Labs. Automatic In-Circuit Transistor Tester	Type 240
1 Tektronix plug-in unit	Type 84

Three C.R.T.'s have been replaced in Tektronix oscilloscopes during the past two weeks. Two of these C.R.T.'s were in warranty. The other one was replaced due to a badly burned screen.

R. Winslow

Semi-conductors tested since last report.

TYPE	MANUFACTURER	UNITS TESTED	% REJECT
MD-114	Sprague	696	1.29%
MD-114	Philco	10874	0.52%
SDA-1	Gen. Elect.	181	1.11%
SW-1250	Texas Instrument	300	0.33%
2N-398A	Motorola	19	0.00%
2N-398A	R.C.A.	106	0.94%
2N-456A	Texas Instrument	300	0.33%
2N-744	" "	400	0.25%
2N-1184B	R.C.A.	6	33.3%
2N-1304	Texas Instrument	3000	1.0%
2N-1305	" "	25000	0.75%
2N-1305	Gen. Elect.	3500	0.63%
2N-1494	Philco	14	7.15%
2N-1600	Texas Instrument	35	31.4%
2N-1796	Philco	290	3.78%

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R. Winslow (cont'd)

TYPE	MANUFACTURER	UNITS TESTED	% REJECT
D-001	Transitron	25000	1.11%
D-003	Clevite	3571	0.35%
D-007	National Transistor	2060	0.39%
Q6-100	International Diode Corp.	12	0.00%
1N-429	Hoffman	200	1.00%
1N-1217	Westinghouse	280	0.00%
1N-1315	Hoffman	94	0.00%
1N-3316B	Dickson	100	10.0%

I am including the following information for whatever possible value it may be to interested personnel. I would appreciate it if those who wish to see this data included in future reports, would notify Bob Hughes, Klaus Doering, or myself.

Untested Semiconductors on Hand

Amount	Type	Manufacturer
75	SW1250	Transitron
5	2N398	R.C.A.
36	2N1494	Philco
10	2N813	Raytheon
250	2N709	Fairchild
50	2N1718	T.I.
5747	MA90	Sprague
100	SP390	T.I.
4916	MA90	Sprague
150	2N1719	T.I.
26	2N308A	Motorola
9	1N3156	"
36	2N1494	Philco
1000	SJ1071	T.I.
8000	MA90	Philco
2000	MA89	"
1000	2N1146A	T.I.
3000	GA212	T.I.
3000	GA439	T.I.
1426	MA89	Sprague
12750	D001	Trans.

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R. Winslow (cont'd)

Amount	Type	Manufacturer
19550	D001	Trans.
25000	D001	Clevite
50	1N825	Trans.
26	1N3156	Motorola
10	1N825	"
250	2N994	G.E.
401	D664	T.I.
100	1N648	Clevite
50	1N469A	Hoffman
937	D007	Trans.
1429	D003	Clevite
1182	D662	"
1000	1N1220	Westinghouse
24	1N2070	T.I.

R. Gaboury

During the past two weeks, our workload has increased due to incoming inspection which has required overtime, but right now we are back to normal. Once in a while paper work is missing on some items and we have to chase after it. This is a time consuming job. If in a case like this, somebody has to wait for his work being inspected, it is not always the inspection department that keeps things from going.

Production Control gives us a priority list which helps to get work out in the order it is needed. It is recommended that any other department which needs anything in a hurry should also give us such a list, because we simply do not always know what is needed at certain times.

K. Larsen, WCO

I visited several people at Los Alamos Scientific Labs who expressed interest in the PEPR system. One group has a specific interest in the M.I.T. use of PEPR system. Another group is looking at a PEPR type of system to examine medical slides. A pathologist and a mathematician are working together to determine if there is a

K. Larsen, WCO (cont'd)

pattern on medical slides that is not visible to the human eye and if the pattern can be examined by a computer to determine conclusively whether or not a tumor is cancerous. The slide is a very fine cross section of a tumor which is examined by pathologists who in many cases must make intuitive judgments. These two people intend to visit Dr. Bless of M.I.T. and the PDP-1 installation at Lawrence Radiation Lab. Another group is evaluating computers that might be used to monitor and control a nuclear reactor for the Ultra High Temperature Reactor Experiment (UHTREX).

At Holloman AFB, the latest system built with DEC modules was designed to check the quality of magnetic tape for analog use. They write a known signal on the tape and check the read-back with slice amplifiers and print out the number of drop-outs. A drop-out is detected when the read-back amplitude is 10% or 40% below specification. A switch on the control panel sets the 10% or 40% points.

At White Sands, New Mexico, I talked to several people at their computer facility about our PDP-1 computer. They are planning quite an extensive expansion of their data reduction facility and I will be keeping in touch with them to inform them of our latest equipment.

I made a trip to U.S.N.O.T.S. at China Lake and had an opportunity to demonstrate our lab modules and digital-to-analog equipment. They are specifically interested in the digital-to-analog modules, and have since told me that they have submitted a purchase requisition. Because of familiarity with the product, they are a large 3-C user so I will be taking advantage of every possible opportunity to talk with them to make them more familiar with our equipment. I think the D/A equipment has been a good "door opener" in this case.

In Seattle, Washington, I spent two days with Oliver Judd. We visited the analog computer group that was looking at a PDP-1 for tie-in with their existing analog equipment. They are presently reviewing a quotation that was submitted to them for a PDP-1 with analog-to-digital and digital-to-analog hardware attached. It

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K. Larsen, WCO (cont'd)

looks like there is a lot of interest in our PDP-1 computer for this application.

A group from the antenna department will soon be evaluating computers for use with their Scientific Atlanta antenna pattern record system. They need to more fully evaluate the antenna lobe characteristics with an on-line system.

I also talked to the people who are using our modules in a system that reads analog tapes generated during flight tests, and digitizes the information. Then it prepares a formatted tape for the IBM 7090. They are quite pleased with the overall reliability of the system. They are currently designing another system and will be ordering DEC modules for it.

At a recent visit to Ampex, I learned that they are quite pleased with their latest 2113 Core Tester. They had it in operation with a Ramsey core handler the same day they received the equipment. They will be using this full time for grading their 30 mil cores. This is the second 2113 for their 30 mil core facility. They are using Ramsey's new 500 core per minute 30 mil core handler with both of these testers.

At present we are working on a system proposal for National Cash Register that will involve a program pattern generator and three remote test stations. Each test station will have current drivers, sense amplifiers, and decision logic for testing their thin film elements. One test station will be monitoring the strip as it comes from the process oven. One station will be used to test the strips after they have been cut to length and the third station will be testing the elements after the windings are in place.

Bob Oakley and I are working with JPL's computer applications group to solve their problems so that we can put PDP-4's in place of special systems to do formatting of Ranger Space Probe telemetry data for output to an IBM data acquisition system and to a magnetic tape for back-up.

Ron Coleman and I went to Aerojet General to talk to the analog people who submitted a request for quotation on a hybrid digital-

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K. Larsen, WCO (cont'd)

to-analog computer system. They indicated that they would like to see the bidders include the PDP-1 for the digital portion of the system. They are strictly an analog group and were pleased to have us go over various subroutine timing relationships with them.

R. Mills

Capital Equipment Expenditures

Month Ended - August 31, 1962

Date	Vendor	Qty.	Amount	Description
8/6/62	Claus Gelotie, Inc.	1	$ 837.90	Drum Dryer
8/15/62	Tektronix, Inc.	1	650.00	#82-Plug-in unit
8/27/62	Technical Inst., Inc.	1	2,750.00	Reg. Power supply
			$4,237.90	

Month Ended - September 30, 1962

Date	Vendor	Qty.	Amount	Description
9/4/62	Botwinik Bros.	1	$ 550.00	Spot Welder
9/26/62	Tektronix, Inc.	1	1,275.00	Curve tracer
		2	470.00	Amplifier Assemblies
			$2,295.00	

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J. Burley, DCO

Activity of D.C.O. territory over the past four weeks has been up a bit over the previous four weeks. We have been concentrating on getting more computer business and feel it is going to pay off. The following list of items is by no means exhausted - these are merely those items that come to mind while riding in an F27 to Greensboro, N.C., which is a trying experience in itself.

University of Michigan Ristenbatt	PDP-4 or A-to-D Tape Format
Conductron, Inc.	5 & 10 megacycle modules
University of Mayland, Kehoe	PDP-1
Condon	5 & 10 megacycle modules
Kearns & Law	PDP-4 or modules
Army Strategic Communications Command	looking at several computer requirements
A.P.L.	several systems and design assistance
Western Electric	should come alive again with their new $146,000.00 contract on Nike-Zeus
Chemstrand Research	modules
N.I.H.	modules
Martin Orlando	PDP-4 or modules
United Gas	their activities are increasing and they are developing new products - will require logic modules
Robert H. Ray Co.	recent merger with Mandrel Industries should help sale of PDP-1
Redstone Arsenal	modules
Bowman Gray School of Medicine	PDP-1
North Carolina State University	Link Computer

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J. Burley, DCO (cont'd)

Doing missionary work with following:

U. S. Steel
Aerojet-General
Fischer & Porter Co.
Socony-Mobil

Quality control has been good in my area, until I tried to hook up logic kit for Greensboro show. Same old problem of having to use extreme force in trying to insert banana jack in lab series modules. Some banana jacks difficult to mate with each other. Overall, I received much praise from customers on the fine quality of our modules.

I would like Jim Myers to contribute to next bi-weekly describing ways, if any, with which we can make his job easier, hence giving better service to our customers. I'm sure there are some things he would like to see initiated, described, or what have you, by the field offices. Are we misleading customers on delivery, making out info on advance verbal orders? Any criticism Jim?

I would appreciate sales leads from everyone at DEC. Have had some help from Gordon Bell, Stan and recently H. Anderson. These are invaluable! The type of leads I am seeking is info on firms setting aside large sums of money for capital expenditures on plant modernization, process control, automation, info on new plants planned etc. Thirty-five percent of the nation's population is in my territory, a territory packed with heavy industry and my biggest problem is finding out what goes on here. Send it in any form, but please send it!

Still would like for the Sales Department to provide a new introduction to DEC employees and what they do. This would be very helpful to the sales offices. Our next BULLDOG TROPHY should go to Elsa Newman for her untiring efforts to incite people into participating in DECUS. Excellent job!

For those interested, Jim Myers has a copy of the Renegotiation Act of 1951. Many will be surprised at some of the agencies that heretofore were believed to be renegotiable which in truth are not.

J. Burley, DCO (cont'd)

To keep us going in the right direction, some feedback as to our ratio would be helpful. There's good government business to be had and we can still afford a 64-36% break.

COMMUNICATE:

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K. Fitzgerald

EN 1000	50%
JN 100-00	50%

The greater majority of my time for the past two-week period has been spent in general administrative work in the shops with heavy emphasis having been put on the problems of paint color and texture. Scott Miller, Klaus Doering and myself are presently trying to set up the standards for paint which will satisfy all the requirements of pleasing appearance, color match, ease of application, uniformity, easily silk screenable, durable, and easy to touch-up. The paint shop has been instructed to paint samples of each color they use every day and of each new batch of paint as soon as it is used in order to determine the range we can consistently expect and to allow the silk screening people to set their standard of texture necessary for silk screening and touch-up. The whole program of setting these standards is expected to take approximately two weeks.

Sheet Metal Shop

The load in the sheet metal shop is about the same as it has been for the past month or so; however, heavy emphasis is now on production items and it has been necessary to keep two temporary laborers from Labor Pool, thus releasing two of our more experienced men to handle the special and rush jobs that have been cropping up recently. The Sheet Metal Shop is also using a time clock to punch their times on their daily job tickets in order that we might get more accurate figures on time necessary to complete certain work. These figures, in turn, will give us more accurate costs and enable us to estimate more accurately time required to complete a job, therefore making our scheduling much easier.

Machine Shop

The machine shop is handling its present load very nicely with little or no overtime and for the first time we have been able to actually make production runs on larger jobs like display housing, castings, memory plane castings, and tilt and turn mechanisms for displays. All of these jobs have been in fairly large quantities and we should be able to cut the cost of machining on these considerably by running them through as a production unit.

DF633 DIGITAL EQUIPMENT CORPORATION · MAYNARD, MASSACHUSETTS

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K. Fitzgerald (cont'd)

Cabinet Shop

The cabinet shop load has decreased quite a bit with the cancellation of the ADX machines and therefore the people in the shop have been able to do more of the detailed work in regard to cabinet assembly and actually spend some time working on jigs and fixtures for more efficient assembly of cabinets. They have also been extremely busy for the past week cleaning up ADX 6 and 7 and the duplexing unit which is scheduled to be shipped on Saturday, September 29. The cabinet and carpenter shop is going to have to work Friday night quite late in order to get the machine completely cleaned up and crate it for shipping on Saturday.

Carpenter Shop

With two men in the carpenter shop now we have been able to handle many more of the small carpentering jobs that arise around the plant and also take care of the special boxes, crates and benches necessary for our daily production. I do want to impress upon everyone, however, that carpenter work has got to be requested on a regular work requisition form and scheduled the same as all other shops, and whenever there is a conflict in schedules that cannot be resolved between the carpenter shop and the person involved, they must be approved by me before we interrupt the present schedule.

R. Doane

VHF System	40%
VHF Clock	25%
Test Equipment	10%
Current Calibrator 72	15%
Miscellaneous	10%

The VHF test system is now completely wired, with many revisions. The control section has been tested, and so has one of the shift registers. The system will be completely tested after transistors needed for three more flip-flops arrive. The serial adder requires a flip-flop and the exclusive-or section of two logic modules, in addition to the gating in the first bit of the shift registers.

The first attempt at a VHF multi-range clock has produced 30 Mc operation.

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R. Doane (cont'd)

Parts for the production of 25 of the new Current Calibrator have been ordered, two are being made in the model shop now for customers, and a third is already in use by G.E. No complaints, so far.

At last an American manufacturer has learned to make 2Ω metal film resistors. Daven has sold us 20, and although they only guarantee ±1% tolerance, at least we don't have to communicate with them in broken English or pulverized Italian. As soon as Jerry Hamilton gets a chance to check them out with fast-rise current pulses, we will know whether they can solve our delivery problem with current-sampling resistors.

D. Denniston, NYO

Very little of an unusual nature has been happening in the New York area since our last Biweekly contribution of more than a month ago. Nevertheless, several new module customers, especially at Bell Labs, of course, along with some preliminary PDP sales work, has kept us quite busy.

In general, our much improved delivery has brought back the good will of our customers, with perhaps the exception of Mr. Schwender at Brookhaven. I know we have strained to meet his stringent requirements, but several modules, the 4604, in particular, have held up his work.

Speaking of Brookhaven, I recently learned of a conference to be held there with Dr. Paul Hough as one of the principal speakers. Since my information came from one of our customers at Princeton University, I knew little about it and understood that it would be "small and informal" and although I felt it would be most worthwhile to attend, I honestly did not feel that those outside the elementary particle field would be warmly welcomed. After it was over, one of our customers at Brookhaven told me that about 80 people were there, logic circuitry was of interest to many, I.B.M. was represented, and, he believed, two DEC people were there. I do wish I had known we were invited, if we really were.

During a recent trip to Western Electric in Princeton, New Jersey, I noticed that they had received a Model #75 Bias Panel that was

D. Denniston, NYO (cont'd)

only partially wired and was missing its power cable. No wonder they were confused as to how it was used.

L. Prentice

1000	95%
1136 Link Tape Unit	5%

Security - An investigation was made of the emergency lighting units of which there are eleven in Building 5 and only two were found to be operative. New batteries have been ordered for these and will be installed as soon as they arrive. A study will be made of their location and possible re-location for better protection in case of necessity of evacuation of personnel from Building 5. Recommendations will be made as soon as possible to Ken Olsen in regard to auxiliary lighting and regular lighting for the stairwells in the center of Building 5 and at the Walnut Street end of Building 5.

Also under investigation is a warning system tied into the risers of the sprinkler system which would give a warning to the guards in Building 5 and possibly in Building 12 - a separated type annunciation system which would give them an indication of which riser was feeding the leaking sprinkler head. It may only be economical to put this system in Building 5.

High Rejection Rate of Painted Parts - We have completed a series of paint samples and these have been selected by Klaus Doering as an intermediate standard. We are running a control sample on the paint each day for the following two weeks, at which time we will again evaluate the samples and if indicated we will run the tests for another two weeks, this being the best time of year when we can experience different humidity levels. When the building is completely closed in winter the humidity is very low. It is hoped that when these samples are completed and evaluated that the standards for paint will become less opinion and more fact.

Printed Circuit Boards - We have received from Burgess Brothers the last die (the 16-hole die) which punches two indexing holes in each printed circuit board. This is used for drilling, blanking, and other operations performed on the boards as well as locating the

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L. Prentice (cont'd)

silk screening. If this die passes inspection, we can begin to give punched boards to silk screening so that master plates can be made up for silk screening eight boards at a time.

On Wednesday, September 26, Ken Fitzgerald, myself, and Cy Kendrick visited 128 Supply Company in Waltham, and looked at a four head drilling machine made by Excellon Industries, Los Angeles, Calif. We could pallet load 20 boards at a time on this machine after blanking, and they claim that we can drill approximately 42,000 holes per hour with this machine. This machine appears to be well built and could be adapted to our use. This requires some further study and we expect to hear some proposals from this company in the near future.

Low Performance Tape Drive - The first drawings for parts for this tape drive have been released to the machine shop and a pattern drawing has been completed which will be turned over to Maynard Pattern Works for the spools for the tape drive. The first tape drive spools were machined from solid stock by Joe Gill in the Model Shop. The next report should have some real progress on this unit. Materials for some of the parts are scheduled to arrive today.

A. Blumenthal

The Minneapolis-Honeywell PDP-1C-25 computer was shipped on September 11, 1962. Exactly seven weeks elapsed from its delivery to checkout to the time of shipment. This is an excellent record considering that options of 2 mag. tape units, extra memory, automatic multiply-divide and display were included in the system. Also, a full elevated temperature marginal check was done, the formal acceptance test was run, and an extremely thorough inspection was performed on the entire system. The machine is now being installed by members of the checkout, mag. tape and field service crews.

The MIT machine, PDP-1C-26, together with PEPR, was delivered on Friday, September 21, 1962, after an intensive period of closed loop testing of the entire system. This machine spent 15 weeks in the house from delivery to checkout. The extended period was due to the fact that MIT preferred to leave the machine here so it could

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A. Blumenthal (cont'd)

be used in proving out the PEPR system. Two days were required to complete the installation.

At the present time three machines are undergoing checkout. The one originally slated for Adams Associates is being outfitted with automatic multiply-divide so that it can be used in a joint display in conjunction with an analog computer at the EJCC in December. It should be ready for shipment within a week.

The Atomic Energy Commission of Canada machine, PDP-1C-27, began checkout on Wednesday, September 19, 1962. It was the first machine received with a full complement of modules. The typewriter is the last part of the standard machine awaiting test.

Checkout of United Aircraft's PDP-1C-24, special options has commenced. The Packard Bell Multiverter seems to be OK, except for minor adjustments. The multiplexer will be shipped Friday, September 28, and should be here for checkout by Monday. Programs for acceptance tests on the special options have yet to be written. The machine is slated for shipment on October 15, 1962.

A system of information feedback from computer checkout to production has been adopted regarding wiring errors and other such troubles. Upon completion of checkout of each machine, the information is compiled from the checkout data sheets and presented to production on an inter-office memorandum. This will undoubtedly help reduce the number of such troubles encountered and reduce the time each machine spends on the floor. This treatment had been applied to the MIT and Honeywell machines, thus far, and the data therein seems to indicate that inspection methods should be elaborated upon.

All of the tape readers received recently have exhibited a considerable amount of photodiode drift, making it difficult or impossible to adjust their amplifiers in a way that enables operation over a wide temperature range. The manufacturers are cognizant of this problem and have agreed to supply us with replacement heads using LS-400 diodes for all units that we consider to be unacceptable. These diodes are much more stable than the original type.

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R. Tringale

PEPR Controller 2310	80%
2114 Core Tester	15%
Miscellaneous	5%

During the week beginning the 17th of September, the PEPR Controller went through a number of acceptance tests. These tests involved both the PDP-1 and the PEPR Controller. The programs used in the tests were designed to simulate as close as possible the actual operating conditions, which will be scanning bubble chamber photographs.

The PEPR Controller passed the tests and was delivered on Friday, September 21, and installed over the week-end.

E. Harwood

JPL Output line units have been checked out with the exception of the indicator and switch panel which is currently being wired. We temporarily connected it to one of the ADX systems and were fortunate that an old teletype unit was left here, so we were able to check out the system as it would be used on the computer. We will send a program to JPL showing how the line units may be used on their computer.

The ADX 6 and 7 Duplex System is in the final stages of its checkout. It has gone through some preliminary inspection, and now the machines are being readied for their acceptance test, which should take place Friday morning. If all goes well, the acceptance test should be over around noon, and we will be able to crate the machines Friday afternoon and evening and ship them out early Saturday morning.

Leo Gossel has written a program to check the Duplex System and this is the program which we will use for the acceptance test.

We plan to send a good size crew to ITT on Monday to install the ADX 6 and 7 systems. Most of the crew will be through by Tuesday afternoon and that will leave just one test man and assistant to finish checking out the system. We expect the complete system will be checked out by October 5th.

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E. Harwood (cont'd)

ADX-3 has gone through all its preliminary stages of checkout and is ready to accept extra memories and mag tapes. We have been promised the memories sometime this week and the mag tape control by the end of next week. Due to the delay in receiving the mag tape control the machine is approximately four days behind schedule. We do not anticipate any delay in the delivery schedule as we are sure we can make up this time.

ADX-8. This machine arrived in the test area on Monday, September 24, and two ITT people were assigned to checkout the system. They will be supervised by Don Murphy and will proceed with the normal production testing of the machine. We do not anticipate any delays due to these people doing the production testing of the machine. Since this machine arrived in the testing area one week late, it is now behind schedule, but we feel sure that we will be able to make up this week in the latter stage of the checkout.

The ADX group has assumed the responsibility for the extra gear on the Minneapolis-Honeywell machine. This includes the design and layout of the entire system which consists of a pile A to D and D to A equipment by Packard Bell, plus some buffers designed by DEC.

We have placed the orders for all the Packard Bell equipment and should get the rest of the orders for the special equipment in the mail by the end of next week. This system is due out in January and we expect it will be a tight schedule all the way.

R. Hughes

We are having delivery problems with the MD114 transistor. Philco simply failed to deliver the amount we had ordered, and we had let our second source (Sprague) fall by the wayside when they raised their price on this device. We expect Philco will deliver next week. Ten thousand pieces are due October 1, and 20,000 a week later. We have also ordered 100,000 from Sprague at $1.25. We are going to have to continue to investigate a replacement for this type to insure two sources and eliminate delivery problems.

Ten thousand of the 100,000 MD114's ordered from Sprague will be MD114R and have a red band around the transistor to readily identify

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R. Hughes (cont'd)

it. This is the unit mentioned in the last biweekly report which will be used in the 1972. It has a BV_{CES} greater than or equal to 50 V at I_C = 100 microamps. All 1972's that go through test now will be tested at 55° C. This is an effort to weed out the marginal units which are giving us trouble. Each 1972 will use eight of these transistors.

We now have 970 MA80 red transistors in stock. These are a high punch-through unit (15 volts). These have been replaced by the MA90 red units. In the interest of minimizing the inventory problem, these transistors are going to be used in place of MA90 non-red units.

The 1538 D.C. coupled sense amplifier has now been phased into all new memories. This unit works very well. Its advantage over the old 1540 A.C. coupled sense amplifier is that it has no baseline shift. The 1540's exhibit this baseline shift because of pulse repetition frequency sensitivity inherent in AC coupled circuits. We made an effort to have the unit all adjusted in tests so that we could simply plug it into a memory and have it work (we knew we would have to rebalance the AC balance pot in this event) but it turns out that we have to readjust the slice and DC balance (as well as AC balance) when even going from plane to plane in the same memory.

The SJ1071 transistor mentioned in the last biweekly report will be used in the 4673 Nixie driver.

Engineering is now working on a 1989, read-write driver which will replace the 1973. Other things in the works are a 1987, which is a split-bus 1972 which was designed for linc computers, but will probably replace the 1972. The 1971 is a linc sense amplifier (two in a package) which might possibly be used on PDP-4, because it has a slow memory cycle.

We are planning to use a silicon controlled rectifier in the 1986 memory tester switch. The number of this unit is SW1250.

We have discovered about 300 resistors color coded 1500 ohms which are really 43,000 ohms in many different modules, in various stages of production. These were manufactured by Allen-Bradley. In the

R. Hughes (cont'd)

immediate future, we are going to sample-inspect resistors. We had decided to do this about a month ago, but this will give some push to do this.

We recently received three batches of Ferroxcube pulse transformer cores and put them in production without inspecting or analyzing them. We will attempt to avoid this in the future.

The circuit schematics have all been updated and Cy Kendrick has updated his parts list accordingly.

A procedure has been worked out with the Sales Department to keep returned modules from getting in the finished goods stockroom. There is now a special locked room next to incoming inspection for keeping these modules which are returns from customers, both internal and external. A memo describing the exact procedure will be issued shortly.

We now buy 2N1305 transistors from Texas Instruments. When we order them we order GA748's. Using this number tells the manufacturer that we want the leads cut to a specific length and that we want a transipad molded onto the transistor case. It also specifies a V_{CE} Sat test which is V_{CE} Sat less than or equal to 0.1 volts at I_C 38.9 mils; I_B 1.84 mils; R_{BE} = 957 ohms. This test insures that 2N1305's will work as flip-flop output buffers. The transistors are still marked 2N1305 and the circuit schematic still calls for 2N1305.

We are conducting a life test on fans. We have two Gold Seal muffin fans and one Pamotor fan being tested. The units are operating in an oven at a temperature of 62°C.

A 575 curve tracer has been received and will be located in the Quality Control module repair area. This unit will be used for analyzing defective transistors removed from modules. It will also be available to any engineer who wants to use it.

Ferroxcube is going to give us a long term loan on a 64 x 64 coincident current memory plane using 30 x 18 mil cores. These cores have a full drive at 25°C of 700 mils, a one output of 60 millivolts and a T_s of 0.4 microseconds. This plane will have

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R. Hughes (cont'd)

untested cores in it and was borrowed for use by Jon Fadiman in conjunction with his memory testers.

J. Cudmore

EN 1073	40%
EN 1098	60%

The results of the Module Test Reports are starting to become meaningful. These reports will be used to point out test problems and hopefully we can then eliminate some of the testing difficulties. I am sure Jerry Hamilton will be able to simplify the current driver testing, now that he has actually tested a production unit. The average test for a Type 62 Current Driver is about 1 hr. and 15 min. The 4304 Integrating One-Shot, which is becoming a high volume unit, requires almost 40 min. of test time. This test will be revamped. Succeeding weeks will be spent analyzing the difficult tests and test procedures. Periodic equipment failures still plague test. The 10 mc burst generator operates very poorly and sometimes not at all. I understand Engineering is working on a more refined model and completion of this device would be greatly appreciated. Some of the more commonly used testers are falling apart and will have to be rebuilt.

The 1201 switching time tester is back on the air after the 567 scope was returned from Tektronix. The biggest headache in making the required measurements from 10% to 90% is that the noise on the ground paths inherent to the model exceeds 20%. These units can be tested if the measurement points are shifted from 10% to 25% and 90% to 75%. Correlation units will be measured next week. After verification of the results, this tester will be used in production. A modification to the special burst generator in this system is being designed to enable 4201 testing.

I would like to again propose the elimination of one of the test data sheets. Delivery of test data sheets is sometimes a problem and elimination of the extra sheet would save some test and inspection time. Subsequent returned module reports will include machine number and customer information if this information is given on the defective module tag.

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N. Fitch

EN1098 100%

Within the past two weeks I have completed the 567 Oscilloscope programming panel used for externally programming the readout scopes. At the present time this relay panel is driven manually but will soon be driven by logic enabling us to make many time tests without changing the settings on the scope itself.

The 1201 Automatic Time Tester has been modified to make time measurements between 25% and 75% of the waveform under test. This modification was necessary because the scope was triggering on the noise instead of the 10% and 90% of the waveform.

At the present time I am developing a burst generator for the automatic time measurer to enable us to test 4201's automatically.

D. Dubay

Test Equipment Headquarters

The following equipment has been calibrated since September 17th.

Quantity	Description	Type
14	Oscilloscope	543/543A
2	"	541A
2	Transistor Curve Tracer	575
1	Oscilloscope	321
1	"	515A
1	Square Wave Generator	105
4	Current Probes	P6016/131 amp.
14	Preamplifier	CA
3	"	L
2	"	D
3	"	M
2	"	S
1	"	K
1	"	R
2	"	Z
2	"	H
1	"	G
1	"	E

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D. Dubay (cont'd)

Quantity	Description	Type
25	Meter	630NA-RM
16	"	630NA
10	"	980
4	"	931

One of the 567 Digital Readout Scopes was sent to Lexington to be repaired and calibrated. It is back in the plant now.

A 575 Transistor Curve Tracer has been received from Tektronix as of this date (9/28/62).

R. Winslow

Semiconductors tested since last report:

Type	Manufacturer	Units Tested	% Reject
MA89	Sprague	995	0.60%
MA90	Philco	4000	0.78%
MD93	"	7	0.00%
MD93	Sprague	1400	1.2%
MD94	"	4076	0.93%
MD95	"	8000	0.79%
MD95	Philco	282	12.0%
MD114	"	1439	0.21%
SDA-1	Gen. Elec.	200	0.00%
SDA-1	Texas Instrument	200	15.5%*
2N1304	" "	2000	0.75%
2N1305	" "	19870	0.98%
2N1305	Gen. Elec.	2500	1.96%
2N1306	Texas Instrument	500	1.0%
2N1309	" "	1000	0.6%
2N456A	" "	200	1.0%
2N744	" "	100	0.0%
2N1600	Transitron	7	0.0%
1N458A	Texas Instrument	31	13.0%
1N1315	Hoffman	6	0.0%
1N3316B	Dickson	100	10.0%
1N3005A	Motorola	30	0.0%
Q5-100	Int. Diode Corp.	400	8.5%

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R. Winslow (cont'd)

Type	Manufacturer	Units Tested	% Reject
D001	Clevite	50000	1.5%
D007	National	2230	0.9%
SW1250	Transitron	25	16.0%

*Wrong markings

R. Grey

Wilwrite Product Resistors were removed from the stockroom and from a few modules in Finished Goods. These resistors are poor in quality for two reasons: (1) the resistive value drifts all over the place, and (2) the physical appearance of the resistor is poor due to a plastic sleeve over the carbon. The sleeve gets gummy in trichlorethylene.

I understand that these resistors were once before rejected, but due to new personnel, they were reordered. Purchasing has been notified of this situation.

Another problem which was encountered was with 1.5K - 1/4W - 5% Allen-Bradley Resistors. The color coding on these resistors did not indicate their resistive value which was 43K. An inspection of the production area turned up 250 of these resistors.

It may be of some value to know that there were 40 out of 80 in a lot of 3101's; 9 out of 90 in a 4603; 10 out of 90 in another 4603; 26 out of 450 in a 4604; 1 out of 240 in a 1103; 48 out of 60 in a 4301; and 105 out of 540 in a lot of 4213's. The stockroom and other areas are being checked to remedy the situation.

It is obvious that Allen-Bradley made an error in their color coding procedure--with luck this seldom happens.

We are now using the new Standard Procedures for Inspection. It would be greatly appreciated if everyone making computers or systems would correct their defects well before the acceptance tests.

R. Gaboury

During the past two weeks, the Mechanical Inspection Department has added a girl employee. All finishing, such as chromicoat, anodize and silk screening have to be inspected 100%, and capacitors,

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R. Gaboury (cont'd)

resistors and other electrical components have to be sample-inspected, so the addition of a new employee has helped immensely.

K. Doering

Inspection procedures for in-process inspection are in the works right now. This project should be finished by the end of the coming week.

The procedures and forms for assembly inspection have been distributed and are in use from now on.

The girls in the test area received inspection procedures for system and laboratory module inspection after electrical test.

All purchased material that goes to stock has to go through incoming inspection first. We could reach an agreement with Henry Crouse about this.

J. Fadiman

During the past two weeks work has been concentrated heavily on the production of the Memory Tester 1520 for IBM, Owego. This is the first of our more complex memory testers with extra drivers to provide faster rise times. We are proceeding with the wiring at all possible speed in order to allow sufficient time for checkout of the machine. This is also the first of our memory testers to use the new read-write switches, Model 1986, with silicon control rectifiers.

Work is proceeding on the logical design of the semi-automatic Core Tester Model 2114, also for IBM, Owego. This is a complex programmable pulse generator for testing multiple aperture cores.

Wiring is also being done on another automatic core tester, Model 2113, this one for RCA in Needham.

We have received an order from Ferroxcube in Saugerties, New York for a memory tester, Model 1521, price $60,000. We are now finishing up on the logical design of this memory tester and will start putting it in wiring next week. The astronomical clock, Model 2113,

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J. Fadiman (cont'd)

for Mitre is nearing completion. This is a system to be used in conjunction with the Venus project. The Systems Group will also do part of a large project for NASA involving a large number of analog-to-digital and digital-to-analog decoders and registers. We have also received orders for two memory exercisers for Western Electric in Chicago, total price $49,300.

Two systems have been shipped within the past week: one of them is the Automatic Core Tester 2113B to Ampex Computer Products Co. in Los Angeles and the other is the PEPR system which was finally shipped last week to MIT.

Possible new orders for systems include the following: an encoder-decoder test set for Western Electric in North Andover, price - $7,507; a memory exerciser for Bell Telephone Laboratories in Murray Hill, New Jersey for testing out .2 microsecond memories, price - unknown; a memory tester Model 1516 and a core tester 2113 for the Mobara Works of Hitachi, Ltd. in Tokyo, Japan; and a memory tester Model 1516 for Siemens in Munich, Germany.

Last Monday I went down to Keasbey, New Jersey to visit the Indiana General Corporation (General Ceramics Co.) and talked to them about equipment which they now have and also future test equipment needs. I spent some time with Mr. Ev Valenti concerning new memory testers. His feeling is that we must provide a memory tester with faster rise times, like 50 millimicroseconds through a plane and 150 milli-microseconds through a stack. Even our newest Model 1521 will not do this. However, I feel that General Ceramics definitely needs new memory tester equipment and when they have the chance to see what our 1520 and 1521 will do, they will probably place an order with us for a system which will provide the fastest rise time which the present state of the art allows. I suspect they will also sometime in the future, say within the next six months, be ordering a semi-automatic core tester, Model 2109, with eight drivers and 16 states for testing multi-aperture cores. In general, they are happy with the present memory test equipment and I gave them some minor improvements that can be made and also explained about the proper DC compensation for the drivers in the memory tester.

Installation of the semi-automatic core tester, Model 2110, and Ramsey-Handler, Model CH70, was made at Sylvania Electric by

J. Fadiman (cont'd)

Dick Whipple within the past two weeks. Everything appears to be satisfactory here except for the fact that again all the capacitors mounted on the back plenum door broke loose, making a mess of the 776 Power Supply. George Gerelds is going to work on a way of securing these capacitors with clamps so they do not come loose in shipment of our machines.

Two new engineers have joined the Systems Group on a permanent basis. One is Pat Greene, who comes to us from Western Electric in Andover and the other is Ed deCastro, who has been working with us this summer and also for previous summers. Thus our engineering capability has been greatly increased, and we will be able to take on a number of new systems jobs in different fields, as well as do some much needed improvement work on the systems which we are now manufacturing. Roy Elliott has also joined our group as a wireman, coming from Maynard Sandler's Production Group.

Judith Ebner

Books on Programming

Compiled by REGNECENTRALEN - "ALGOL" (Library No. 510.783 0)

During a meeting in Copenhagen on the evening of Feb. 28, 1959, representatives from a number of computing centres, who are all actively engaged on using the ALGOL language for facilitating the programming for their respective computers, agreed that Regnecentralen, Copenhagen, should take steps to facilitate the continued collaboration of these computing centers in all questions related to the practical use of the ALGOL. This book contains ALGOL-Bulletins (AB) from 1 to 14 inclusive.

Kipiniak, Walerian - "Dynamic Optimization and Control" (Library No. 510.783 0)

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

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Judith Ebner (cont'd)

be applied as optimizing controllers.

McCrackon, Daniel D. - "A Guide to Algol*Programming" (4 copies) (Library No. 510.7830)- Also 4 available "Guide Fortran* Programming"
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 ALGOL, or a similar compiler, because it is not necessary to learn the details of computer operation.

Charnes A., Cooper, W.W. - "Management Models and Industrial Applications of Linear Programming" (Vols. 1 and 11) (Library No. 510.7830)
Directed mainly to those interested in applications linear programming.

Dennis, Jack Bonnell - "Mathematical Programming and Electrical Networks" (Library No. 510.7830)
This research monograph offers a new approach to mathematical programming based on anology with electrical networks.

Bucholz, Werner - "Planning a Computer System: Project Stretch" (Library No. 510.7830)
This book is primarily concerned with the selection of an instruction set and related functional characteristics of a large high-speed digital computer. Except for cost and speed, these are the characteristics that do most to distinguish one computer from the next -- yet they have received scant recognition in the literature so far. For example, every computer designer makes a choice between binary and decimal arithmetic, but this book contains the first non-superficial treatment of this fundamental aspect of computer design. The subject is a specific computer: the IBM 7030, which is the outcome of a design project called "Project Stretch." Authors of individual chapters participated actively in this project. This text, therefore, reflects the reality of direct personal experience, giving reasons for design choices and stating compromises between conflicting requirements. Because the IBM 7030 combines computing and data processing facilities previously found only in separate computers, together with new features

Judith Ebner (cont'd)

important for real-time operation, all of these important topics are treated in detail. Some of the numerous original ideas described are: the interrupt system, the floating-point exception handling, variable field and byte size operation, indexable addressing to the bit level, logical-connective instructions, memory protection, instruction look-ahead, and the generalized input-output approach.

Digital Equipment Corporation - "Programmed Data Processor-4" (Programming Manual) (Library No. 510.7830)

(A reference shelf of Digital Manuals will be available in the library as they come off the press. Anyone who would like to contribute previously published manuals, please send them to the library.)

Graf, Rudolf -"Modern Dictionary of Electronics" (Library No. 423)
Electronic terminology and their functional definitions.

Tweney, C.F. and Hughes, L.E.C. - "Chambers' Technical Dictionary - 3rd Edition" (Library No. 423)
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.

"Ninth International Congress of Linguists" (Library No. 406)
Preprints of papers for the Ninth International Congress of Linguists held on August 27-31, 1962 at Cambridge, Mass.; including the following three papers from the session on "Applications of Computer to Language Analysis."

1. "The Impact of Language Data Processing on Linguistic Analysis" by Paul Gaivin of Ramo-Woolridge.

Judith Ebner (cont'd)

2. "Statistical Determination of Isotoping" by H. Kucera of Brown University.

3. "Content Recognition and the Production of Synonomous Expression" by W. Toch, University of Texas

Strumpen-Darrie, Robert and Berlitz, Charles F. - "French (The Berlitz Self-Teacher)" (Library No. 428.24)

Strumpen-Darrie, Robert and Berlitz, Charles F. - "German (The Berlitz Self-Teacher)"(Library No. 428.24)

Michelin, Pneu - "France 1962" (Library No. 428.24)
A French Guide written in French

Fodor, Eugene - "Germany 1961 - Fodor's Modern Guide" (Library No. 428.24)

Cooke, Nelson M. - "Basic Mathematics for Electronics" (Library No. 510.7834)

This is the second edition of the textbook originally entitled "Mathematics for Electricians and Radiomen." The purpose of this new edition is unchanged. It was written to provide students of electronics and electrical subjects with a sound background in basic mathematics. Wherever possible, mathematical concepts and processes are related directly to electrical and electronics applications, and some chapters deal solely with applications. The format of the second edition has been carefully redesigned to make functional use of two colors. The second color is used for emphasis and to call attention to important equations or to a particular portion of a figure. As such, the second color serves as an added teaching tool for instructors and an aid to comprehension and understanding for students. As the result of extensive correspondence with teachers and students using the first edition and a national survey conducted by the publisher, a review of the basic operations in arithmetic has been included in Chapters 2 through 6. This review was included for the large number of students whose abilities in "figuring" had lessened mainly because time had elapsed since they had needed to employ these skills.

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Fuller, Don - "Organizing Planning and Scheduling for Engineering Operations" (Library No. 658)

Many engineering departments are inefficient because they have structured the organization and based the operations on professional competence and technical ability rather than on managerial competence and administrative ability. The very word "operations" implies the need for managers and administrators and if Engineering is to be a financial gain to the company rather than a financial drain, the department must be run in accordance with the basic principles of effective management. In short, those responsible for the engineering input and output must either manage or be managed; they are in no position to complain of "interference" from the outside when they invite such interference by flouting the basic principles of good management to which other departments must conform.

Perry, J.W. and Kent, Allen - "Documentation and Information Retrieval" (Library No. 658.3)

This monograph has been written in the conviction that mathematical formulation of basic principles, together with cost analysis of procedures and operations, will permit the development of information systems to be placed on a firm engineering basis.

Granick, David - "The European Executive" (Library No. 658.3)

An analysis of the post-war European executive--leader in the Common Market, and both ally and competitor of American business. In beginning, Professor Granick stresses the realization that although Western Europe has seen substantial economic and industrial growth, and while it is the home of many giant companies, modern industry, for the most part, still functions within an older structure of society. These elements, antedating modern industrialization, are still powerful and provide a class basis and a set of social values radically different from those which are dominant in the U.S. Through an analysis of the great changes that are permeating industry throughout Western Europe today, Mr. Granick reveals how the various class lines are, in some instances, breaking down, and, in other instances, notably Britian and Germany, often reinforcing themselves. In the second part of the book,

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Professor Granick treats in detail the more technical aspects of management in the various countries--describing how top management is educated and recruited, and how these executives in each country consider their priorities in production, sales, expansion, etc. The final part of the book is concerned with modern labor-management relations and Professor Granick provides an intriguing discussion of the various political and social philosophies which typify and explain their interacting conflicts.

Niebel, Benjamin W. - "Motion and Time Study" (Library No. 658.5)
This book treats the place of the methods, time study, and wage payment function in industry, describing the techniques used to conduct proved methods programs that will result in substantial savings in labor and material for any type of business. The author presents accepted and proved techniques of work measurement and outlines the many helpful controls made possible after fair time standards have been developed. The requirements and methods of installation of sound wage payment plans are discussed in detail.

1963 CONVENTION CALENDAR

Date	Convention	City	Place	Exhibits Management
Jan. 14-17	Exhibit of Scientific Instruments & Apparatus	London, Eng.	Old & New Hort Hall	Inst. of Physic & Physical Soc.
Jan. 28-31	Electrical Engineering Exposition	New York, N.Y.	Coliseum	Reber-Friel Co.
Feb. 4-20	UN Conference on Applications of Science & Technology	Geneva Switzerland		European Off. of UN Palais des Nations
Feb. 17-21	International Frankfurt Fair	Frankfurt Germany		Messe-und Ausstellungs
Feb. 20-22	International Solid State Circuits Conference	Phila., Pa.	Sheraton	
Mar. 25-28	Institute of Radio Engineers International Convention	New York, N.Y.	Coliseum	Wm. C. Copp
Mar. 31-Apr. 4	National Science Teachers Convention	Phila., Pa.	Bell-Stratford	Robert H. Carleton
Apr. 2-4	Progress in Electric & Electronic Equipment Exhibit	St. Louis, Mo.	Kiel Auditorium	Harry Guest
Apr. 16-May 6	Tokyo International Trade Fair	Tokyo, Japan		Tokyo International Trade Fair Commission

1963 CONVENTION CALENDAR

Date	Convention	City	Place	Exhibits Management
Apr. 17-18	Amer. Inst. Elec. Engineers-IRE Conf. on Non-Linear Magnetics & Magnetic Amplifiers	Washington, D.C.	Shoreham	F. G. Timmell Westinghouse Electric
Apr. 17-19	IRE-Southwest Conf. & Electronics Show	Dallas, Texas	Municipal Auditorium	Dr. Chas. K. Hager
Apr. 24-26	IRE-Regional Technical Conf. & Trade Show	San Diego, Cal.		Frank S. Holman
Apr. 28-May 7	German Industries Fair	Hannover Germany		Deutche Messe-u Ausstellungs-AG
Apr. 30-May 12	Brussels International Trade Fair	Brussels Belgium		
	U. S. World Trade Fair	New York, N.Y.	Coliseum	Chas. Snitow
May	Instrument Automation Pacific Northwest Reg. Exhibit & Conference	Seattle, Wash.	Coliseum	R. W. Evans
May 6-10	Amer. Soc. of Training Directors	Chicago, Ill.	Pick-Congress	Gordon M. Bliss
May 6-10	Natl. Industrial Production Show of Canada	Toronto, Ont.	Exh. Park	Norton J. Anderson

1963 CONVENTION CALENDAR

Date	Convention	City	Place	Exhibits Management
May 8-11	National Sciences Fair	Albuquerque, N.M.		Jos. H. Kraus Coord
May 20-23	Design Engineering Show	New York, N.Y.	Coliseum	Saul Poliak Clapp & Poliak, Inc.
May 21-23	Spring Computer Conference	Detroit, Mich.	Cobo Hall	John L. Whitlock
May 23- June 3	International Trade Fair	Paris, France		
June 11-13	Natl. Symposium on Space Electronics & Telemetry	Los Angeles, Calif.		Conrad H. Hoeppner
July	Electronics, Instruments & Components Exhibition	Manchester England		Inst. of Electronics
Aug. 16- Sept. 2	Canadian Natl. Exhibition	Toronto, Ont.	Exh. Park	Hiram E. McCallum
Aug. 20-23	Western Electronic Show & Convention	San Francisco Calif.	Cow Palace	Don Larson
Aug. 24-29	Autumn Fair	Offenbach Germany		Offenbacher Messe Gesellschaft MBH

1963 CONVENTION CALENDAR

Date	Convention	City	Place	Exhibits Management
Sept. 9-12	Instrument Soc. of Amer. Annual Instrument Automation Conference & Exhibit	Chicago, Ill.	McCormick	Wm. H. Kushnick
Sept. 14-29	International Trade Fair	Ghent, Belgium		
Sept. 18-22	Aerospace Panorama	Detroit, Mich.	Cobo Hall	Robert C. Strobell
Sept. 30-Oct. 2	IRE-Canadian Electronics Conference & Exposition	Toronto, Ont.	Automotive Building	Grant Smedmor
Oct. 7-9	Natl. Communications Symposium	Utica, N. Y.	Memorial Auditorium	R. E. Gaffney
Oct. 14-18	Amer. Rocket Soc. Annual Mtg. & Astronautical Exposition	New York, N.Y.	Coliseum	Robert T. Kenworthy
Oct. 28-30	Natl. Electronics Conference	Chicago, Ill.	McCormick Place	Rudolph J. Napolitan
Nov. 4-6	Northeast Electronics Research & Engineering Mtg.	Boston, Mass.	Commonwealth Armory	Steven K. Gibson
Nov. 11-15	Amer. Inst. Electrical Engineers Conf. on Magnetism & Magnetic Materials	Atlantic City New Jersey	Chal-Haddon Hall	John L. Whitlock

1963 CONVENTION CALENDAR

Date	Convention	City	Place	Exhibits Management
Nov. 12-14	Fall Computer Conference	Las Vegas, Nev.	Convention Center	John L. Whitlock
Nov. 12-16	Electrical Techniques in Medicine & Biology	Baltimore, Md.	Lord Baltimore	R. S. Gardner
Nov. 18-21	Atom Fair	New York, N.Y.	Americana	Edw. B. Markart
Nov. 19-21	Intl. Automation Congress & Exposition	Phila., Pa.	Sheraton	Richard Rimbach

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G. Rice

The first PDP-4 to be delivered to a customer has been accepted this week. The customer is Foxboro Company, one whom we hope will be a multiple user of PDP-4's in the future.

The acceptance test was broken into three parts. The first part being eight hours of continuous operation with our test routine without a failure. This test routine is basically a combination of the following test: instruction test, memory checkerboard test, reader/punch test, and a teletype test. The second part of the acceptance test consisted of several unique tests, made specifically to test the special equipment which was also a part of this computer. The third test consisted of a mechanical and physical inspection. Our computer passed all tests in good shape with only one minor complaint. This complaint being with the stickers which we use to identify switches and panel locations inside the doors. Upon checking with our people it was found that these stickers do have a tendency to fall off. I think that in future systems we should do something to replace these stickers with a more permanent type marker. As a temporary solution we could use a more suitable glue than the adhesive on the back of the tapes to hold them in place.

Another problem which we encountered during our own inspection was with the paint. This DEC blue which we use seems to be impossible to touch up. Each can of supposedly identical paint has a slightly different shade. One possible quick solution might be to set aside a small amount of paint for touch up during the painting of the doors and end panels, for a particular computer. Then at a later date, possibly several months, we would have some of the original paint which should match better than that from another source.

Recently several modifications and additions have been made to the PDP-4. A write-up of the changes will take the usual delay; therefore, I will attempt to summarize the important changes here.

Instruction changes:

1. Skip modification to operate instruction
   a) operate bit 8 = 1, skip if link = 1, snl
   b) operate bit 9 = 1, skip if AC = 0, sza

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G. Rice (cont'd)

Instruction changes (cont'd)

c) operate bit 10 = 1, skip if AC - minus, sma
d) operate bit 11 = 1, reverse the conditions for a skip; i.e., do not skip if any of the above conditions are present.

2. Law N instruction

The law N instruction, operation code 760000, places the address portion of N in AC_{5-17}. Ones are placed in AC_{0-4}.

3. Double rotate facility

A second rotate AC left (ral) or rotate AC right (rar) will be affected if operate code bit 7 = 1 and rar or ral is given.

4. Auto-indexing registers

If an indirect reference is made to registers 10_8 - 17_8, a one is added to the register before the indirect address is made.

5. Cal Y instruction

Y is completely ignored. If the indirect bit is a zero, jms 20 (100020) is effected. If the indirect bit is a one, jms 120020 is effected. The cal instruction helps make the recursive facility necessary for compiler writing possible.

Additional options:

1. Drum System

We have already proposed two different drum systems. One of these is a parallel system with a word capacity of up to 65K. This system we have in trial operation at the present time. The second system, not as sophisticated, is a serial drum system, which to date is only in proposal form.

G. Rice (cont'd)

2. Memory extension

We have recently proposed a memory extension system. The memory extension system will enable the memory to be expanded to 32K.

3. Extended Arithmetic Control Unit

Another proposed addition to the PDP-4 is an arithmetic unit. The arithmetic control unit (ACU) attaches to the PDP-4 and allows arithmetic operations to be performed faster. The ACU serves as an extension to the accumulator; and consist of control circuitry, a multiplier-quotient register, and a step counting register. The maximum time to obtain a signed 36 bit product would be approximately 25 memory cycles or 200 microseconds.

The ACU, memory extension, and serial drum have not been built yet and probably will not be in the near future unless there appears to be a definite need. Also, under very serious consideration for the PDP-4 is a Fortran type compiler.

In case anyone is interested, I have a technical manual from Kleinsmidt on their model 311 Teleprinter with parallel signaling.

Elsa Newman

The technical newsletter, DECUSCOPE, is 6 months old. The name combines Digital Equipment Computer Users Society with SCOPE for the PDP scope. DECUSCOPE aims to promote active interchange of ideas of interest to PDP users. DECUSCOPE implements the goals of DECUS (the users group) as set forth in the Society's By-laws:

1. To advance the art of automatic data processing through mutual education and interchange of ideas.

2. To establish standards and to provide channels to facilitate the exchange of programs among members.

3. To provide feedback to the computer industry pertaining to equipment and programming needs.

Elsa Newman (cont'd)

Contributions, in the form of technical papers and notes have been received from users and DEC programmers.

I wish, at this time, to give my heartfelt thanks to DEC programmers, Dit Morse, in particular, who already have contributed and on whose cooperation I will continue to count.

DECUS is planning a Technical Meeting in October at Hanscom Field, where the DX-1 Experimental Dynamic Processor will be on display. Papers for this meeting are now being invited. More details will be announced in the September issue of DECUSCOPE. I welcome any and all comments and suggestions for effective fulfillment of DECUS goals.

Jim Burley's idea of tagging correspondence which requires an answer with a red flag is a real good one. I will use same. Thanks JIM.

D. Adams

Roving Inspection

In the past two weeks there have been several computers and other systems which needed intermediate and final electrical inspection. These inspections took a great deal of time but were completed with very little trouble.

One problem that was noted and should be watched carefully in the future is the running of wires behind the chassis ground lugs of the mounting panels. When the wire or wires are pulled along between the mounting panels from bay to bay, they may rub against the ground lugs connecting each panel. In doing so, the insulation may be sliced off the wire at various points leaving bare wire.

The Minneapolis-Honeywell computer had a twisted pair of wires which ran the full length of the computer. The wire had bare spots at various spots down its full length. This pair of wires had to be replaced while the computer was sitting in the Crating Room, waiting to be crated for shipment. Klaus Doering is having mechanical and electrical inspection forms made up, so there will be a more formalized procedure for inspecting all machines. There will be a memo soon to explain the new procedure.

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D. Adams (cont'd)

I am starting to write an inspection procedure for checking out all computers, special systems, and optional equipment. Automation Component capacitors have been breaking down in the field. It has become so bad that starting now no system or laboratory module can leave the company with them in it. Production, stockroom, module inspection, and finished goods know of this and will be on the look-out for them. All of the A.C. capacitors have been taken from stock, and an inspection of finished goods produced 366 modules using these capacitors. These were sent back to production, and the capacitors were replaced by either Sprague or Erie capacitors.

As time permits, each system will be checked for these A.C. capacitors. There were 108 modules with these capacitors in the MIT PEPR and 61 in the MIT computer.

R. Gaboury

During our Final Inspection we have found scratches on silk screened panels. We should have these panels reworked; however, this usually takes ten days for rescreening and four hours to change if one happens to be in stock. Liquid masking will eliminate this problem.

I have tried "Liquid Masking Tape" on some panels which can be brushed on. When it dries it can be peeled off very easily. This would protect the panel from minor scratches. This protection would be put on as soon as the panel comes in to inspection from an outside vendor, and will be removed by the Inspector at Final Inspection---it should not be removed before this time.

K. Fitzgerald

100-00	50%
EN 1000	50%

Machine Shop

The machine shop has been devoting most if its time for the past two-week period on standard production items, and a few emergency jobs for special project jobs which have come up on short notice. There have been no outstanding problems or items worthy of special note,

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K. Fitzgerald (cont'd)

with the exception that we have had to work approximately 10 hours per man overtime in order to keep up with the regular work load.

Sheetmetal Shop

The sheetmetal shop is presently requiring three to four weeks for completion of all work in the shop due to the heavy work load at this time. Because of this heavy work load we have hired laborers from "Labor Pool" to help out in the area of machine operators. At present, it looks as if we will need this extra help for approximately two to three weeks to take the heavy demand off our own people and keep the overtime to a reasonable limit.

One of the biggest problems we have been having in the sheetmetal shop lately has been in the painting booth. There has been three or four days when we could not paint because of the high humidity conditions, and we feel that it is cheaper not to paint at all rather than to have 50% to 60% rejects and then have to repaint. Another more serious problem is the nature of the paint itself. It seems that with our standard Doeskin Tweed there is a shelf life on the paint of about three months. We have found that sometimes it even exceeds this and therefore we don't have too many problems with this particular paint. However, our solid color textured tweed which we use on computers, special systems, has a shelf life of only 30 days. Sometimes even less than this, depending upon temperature and humidity conditions. It seems that the solid color breaks down in the bucket and when the paint is applied it shows a small white fleck. This has happened to us on two occasions in the past week and we have not been able to paint any of the standard Digital blue or ITT blue because of this. We have approximately 45 to 50 gallons of this paint which we cannot use. The supplier has promised to give us credit for it, but that does not get us out of the hole of not having paint with which to paint. Because of this problem I have contacted an independent paint chemist and asked him to come in and go over this problem with us, hoping, perhaps, he can come up with a formula for a different type of paint that is still air dry, textured, and the correct color, but does not have a shelf life. This, I feel, is about the only way that we can possibly change paint. Even though we have had many problems with paint in the past, the only other textured paints on the market are generally two-coat

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K. Fitzgerald (cont'd)

paints requiring a baking oven capable of temperatures to 350°.

There are two methods of reaching a bake temperature of 350° and they are either gas fired ovens or banks of electric heating units. The first case, gas fired ovens, would be quite expensive to buy and install and the fire hazard from something of this type would be extremely high. The second alternative has the same fire hazards and is expensive; also involved would be the necessity for a new electrical service to the building, as we presently do not have enough amperage on our present supply to allow a hook-up of this type.

We have been experimenting for the past two weeks on a clear conversion coating for aluminum and I have run a production lot of 1901 top and bottom plates through Alodine #1000 which leaves a clear chromated service on aluminum and are all uniform in color and texture. The only drawback I see on these pieces is that it will be difficult to determine whether or not the pieces have been coated. However, I am sure that the details of controlling this can be worked out quite satisfactorily. We will continue to run pieces through this process hoping to find any bugs and problems, so that we might make a fuller report later on. We also have a green colored conversion coating. However, this requires a high temperature bath and a little closer control. We ran a few pieces through this but not enough to really justify a full report. However, preliminary work indicates that we would probably have the same problems on color match, rainbow effect, and streaking, as those that we have with our present Chromicoat system.

Cabinet Shop

The cabinet shop spent most of the past two-week period getting the ITT console ends assembled and installed on units for ADX-9 and 10. The console units for ADX-11 and 12 are being delayed again because of the paint problem. However, we are expecting shipment by the 21st.

Carpenter Shop

The carpenter shop is fully installed upstairs in Building 5 at this time. We have shipped from this area six times now and we feel confident that we have a pretty fair system operating. Also, the scale is now in operation up there and we will be able to weigh the units whenever necessary.

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K. Fitzgerald (cont'd)

I would like to outline at this time the final draft of a memo that will soon be published for the crating and shipping of all units requiring packing or crating:

"All machines and equipment requiring packing and crating will be sent to the crating area adjacent to the Carpenter Shop in Building 5 at least one day prior to the date which the transport people are scheduled to pick it up. If the system is composed of more than six standard computer cabinets and a typewriter table, it must be delivered to the shipping area two days prior to the pick-up time. This time is necessary to allow for the last mechanical inspection by Quality Control and any necessary rework which is discovered. The machine will not be crated or shipped until such time as the Quality Control department notifies the carpenters that it is ready for crating. It is also imperative that the Carpenter Shop receives a work requisition for the crating at least one week prior to the date of shipping. This is necessary in order to insure that there will be no conflicting shipping dates with other departments. When this work requisition arrives in the shop, any conflicts will be discovered immediately and the requisitioner will be so notified so that he may resolve the conflict in ample time to notify the shop of the actual shipping date."

L. Prentice

General Engineering	75%
Engineering Project - Security	25%

The subject of this Biweekly Report is Security. We initiated Pinkerton guard service Monday, September 10th. This has now been in operation for the past four days. As with the initiation of any new service, there are still things that need to be done to smooth out the operation. The primary reason for adopting guard service is to make our people security conscious; that we do have a need to know who is in the building at all times and that we have keen interest in safety for our employees. The other benefits we hope to derive from this accrue from a 24-hour fire watch and access to the building around the full 24-hour cycle, seven days a week. While it is impossible to have this degree of security without minor inconvenience, we hope that the inconvenience will be small and to a very small number of people. While these are our main concerns, a great

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L. Prentice (cont'd)

many other small benefits accrue from a guard service of this type. Our next endeavor in this area will be to provide more adequate fire protection than we presently have.

A man has been hired for the Tool Crib in Building 3 and we expect to have this in operation within the next few weeks. An all employee memo will be gotten out explaining how the Tool Crib will operate and the necessity for keeping records, etc.

I wish to thank Bob Lassen and his people and Dick Mills and Brad Towle for the assistance given in setting up the security guard system.

H. Crouse

The major component vendors are generally delivering to our scheduled dates; additional orders have been placed with:

Potter Instrument	- 20 handlers with three month lead time	$131,500.00
General Ceramics	- 25 memory stacks 64 x 64 x 19	$ 79,875.00
Soroban	- 25 computeriters	$ 47,756.25

Semiconductors - current usage of the Germanium D001-1 diode is 100,000 devices a month. Transitron and Clevite are our suppliers on a year's schedule. Price is $0.15 each. The price increased half a cent for additional specification that is 0.25% AQL level.

Texas Instrument has contracted to supply 2N1305's (GA 748), 4JX1C741 (GA439) and GA212 with an epoxy base and leads cut to length. In large volume the units are priced at $0.34, $0.305 and $0.605 respectively. General Electric has submitted a similar proposal. The General Electric units would have a Milton Ross Co. base glued to the can with epoxy rather than die stamped, as is the Texas Instrument devices.

The new cafeteria in Building 5 is beginning to operate. Until the outing is over and has relieved the work load on Bill Tobin coffee breaks will be the only services offered. Probably two weeks hence, full operations will begin. Constructive suggestions and complaints will be received by yours truly.

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F. Kalwell

Recently, Derrick Chin and I visited Raytheon, Quincy Tube Division, in regard to our problem of CRT tubes used on visual display. I am certain that the problem of defects in the screen will be corrected and all tubes will be inspected per DEC specifications in the future prior to being shipped.

This week a list has been circulated on all machine screw fasteners that DEC uses. I'll bring this list up-to-date as new fasteners are added to our production stocks.

With failures occurring in Rotron Muffin Fans, I've recently purchased three Pamotor axial fans for Bob Hughes' evaluation. This fan has a large starting capacitor and at the present time cannot be supplied without this capacitor. The Pamotor fan is more costly, but it has a greater air flow capacity, is guaranteed for one year and is permanently lubricated.

I'd appreciate a six-week lead time on requests for patch cords and special power cords.

Dave Adams from Quality Control has complained of taper pins not being properly crimped on our wire. The Amp repair man adjusted the machine to crimp 22 AWG wire and presently it is crimping properly. The other problem has been on the consistency of our vinyl wire; all future orders on vinyl wire will have a .046 min. O.D. and max. .053 with normal O.D. of .051.

R. King

I am now purchasing items in the maintenance, repair and operating supply lines. Due to many department moves and new personnel, we are presently purchasing a large quantity of office furniture. We do not have a large inventory of office furniture in the house, but some of the vendors we deal with carry an inventory to service our needs. If the lead time on the following items could be given by the requisitioner, I'm sure we could service all requests more smoothly.

1 week for desks and 4-drawer cabinets
2 weeks for typing stands, side chairs, executive chairs, secretary chairs and 2-door stands

R. King (cont'd)

The office chairs come in various colors, but we deliver these on a first come first served basis. If you desire a certain color, please specify on the requisition and we will do our best to accommodate you.

Judith Ebner

CORRECTION

Theobald, Robert - "Profit Potential in the Developing Countries" (Library No. 658.8)

An AMA reference study. A brief summary of Part 1, 2, and 3 follows:

Part One, a stimulating analysis of the outlook for the U.S. company abroad, was written in the winter and spring 1960-61. Revisions have been made since then to incorporate changes--notably changes in the organization of U.S. Government agencies--bringing this study up to date as of late October 1961, wherever possible. The probable effects of the new Agency for International Development have been considered, as has progress in the unity movement in Europe.

Part Two contains 53 brief statements by foreign governments on their attitudes toward outside private investment and the advantages of investing in their countries.

Part Three offers statistical summaries of economic conditions in 75 nations. Some of the more mature countries are included in the summaries, but the emphasis is definitely on nations for which information has previously been scarce, or, at best, widely scattered and hard to find.

D. Dubay

Test Equipment Headquarters (EN 1048)

Twenty scopes and twenty preamps have been calibrated in the past two weeks. Both 581 scopes have been modified and calibrated for use of the type 82 dual trace preamps.

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D. Dubay (cont'd)

Our second type 82 arrived last week along with another type 109 mercury pulser.

The new Tektronix oscilloscope camera has developed a sticky lens and has been shipped back for repair.

One of the type 567 Digital Readout Scopes is at Lexington for repairs.

R. Hughes

In an effort to weed out high-failure-incident components, we are now using only Gold Seal Muffin fans in all products which require muffin fans. All of our muffin fan failures to date have been with non Gold Seal types.

Modules with automation components capacitors are being removed from finished goods for rework by production to eliminate these capacitors. These units have shown a high-failure-incidence and are being replaced by either Sprague or Erie.

Incoming inspection of core memories, readers, punches, typewriters and mag tape handlers, is now being performed under Jack Smith's supervision. Quality Control will only be involved to the extent that it will keep people informed of any problems relating to vendors.

The last few days, for two hours a day, Cy Kendrick and I have met and have updated his parts list and at the same time I have marked up my circuit schematic book. The drafting room originates change notices correcting the parts nomenclature. A primary reason for this change is confusion in production. A typical instance would be we have ordered zener diode type 1N3316 for our 735 power supply. This number calls for a zener diode voltage tolerance of 20%. When we order the part we ask for a 5% diode, but since the part number calls for a 20% voltage tolerance, that is what we get. The correct part number for this device is 1N3316B.

For our NIXIE driver, we can now buy a transistor specially designed to drive NIXIE tubes. Our part number for this device is SJ1071. It is a silicon NPN, low leakage transistor in a TO5 package having the following ratings: BV_{CEO} greater than or equal to 65 volt at

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R. Hughes (cont'd)

1C 10 mils (pulse).

The purpose of this test is to get by all of the negative resistances that this breakdown voltage parameter would exhibit so it is measured in a high current region to demonstrate that the minimum voltage collector to emitter (base open) is 65 volts. It has a 2 V emitter to base junction and a beta of 10 at 5 mils. Price of this device is $.73 per each 1000.

Deposited carbon resistors are generally thought of as being 1% resistors because that is what is printed on the outside of them, but the military considers them a 4% resistor, because when you solder them into a circuit they change value and don't quite return to their original value, and because the temperature coefficient is so high--it is 500 PPM/°C. We can purchase for the same price (about 15 cents) metal film resistors with a guaranteed temperature coefficient of 150 PPM/°C. These resistors are made on the line that makes 50 and 25 PPM/°C resistors, but where the 50 PPM resistors are tested to be 50 and the 25 PPM are selected from that same line to be 25 PPM, the 150's are simply not tested for temperature coefficient.

It is fairly obvious that we should incorporate these resistors into our old as well as our new designs because they would improve the performance of our circuits. Vendors are Sprague and IRC.

Our wirewound Tel Lab resistors do not stand up very well, particularly in our manufacturing process. When we clean etched boards we have trouble with the resistors opening and the labels being scrubbed away. New designs should use a resistor such as the Daven Epoxy Encabsulated types.

We have systematized the repair of returned modules and issue a weekly list of all the repairs made. Copies of this list go to everyone we could think of who would be interested in it. If anyone is not presently receiving this list and would like it, please holler.

Note: We haven't forgotten you fellows in the field offices--you will be getting copies.

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R. Hughes (cont'd)

Speaking of field offices, if you have any Quality complaints, please send them directly to me on the teletype, preferably as soon as they occur.

During the last couple of months, we have had a very high incidence of failures in our core memory 1972 switches. The MD114 transistors get shorted out. These units die in a rather random fashion. We have trouble with them in the memory checkout area--we will lose a few packages, and then on the systems floor, we may lose more packages. Up to 15 have gone bad at one time, and we can't find out why. They don't burn out as a function of address or particularly as a function of time, and about the only thing we can say is that lately we have been using Sprague transistors, and that these have a lower voltage breakdown than the Philco transistors which we have previously used.

The breakdown rating of the MD114's is typically far higher than the transistor actually sees. The machine the transistor has on it is 22 volts. In plotting the distribution of breakdown voltages for Sprague MD114 vs. Philco MD114's, we discovered that the Sprague, in general, has a lower breakdown voltage. Out of 100 tested, all were 23 volts or more. Of the Philco's tested, all were 40 volts or more. However, 73% of the Sprague were less than or equal to 62 volts, whereas 79% of the Philco were greater than or equal to 62 volts.

We are going to select MD114 transistors for 50 volts breakdown and put these in the 1972's and hope that the problem will go away.

J. Cudmore

EN-1073	50%
Module Test	50%

The Customer Defect Report is now in use. This is a report which enables QC to record each returned module, serial no., defect listed, trouble found and disposition. A weekly report will be issued which will tabulate the returned modules for the previous week. The first of these weekly reports was issued on September 11. Of 29 returned modules 23 had no decernible defects. We are severely hampered if

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J. Cudmore (cont'd)

the defective module tag is not filled out. Each returned module is tested at room temperature and at 55°C.

The 4203 FF has undergone a circuit revision. The 2N1305 transistors used as output buffer amplifiers were somewhat marginal due to insufficient overdrive cap.

The 2N1305's have been replaced with 2N1309's which have less stored charge, higher cut-off frequency and a higher Beta. The 2N1309 was selected, instead of the 2N1307, since we already stock the 2N1308. This allows the same complementary features of 2N1304, 2N1305 combination in a higher frequency device.

One of the 567 Digital Readout Sampling scopes has been returned to Tektronix for adjustment or repair. The maintenance of these scopes is a real headache due to the lack of calibration and test procedures.

K. Doering

We have worked out a complete procedure for intermediate and final electrical and mechanical assembly inspection which will help to end the existing confusion about who calls whom and who is responsible for what. I shall make sure that everybody who is involved in this subject gets a copy of this procedure. The new inspection forms are being printed and we hope to be able to use them by the end of this week.

Diode and transistor test people are using a new record form similar to that of the mechanical inspectors. This eliminates and simplifies paper work tremendously and saves quite a bit of time also.

We also made up a form for notifying Purchasing about test and inspection of partial shipments. Inspection procedures for in-process inspection are in the works and should be completed by the end of this week.

Every engineer who makes modifications on parts where a model is involved should make sure that the model also gets changed and goes through the Q.C. Dept. for retest and approval. He should also take

K. Doering (cont'd)

care of getting models back from vendors for modifications. If he is not sure if and where models are existing, he should definitely send a copy of his change notice to Q.C. so that they can take care of the models. No models should be used without Q.C. approval.

Our Die and Jig Insp. Program is going very slowly. We had a rather good applicant for the vacant draftman's job. He will make up the insp. dwg's for this program. I am in good hopes that we can push things ahead much faster.

K. Larsen, WCO

A few weeks have gone by since I made a contribution to the Biweekly, so I have some "catching up" to do.

Ted and I made a trip to Seattle to attend the Northwest Computing Association 5th Annual Conference Show. The response to the show was disappointing and some of the meetings that Oliver Judd (of Rush Drake & Associates) had arranged fell through, but we did get to see our module customer at Boeing and a group doing some interesting work on training devices at the University. One group at Boeing was making a computer comparison chart showing the time required to simulate a 7090 indexing instruction. Based on the number of times this instruction is used in 7090 programming, the PDP-1 was far down the list by this evaluation. They seemed to think that this was a most important measure of computer efficiency.

Interest is growing in the Hybrid Digital/Analog Computer Systems at Boeing and three major philosophies are in existence: the methods now used are adequate and no change is justified; buy components and develop a system for present and anticipated requirements; wait and see what other companies do and then make a decision.

I made a trip to L.R.L. to help them with a PDP-1 memory problem. They had located the cause of the trouble (a broken wire in the 735 P.S.) by the time I arrived and were replacing the transistors in the 1973's. It took only a short time to adjust the drive currents and get the checkerboard program running with margins, but after about 2 hours running, it began to error intermittently. We traced the problem to one of the delicate matrix wires in the memory module

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K. Larsen (cont'd)

which would open after the temperature came up to normal.

At the WESCON show we gave away 85 or 90 boxes of catalogs and also received a good number of requests for catalogs and/or specific information. Thanks to Dit Morse we had some PDP-4 display programs to attract attention. I think the machine looked good even though we had to crowd it in at the end of the booth. Several industrial designers stopped by to pay DEC some compliments on the PDP-4 packaging design. One industrial design consultant suggested that we submit it in an industrial design competition. (I have his card if Loren Prentice or anyone else would like to follow up on this.)

I talked to a fellow from Collins Radio and he said that they have one of their ADX type computers in operation at Cedar Rapids. He thought that the New York Central Railroad was to get the first system. It has a high-speed non-destructive read-out (Biax) memory as a program memory and a standard coincident current memory for data storage.

I think we've made quite a "hit" at Hughes Aircraft with the first core tester (2108) delivered to them. It was received without manuals, drawings, schematics or other helpful information. I also would have appreciated a set of marked-up drawings for the 2113 delivered to Electronic Memories, Inc.

We have been experiencing a few problems in getting computer spare parts from DEC, Maynard. Theoretically, any part that we need on an emergency basis we could have within 24 hours, but in practice it turns out to be several days or even weeks. Apparently the sequence of events goes something like this:

We contact person #1, who calls person #2 and asks him to give the part to #3 for delivery to #4 who will take it to #5 for shipment. At each point it seems to lose some of its priority status and approximately 4 TWX's and 3 phone calls later (which boosts Bell's profits) #6 finds the part under a bench and gives it to #7 who might ship it to us. All I can say at this point is -- HELP!

I would like to make an appeal for advance information on anything that is new at Maynard. If you have a rough draft of a program

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K. Larsen, WCO (cont'd)

write-up, computer application, or module application and you know it hasn't been copyrighted, please send it to us -- honest, we won't give the rough copies away or criticize your handwriting -- we would like to keep informed on "what's new" at Maynard.

R. Winslow

These Semiconductors have been tested since the last report.

Semiconductor	Mfr.	Units Tested	% Reject
D-664	Continental	22072	1.3%
D-662	Clevite	20000	4.1%
D-001	"	25000	1.4%
D-003	Transitron	300	93.0%
1N-1998	Semcor	100	0.0%
1N-1982	"	100	0.0%
1N-3209	Motorola	250	0.0%
MA-90	Sprague	5000	0.4%
MA-90	Philco	4000	0.5%
MA-89	"	1000	0.2%
MD-93	"	1373	2.1%
MD-94	"	2333	7.1%
MD-95	"	7269	9.7%
MD-109	"	530	14.0%
MD-114	Sprague	1733	1.0%
MD-114	Philco	1657	0.24%
2N-1613	Fairchild	40	0.0%
2N-1301	RCA	300	3.0%
2N-1308	Texas Inst.	1000	1.9%
2N-711A	" "	1500	1.1%
2N-1146A	Clevite	1000	10.2%
2N-1218	Sylvania	1000	1.6%
2N-2099	Sprague	101	2.0%
GA-212	Texas Inst.	4000	0.78%
GA-439	" "	5000	3.0%
2N-1600B	Transitron	48	0.0%
2N-1600	"	7	0.0%

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J. O'Connell

I believe the following information on modules not listed in the catalog may be helpful. If there are any additions or corrections, please call Velma Grasseler on Extension 396.

DEC UNITS NOT LISTED IN CATALOG

Model No. & Name	Description	Price	*Tech. Data	Originator
72 Current Calibrator	Two-reference calibrator for use in same applications as 71, but with greater accuracy and less distortion of measured wave form.	$	no	R. Doane
735 Power Supply	For computer memories, temperature compensated. If sold, $455. Price includes 1701 Power Supply Control.	NFS	no	D.Wardimon
769 Power Supply	Same as 766, but uses different transformers.	$	no	R. Hughes
770 Power Supply	Used as standard power supply in CRT display unit. 10,000 volts, 1 milliamp. (+250 volts, -150 volts will supply 20 milliamps.)	NFS	no	R. Savell
775 Power Supply	Same as 773, but with double jack on front panel.	$	no	R.Tringale
776 Power Supply	Same as 769, but for mounting on a plenum door. (Current driver P.S.)	$	no	D.Wardimon
778 Dual Volt Supply		$	no	R. Best
820 Power Control Panel		NFS	no	R.Beckman

*Technical information available.

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J. O'Connell (cont'd)

Model No. & Name	Description	Price	*Tech. Data	Originator
821 Marginal Check Control Panel	Specially designed for use in PDP-1 and PDP-4.	NFS	no	D.Wardimon
822 Power Control for Tape Unit 50	Same as 811 except for changes in circuitry.	NFS	no	D.Wardimon
1161 BCD Decoder	A diode decoding matrix that converts BCD and excess 3 inputs to decimal output. Clamped loads to be added for each of the outputs. Loads to be attached by jumpers and lugs for easy disconnection by removal of jumper wire.	$	yes	J. Cudmore
1536 Mag. Tape Sense Amplifier	Has two variable gain difference amplifiers, each of which has a gain and balance pot available through module handle.	$	yes	J. Cudmore
1537 Drum Sense Amplifier		$	no	E.T.Johnson
1538 DC Sense Amplifier	A DC difference amplifier, rectifying slice and pulse amplifier. Used in PDP-1 core memories for detection of ONES and ZEROS.	NFS	yes	A. Falco
1569 Range Gate	Integrator sampler. Made for Cornell University.	NFS	no	D.Wardimon
1570 Slicer	Used for comparison of a core pulse output (after X10 amplification) with a calibrated DC ref. level.	$237	yes	A. Falco

*Technical information available.

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Model No. & Name	Description	Price	*Tech. Data	Originator
1572 Difference Amplifier	DC Comparator similar to 1547, but with lower drift and higher speed.	$	no	A. Falco
1690 Bus Driver	Contains 4 inverting drivers for use driving heavily loaded output lines where fast rise and fall times would create severe ringing and large induced voltage transient.	$	yes	J. Cudmore
1691 Bus Driver	Contains 4 inverting drivers for use in driving external equipment with logic levels of 0 and -10 v. Controlled output rise and fall times of approximately 1-5 μsec.	$	yes	J. Cudmore
1705 CRT Bias and Focus	To effect changes in resistance values to ensure correct operation of Zener diodes under low voltage conditions.	$	no	D. Chin
1706 Power Amplifier	A unity gain amplifier used princi- pally for focus correction.	NFS	yes	A. Falco
1707 Multiplier Bias Supply	Designed to be used with the 1706. The circuit is a level shifter and places 5 v. across certain resistors in a 4677 type Single-Ended Bridge.	NFS	yes	A. Falco
1803 Relay	Contains 4 Dunco Reed Relays. Designed for special use in an experimental unit.	NFS	no	D.Wardimon
1804 Relay	Contains 4 Dunco Reed Relays. Designed for special use in an experimental unit.	NFS	no	D.Wardimon

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J. O'Connell (cont'd)

Model No. & Name	Description	Price	*Tech. Data	Originator
1956 9-pin Plug Adapter.	Provides connections from logic to rear plug of 4203 flip-flop.	NFS	yes	D.White
1984 Read-Write Switch	Same as the 1977, except input bus is split. Special module used in memory plane and stack testers only.	NFS	no	R.Tringale
1985 Read-Write Switch	Same as 1980, except input bus is split. Special module used in memory plane and stack testers only.	NFS	no	R. Tringale
1986 Read-Write Switch	New read-write switch which we hope will replace 1975, 1977, 1980, 1984 and 1985. A first lot has been tried out in a small system by the special systems group.	NFS	no	A. Falco
1987 Read-Write Switch	Similar to 1972 plus diode decoding circuitry to save the binary to octal decoder.	NFS	no	D.Wardimon
1988 Diode Unit	For use in experimental memory unit. A network of D-007 diodes for use in slow-speed memory for PDP-4, etc. This module is very much experimental and should not be used for design purposes as it will probably be changed.	NFS	no	D.Wardimon
4116 Diode	3- 5-input negative OR gates. Connections same as 4117.	$47.	no	D. White
4161 BCD Decoder	Same as 1161, except for transistors used. Transistors are MD 114. Hence speed is comparable to 4113, etc. Now in drafting.	$	no	D. White

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Model No. & Name	Description	Price	*Tech. Data	Originator
4202B Dual Flip-Flop	A 4202 with shift right path changed so that shift right input terminals control what shifts into flip-flop B. Flip-flop A cannot be shifted. Prevents shifting a sign bit in a memory register.	NFS	yes	A. Falco
4203 Flip-Flop	Used as accumulator in PDP-4. Unit has so many logical connections that an extra connector on rear of module is necessary. (See 1956 for convenient way to connect from this connector to front of mounting panel.) Outputs are buffered, and have same driving capability as 4201, except that no logical delay is provided. A carry output, which should not be heavily loaded, is used for carry propagation. The unit contains all inputs necessary for clearing, shifting in two directions, read-in from two sources, (one of which may be a jam-transfer) clearing, complement and set.	$	yes	D. White
4204 Dual Flip-Flop	Unit is equipped with output buffers but no logical delay. It is useful as a register flip-flop where high driving capability, counting and read-in from several sources is required.	$	yes	D. White
4217 4-bit Counter	Will be a binary counter with common clear and individual gated read-in. Just started. Price not yet determined; estimated $96.	$	no	D. White

*Technical information available.

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Model No. & Name	Description	Price	*Tech. Data	Originator
4219 Quintuple Flip-Flop	Five flip-flops in one package. Features common clear, common set and a jam transfer requiring only one level input. Not yet in drafting.	$	no	D. White
4505 IBM 7090 (P) to DEC Converter	Similar to the 4506. The IBM uses two sets of current levels, only one of which is used on the data channel. These converters will handle the other set. In drafting.	$	no	D. White
4506 IBM 7090 to DEC Converter (N)	Converts IBM 7090 levels, as used on direct data channel (current mode) to DEC standard levels. Six converters per package. Model in final stages; write-up nearly completed.	$	no	D. White
4517 Mag. Tape Read-Write Switch	To be used with NRZ tape system of DEC to convert from two head (1-read, 1-write) to one head system.	NFS	yes	J. Cudmore
4518 Drum NRZ Writer		$	no	E.T.Johnson
4519 Drum Field Select		$	no	E.T.Johnson
4520 Read-Write Hold & Select	For use with 1986 read-write switch in a special system.	NFS	no	A. Falco

*Technical information available.

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Model No. & Name	Description	Price	*Tech. Data	Originator
4605 Pulse Amplifier	Designed for the PDP-4. Contains 3 pulse amplifiers which produce DEC standard 2.5 volt, 0.4 μsec neg. pulses. Each P.A. has a 6-input diode AND gate which can be internally jumpered to any of 12 input lines which allows provisions for a pulse input. The unit has a total of 12 level inputs, 3 pulse inputs, and 3 pulse outputs.	$	no	D.Wardimon
4669 DEC to IBM Converter (P)	This module is the complement of the 4506. It converts DEC levels to 7090 levels used in direct data channel, current mode. Both polarity outputs are available. Six converters per module. Model now released.	$	yes	D. White
4670 DEC to IBM 7090 Converter (N)	Similar to 4669; the IBM uses two sets of current levels, only one of which is used on the data channel. This converter will handle the other set. Now in drafting.	$	no	D. White
4671 BCD Light Driver	Same as 1671, except that this one is capable of handling excess 3 code as well as straight 8421. Will soon replace 1671.	$96.	yes	D. White
4673 NIXIE ® Driver	Converts 8421 code to levels suitable for driving NIXIE indicator tubes. Model is in Engineering; will be released in one month.	$85.	no	D. White

*Technical information available.

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J. O'Connell (cont'd)

Model No. & Name	Description	Price	*Tech. Data	Originator
4700 Printer Buffer Element	Contains 6 independent flip-flops with their individual complement inputs and a common clear input. If all six flip-flops are ZERO, and input gate is activated, a solenoid driver circuit is energized.	NFS	yes	A. Hall.
4701 Ramp Generator	Generates linear (.1% we hope) ramp $ which starts at 0 v. and swings negative over 10 V. range. Starting level and slope adjustable. Preliminary circuit now in Engineering. This unit is definitely in preliminary stages and will not be ready for sale for some time.		no	A. Falco

*Technical information available.

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E. Harwood

The acceptance test on ADX-6 was run on August 22. A man from ITT came down and we started the test about 10:00 in the morning. The test runs for about eight hours and that is just about what it took us to complete the whole thing. The minor difficulties we encountered were quickly fixed, and did not add any time to the test. For the first time since we have been doing these acceptance tests, the whole test was on mag tape and that helped to run it more efficiently. While the tape was here, we managed to make a couple of copies so that we can run the acceptance test before the ITT people come down to run it formally. The ADX-6 machine is still in the house and we will be using it to do program debugging and for the ADX-6 and 7 Duplex System.

ADX-7 - The ADX-7 machine is in its final stages of check-out. All the equipment on the machine has been thoroughly checked and is working fine. We are still lacking two of the extra memories for this machine, and we expect those sometime next week. We will require three or four days to finish up the machine after the arrival of the memories and we expect to have the ITT people come down and perform the acceptance test on a 7 about September 12.

Duplex Control and Switch - The Duplex Control and Switch is completely wired. We hope to get all the modules sometime this week. We will then attempt to do the first duplexing between the ADX-6 and 7 machines. We are currently getting these programs ready to run the Duplex System. At the present time, we are approximately one week ahead of our schedule. This will afford us a decent amount of time to thoroughly check the Duplex Control and the whole system.

ADX-3 - ADX-3 is right on schedule. We are at the present time in the first stage of the check-out procedure, and we have all the necessary modules and the memories to proceed full speed ahead.

JPL Outgoing Line Units - We have turned into the drafting room the drawings necessary to build the JPL Outgoing Line Units. In the meantime, we have marked up a set of ITT drawings and have ordered the mounting panels built. This will be one special bay with a control panel on top, two mounting panels and one plug panel. We should be able to meet the delivery date of the end of October on this system.

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E. Harwood (cont'd)

ADX-2 Extra Tape Units - We have the ADX-2 six extra tape units currently being tested on the ADX-6 and 7 machines. These are the first tape units we have received with the fans on top; therefore, we will be able to check them under 100°F as we now check all systems. We plan to ship these on Monday, September 3. This is one week ahead of the schedule that we had planned for these test units.

R. Mills

Capital Equipment Months Ending - June 30, 1962 - July 31, 1962

June 30, 1962

Vendor	Description	Amount
H. Carlson	2" Stroke C2HP motor, 1 run & 1 stop button	$ 1,950.00
A. Dumont	Oscilloscope, Plug Ins, Probes, Connector	1,427.35
Hewlett-Packard	Milliammeter	550.00
United Shoe	Component Inserting Mach.	2,685.00
Gen. Inst.	Ultrasonic Generator	721.00
Contronics	2 Comparators, 2 Panels	1,450.00
Frank A. Parker	Optical Measuring System	595.00
Pettingill & Pear	10 Desks	947.50
Wright Line	Key Punch Desks	514.50
Ferris Larkin	14 Dbl. Ped. Desks	1,326.50
		$12,166.85

July 31, 1962

Bowry Asso., Inc.	Sidewall Fans	1,799.82
Burgess Bros., Inc.	22 Hole Die	641.52
		$ 2,441.34

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Judith Ebner

Baker, Stephen - "Visual Persuasion" (Library No. 659.13)
A study in non verbal communication through the medium of pictures. The author shows how ideas can be put across to others via their unconscious response to symbols.

Chorafas, Dr. D.N. - "Programming Systems for Electronic Computers" (Library No. 519.92)
This volume covers in great detail the general aspects of computer programming. It reviews the last ten years of technological evolution which have brought about the complex procedures that constitute a present-day programming system.

Conrady, A.E. - "Applied Optics and Optical Design - Part One (Library No. 535)

Conrady, A.E. - "Applied Optics and Optical Design - Part Two (Library No. 535)

Corey, E. Raymond - "Industrial Marketing" (Library No. 658.8)
Introduces cases and concepts, showing industrial marketing both as a general process and as a complex of specific strategies, techniques and counter forces. The discussion of each case leads to the development of ideas of broad significance in industrial marketing. In addition, the book includes chapters which develop and summarize basic concepts emerging from all of true cases in each of the three areas, product planning, pricing, and marketing programs.

Engineering Staff of Hewlett-Packard Co. - "Microwave Theory and Measurements" (Library No. 537.12)
This book has been prepared to meet a continuing and increasing demand in the electronic industry and the academic field for basic information on microwave theory and microwave measurements. The contents provide analysis of microwave theory, microwave instrumentation, and microwave measurement techniques. The material is so presented that it is readily understandable to any person with a fundamental engineering background. No calculus is required. Technical institute students, as well as college undergraduate and graduate students, can use this publication as a basic text or as a supplement to other books. Engineers can use the book to learn the fundamentals of microwave theory and techniques.

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Judith Ebner (cont'd)

Francis, Ely - "Using Charts to Improve Profits" (Library No. 658)

1. What Charts Can Accomplish
2. The Initial Steps
3. Ten Requirements for Good Charts
4. Auxiliary Aids to Good Charts
5. Ten Pitfalls to be Avoided
6. Practical Chart Procedure
7. Following the Sales Trend
8. Controlling Costs
9. Evaluating Profits
10. Controlling Inventories
11. Controlling Receivables
12. Charting the Essential Profit Ratios
13. Charts Can Improve Profits

McCay, James T. - "The Management of Time" (3rd Copy) (Library No. 658.53)

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

McKinley, James L.; Bent, Ralph D. - "Electricity & Electronics" (Library No. 629.132 6)

Written especially for the technician or mechanic who will be concerned with the repair, maintenance, and assembling of aircraft or space vehicles and their components, this timely and completely up-to-date book covers a broad range of subjects. The latest information on electrical and electronic installation, radio receivers and transmitters, electronics instruments, automatic pilots, missile control systems, and communications systems for space vehicles is discussed in detail.

Phillips, Alvin - "Transistor Engineering" (Library No. 621.381)

This outstanding volume offers a sound fundamental understanding of transistor devices. It clearly explains principles of transistor theory and design, and the relationship of all measures electrical characteristics to physical properties of transistor materials. It also develops principles that are

Judity Ebner (cont'd)

basic to designing integrated semiconductor circuits--one of the fastest growing aspects of today's electronics. The book uses an extremely helpful "building-block" approach in which each chapter is dependent on material preceding, and new aspects are introduced in logical order. This builds a progressive understanding of design theory so that any transistor in use today can be fully understood.

Quartly, C. J. - "Square-Loop Ferrite Circuiting" (2nd Copy) (Library No. 621.381 51)

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.

Rhode & McCall - "Press Photography" (Library No. 770)

Pullen, Keats A., Jr. - "Handbook of Transistor Circuit Design" (Library No. 621.381 7)

Develops a systemized approach to the design of reliable circuits for transistors and other active devices.

Susskind, Alfred K. - "Notes on Analog-Digital Conversion Techniques" (Library No. 510.782 0)

About the Book: The outgrowth of a Special Summer Program on Analog-Digital Conversion Techniques held at the Massachusetts Institute of Technology late in 1957, this book offers a detailed exposition of both theory and design. The subject matter is divided into three parts:

1. Pertaining to systems aspects of digital information processing that influence the specifications for analog-to-digital and digital-to-analog conversion devices.

2. A detailed engineering analysis and evaluation of a variety of conversion devices is presented.

3. Devoted to a case study based on development work done at the Servomechanisms Laboratory of the MIT Department of Electrical Engineering.

Judith Ebner (cont'd)

Theobald, Robert - "Profit Potential in the Developing Countries" (Library No. 658.8)

An AMA reference study. A brief summary of Part 1, 2 and 3 follows:

1. Please describe briefly the attitude of your government to U.S. private capital investments in your country, giving information on the major incentive programs, if any, which are in force to encourage the setting up of firms.

2. If possible, give brief case histories of one or more firms which have set up production facilities in your country.

3. What steps do you feel could be taken by U.S. companies to insure a more satisfactory relationship between them and various groupings within your country-government, management of existing firms, labor, consumer interests, etc.?

D. Dubay

Test Equipment Headquarters EN 1048 100%

A total of 21 oscilloscopes and 21 preamplifiers have been calibrated within the last two weeks.

A good part of my time has been spent working on the music and page system. Since the take over of the Raytheon area in Building 5, several speakers have been added and the page desk has been moved from Building 4 to Building 5. The break signals are now timed from the master clock and are loud enough for anyone to hear. A doorbell has been installed at the entrance to Building 5 and is tied into the system in the form of a loud buzzer.

I recently received a Type 82 preamp. This is a dual trace preamp. for use with the 581 Tektronix oscilloscope. Both 581 scopes have been modified for use with the Type 82.

The Tektronix readout oscilloscopes have kept me busy ever since they arrived. I hope to learn enough about them to keep them operating more efficiently. I'm certainly getting enough practice.

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D. Dubay (cont'd)

Several trips to the Tektronix office in Lexington has taught me that we aren't the only ones having problems with this machine.

It is becoming increasingly difficult for people to keep track of meter leads and scope probes. I don't mind replacing these items, but I expect broken ones to be returned to me. Most of these items seem to disappear during the evening. I see no reason for petty theft against your fellow workers. A recent inspection of some tool boxes has shown me where some of these items are going. I would like to point out that there is a very poor impedance match between a Tektronix probe and a Power Craft tool box. The probes really do not do much good in a tool box.

K. Fitzgerald

EN 1000	75%
100-00	25%

The past four-week period has been exceptionally trying for the shops, due to the vacation schedule. However, I feel the shop foreman and their people have handled the situation very well by notifying requisitioners at the time of their request for work whether or not we could meet the dates and we have not had to exceed any promised delivery dates.

Sheetmetal Shop

The sheetmetal shop has received its new SPU handle blanking die and as soon as an OK is received from Quality Control it will be placed into immediate production. This should help to cut our production time on handles by approximately 50%, since it eliminates one whole blanking operation which was necessary with the old dies.

We are presently making experimental production runs using Alodine 1000 and Alodine 401 in our coating tanks. The Alodine 1000 leaves a clear chromated finish on aluminum and the 401 leaves a green color. We expect to make a proposal in a week or so. So far, the clear seems to answer many of the problems on color match and rainbow effect we are getting in our Chromicoat.

During the past two-week period I have investigated spot welders and have found one at a firm in Worcester. We have tried it out and

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K. Fitzgerald (cont'd)

bought it pending a 30-day trial period. This machine is rated at 50 kva and is capable of spot-welding two thicknesses of aluminum with a combined thickness of 7/32. This machine should help some of our design problems by enabling us to use more spot-welding rather than rivets.

We have located a man to fill our last vacancy in the sheetmetal shop. He is pending physical at this time.

Machine Shop

The machine shop has not been quite as busy as the sheetmetal shop in the past four-week period, but that's all over now. Orders which have been placed in the machine shop with an open date for delivery because of apparently no urgent need have all of a sudden become extremely urgent with delivery requirements in the neighborhood of two to three days. Some of these jobs require 50 to 100 man hours to complete. Obviously more thought must be given required dates on work requisitions.

New tooling has been purchased to facilitate the machine of memory plane stack hardware and the first production run using this new tooling is under way at this time. It should decrease the total production time by ten to fifteen percent. Also in the machine shop we have interviewed a candidate to fill our last remaining apprentice machinist job in that area. He is pending reference check and physical at this time.

Carpenter Shop

The carpenter shop and crating area has been completed on the top floor of Building 5, and we expect to be in full swing in this crating area very soon. A memo will be issued in the very near future outlining the procedures for the crating and packing area.

The additional area and personnel in the carpenter shop should allow us to do more of the carpenter work on the premises. However, I would like everyone to bear in mind the order of priority of work for carpenter work is as follows:

1. Crating and packing

K. Fitzgerald (cont'd)

2. Production fabrication (table tops, special benches and tools necessary for production work)
3. Advertising (display booths, special tables, etc.)
4. Plant maintenance

At the present time it is planned to outfit John Culkins with a few more carpenter machines and tools in the old carpenter shop in Building 3. This will allow John to handle more of the simple wood-working maintenance jobs which arise.

Cabinet Assembly Shop

The cabinet assembly shop is operating much more efficiently in its enlarged quarters and is right up-to-date on its work requisitions. However, it keeps slipping behind on our own scheduling because of the amount of rework necessary on machines after inspections and before shipping. This week four people in this area have spent three days patching up, overhauling, and repairing damage caused for the most part by carelessness, and sloppy work habits. It is bad enough that we have to perform this but as far as cost accounting goes, all of this time and materials spent on rework is charged to the individual machine and not to the area responsible for the damage. Quality Control has now set up a system of inspecting these machines as soon as they are assembled and before they are delivered to final checkout. They are inspected again after final checkout and before the final acceptance test. They are inspected once more in the crating and shipping area before they are put in the crate. It seems that it would be quite simple to charge any rework done after these inspections to the group responsible for the machine when the damage occurred. I feel that this would eliminate much of the carelessness and sloppy work if a periodic statement of charges was made known to the area supervisors.

R. Hughes

Klaus Doering is now working full time in Quality Control. He is responsible for incoming inspection and in-process inspection.

Jim Cudmore is responsible for module test.

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J. Cudmore

Production Test	80%
Miscellaneous	20%

Several improvements can be made in the module test department. The proposed improvements are:

1. Automatic Test - Document Automatic Testers and provide operators with simplified set-up instructions. Add calibration points and provide a test module for each test. Formalize the calibration times.
2. Information on a technician's performance and module test time is sketchy or unavailable. Starting September 4 module test time and technician performance data will be gathered. This will enable us to predict overtime needs and potential maximum testing capability of the department.
3. Obtain information on equipment required to test each module and obtain priority or duplicates on this equipment.
4. Develop a troubleshooting group or train technicians more formally.
5. Improve cooperation of engineering department in getting marginal circuits redesigned and complicated testers or test procedures simplified or improved. Cooperation in this area depends on the engineering work load which must be lightened or a priority given to each job.
6. Automatic testing development - This project requires the undivided time of an engineer.

L. Prentice

Vacation	50%
General Engineering	35%
Security	15%

The first week of the last period was spent on vacation and I had an opportunity to visit a copper mine and smelter at Murdockville, in Quebec. This operation is approximately 50 miles inland from the seaport and was built in the wilderness starting in 1952, so it has now been in operation approximately 10 years. Smelter

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L. Prentice (cont'd)

production is approximately 50 tons per 24 hour shift. Smelters are in operation 24 hours a day, 7 days a week. Smelter produces electrodes of blister copper approximately 625-660 lbs. each and further electrolitic refining is done at Montreal. Specially built trucks make two trips per day, 50 miles to dockside and return trips are filled with ore concentrate from two other mines, one located in Newfoundland and one at another location in the Maritimes. Part of the mining operations is accomplished by open pit methods but most of their mining operations are conducted in underground galleries with regular construction equipment, shovels, trucks, drills, etc. Almost no manual labor is used in getting out the ore. The ore itself contains only about 10% copper. Concentration is accomplished by pulverizing the rock and oil floatation and a drying process. Then the ore is transmitted to the smelting operation by conveyor belts. The first melting of the ore occurs in a converter similar to a Bessemer converter and then is recharged into a reverberatory type furnace and then poured as blister copper into molds which are run through a water tunnel and are cooled, weighed, and are ready for shipment. Approximately six to nine hundred pounds of bismuth are refined daily as a bi-product of the copper smelting operation. Power for the operation is brought in on high lines and they also generate their own electricity. Gases from smelting operation are burned in up-to-date water tube boilers, and the steam is used to generate electricity, run compressors, etc. Operations include a large warehouse of supplies, with heavy equipment, approximately 5000 separate items being maintained as repair and replacement parts. They also have a heavy plate shop which includes welding and cutting equipment and some forming for repairs to drag line buckets, shovels, rook drills, etc. They also maintain an electrical shop which is capable of repairing cables and winding electric motors, I would say, up to and including 50-75 and perhaps 100 horsepower. They maintain a large machine shop, mostly devoted to lathe work and have lathes up to 15 feet between centers. Some milling machine operations. All this equipment, with the exception of the welding equipment, is brought in from England.

I enjoyed the opportunity of being able to visit and spend some time there. The security and safety regulations are very thorough and up-to-date. The other operations were all planned in 1952 and reflect that era. No effort seems to have been made since 1952 to upgrade either the welding or machine shop operation.

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L. Prentice (cont'd)

Since returning to Maynard, my time has been consumed trying to find what loose ends need to be picked up and spurred into some kind of operation. Most of the locks have been put on during my absence. We have several additional requests for security on several sections. Some of the people are still on vacation and decisions on how they should be handled await their return.

Starting Tuesday, August 28, Klaus Doering was moved to Quality Control. Ninety percent of his time will be devoted to Quality Control. We will try to find someone within our group who can take over the responsibilities he has been assuming in regard to production equipment, and also standards.

R. Gaboury

During the past 3 weeks we received the following precision inspection equipment in Mechanical Inspection:

from Brown & Sharpe, a Hyte-Set and raiser block
from Taft Pierce, (2) 16" angle irons

We are also getting a Hyte-Check from Brown & Sharpe.

This equipment will enable us to check dies, jigs, fixtures, and gages with extreme accuracy, and leaves no room for any more guess work.

We also bought the necessary equipment for maintaining a program of checking accuracy of micrometers, verniers, etc.

R. Savell

1000	33%
1027	15%
2065	10%
1020	10%
1064	15%
1034	8%
1025	4%
1129	5%

The last bi-weekly period has seen the Lawrence Radiation Laboratory

R. Savell (cont'd)

Computer System accepted by the customer after a 1½ week delay due to failure of the Uptime Card Reader to run (not our responsibility) and 2 days delay due to memory system failures. L.R.L. is quite happy with the system and is thinking of buying another one similar to it.

There was quite a bit of vibration damage to the system when it arrived at Livermore. Screws were loosened in every piece of the system. In the future we should be sure to ship by air-ride van or plane when shipping long distances.

Since my return from Livermore, I have spent a great deal of time cleaning up things that were let go during the last couple of months when the L.R.L. system was here. We are getting instruction and maintenance manuals into shape for all pieces of peripheral equipment. Preliminary copies should be ready to print in another two weeks.

Bob Whitefleet, a summer student, has been investigating commercially available character generators to add to our display line. We concluded that we could build our own - and hopefully, build a better one - and sell it for about the same price it would cost us to buy one. We are attempting to make the characters out of line segments instead of point by point. The goal is one character in about 25 usecs. exclusive of deflection setup time. Results so far look fairly promising.

D. Adams

We recently received 7 Rotron Muffin fans that have failed, due to open windings and binding, in the field. These fans are the permanently lubricated type. Recently, Rotron changed the design so that the new fans must be periodically oiled.

We took several of the defective fans apart to try to find out where the wires are breaking. The motor coil is potted in a Bakelite type of material, the same type material that is used for the fan housing. The coil leads are a very fine pair of copper wires which run through one of the spokes to the solder lugs. We have been trying to find a solvent for this housing that will just leave the copper wires and coil so that we can find where the wire is opening.

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D. Adams (cont'd)

We also noticed that there was no trace of oil in the motor.

I called Rotron to try and find the cause of the short life of these fans, and to see if they could give me some information on a solvent for the housing. The only thing they told me was that the windings opened up due to poor manufacturing technique and that we wouldn't have any trouble with the new fan. They wouldn't tell me anything about the housing material or how to dissolve it.

We took one of the new fans apart to check the difference between them. The coil of the new fan is not potted, there is a new type of solder lug, and the lead wires are a tinned metal strap 1/16" wide by 1/32" thick. From this we might judge that most of the open wires were found in the spoke of the housing.

The new fans may run all right with periodic oiling, but the chances are great that no one will oil them, due to forgetfulness and/or the fact that the oil hole is on the back of the fan facing the housing of the heat sink or memory stack. To oil the fan it must be removed from the housing.

In checking to see if there are other makers of fans that are more reliable than the muffin fan, I found that we replace about 1 out of every 4 fans we install. We found the Pamotor Axial fan which has the same physical dimensions as the muffin fan. The Pamotor fan has a greater airflow capacity, is permanently lubricated, and the motor is guaranteed for one year. It is heavier than the muffin fan, has a die cast housing, requires a starting capacitor which is physically very large, requires more input power, and is more expensive than the Rotron fan.

We ordered and received a Pamotor fan and we are running a life test on it and two Rotron fans. The 3 fans are running in an oven set at 62°C. These will be run without oiling to see how long they will last under heat.

We ordered a catalog from Pamotor to see if they have another fan we could use that does not require the large starting capacitor.

Another problem we had recently is that the 901 mounting panels are being made with the -3 volt decoupling capacitor in backwards.

D. Adams (cont'd)

The model was found to be wrong also. I had the model fixed and the 901 panels in test and finished goods were returned to production to be fixed.

We received 40 banana jack patch cords (911) which were rejected by IBM in Yorktown Heights, N.Y. The only thing I could find wrong with them was about half of them were hard to plug into a socket or themselves. These units were sent back to Component Manufacturing, who make them for us, to see what could be done about this in the future.

K. Doering

During the past week, I have become acquainted with my new responsibilities.

First of all, I have worked out a basic organizational plan which is supposed to clarify procedures and record keeping and to cut time on unnecessary paper work. This will, to a large amount, mechanize paper work and allow some people to spend more of their time on their actual job.

Then there has been a number of bigger and smaller Q.C. problems brought to me. Not each one of them can get solved right away, simply because of lack of time. Each of them is being, or will be, worked on and people involved will get a straight answer.

Some things, naturally, require more time because we do not want to troubleshoot but rather prevent failures from happening again. This, however, requires a thorough study of the problem.

R. Winslow

These semi-conductors have been tested since the last report.

Semi-conductors	Manufacturer	Units Tested	% Rejection
FSP 24	Fairchild	20	40%
MA 89	Sprague	2287	1.2%
MA 90	"	3226	0.5%
MD 114	"	5399	0.3%

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R. Winslow (cont'd)

Semi-conductors	Manufacturer	Units Tested	% Rejection
MD 114	Philco	198	0.0%
2N 398A	R.C.A.	106	9.5%
2N 522A	General Instrument	250	0.4%
2N 674	Philco	2905	0.1%
2N 1065	General Instrument	5000	1.1%
2N 1184B	R.C.A.	300	9.7%
2N 1204	Philco	289	0.7%
2N 1305	Texas Instrument	5130	1.0%
2N 1494	Philco	100	5.0%
2N 1495	"	400	0.8%
2N 2099	Sprague	2111	2.7%
D-001	Clevite	99509	2.1%
D-001	Transitron	27900	2.6%
D-003	Clevite	1274	0.2%
D-662	"	3108	2.8%
D-664	Texas Instrument	1330	2.7%

J. Burley, DCO

Territory Situation

Year end buying of June and July and the follow-up work is about to come to a close. The majority of the shipments has been made. I expect now to have some time to better study my territory and seek out the type of customers we prefer.

Computer interest is at an all time high in this area, involving both PDP-1 and the PDP-4. I expect to invite Spike Naylor to come to Maynard after Sept. 17 to look at PDP-4 (he is with Army Strategic Communications Command.) Among those interested are:

Army Strategic Comm. Command
Burroughs, Paoli
Martin Co., Baltimore
Frankford Arsenal
Armed Forces Institute of Pathology
General Electric, Valley Forge

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J. Burley, DCO (cont'd)

An RFP came from the Joint Communications Agency, but since it required services which we do not offer and also appeared very ADX-ish we got the newly opened ITT office on the trail. I should think they have an excellent chance of getting the contract. I'll get better acquainted with this office once they're better settled and hope to work closely with them.

Still eliminating ourselves from consideration on many computer requirements by refusing to lease. However, since most of these instances involved renegotiable purchases, I wouldn't at the moment plead for leasing. (Doubt at the moment that the PDP-4 would really lend itself to this anyway unless it would be PDP-4A.)

Literature & Information

Anxiously awaiting the new A to D Brochure. It's understandable that a new document takes time, but I feel we should have kept a supply of the old brochures to overlap the old one. They are much in demand.

On the subject of publications, I would like to see a list of the items we have to sell, along with prices and delivery info if available. To prevent procrastination, I would suggest that this be a confidential list, one that we would not be committed to necessarily. Which testers are salable now, memory buffers, are the items on the PDP-1 price list the only features or options we offer? Lack of a price should not prevent the entry of an option or accessory on this confidential list.

There are many new people at Maynard whose job functions are unknown to me.....the same goes for some of the older employees. Suggest a list of contacts be drawn up by the sales dept. (Hi, Stan) listing people to be contacted on specific problems. It's time consuming to ask Dick Best to help me out on a driver problem when I should have gone to J. Hamilton directly. Jim Myers shouldn't have to channel a request for thumb tacks to Fern. Again, we needn't be committed to this list.....it needn't assign responsibilities but merely be a guide as to who does what at Maynard. We're large and still growing. Let's re-introduce ourselves.

Delivery

I would like to know our delivery situation. Any target date yet on having say $50k worth of modules in stock?

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J. Burley, DCO (cont'd)

Quality Control

A couple of quality control problems have come up. Have already reported on the connector problem, one discovered earlier in testing. APL has possible problem with G.E. transistors passing pulses. This has yet to be confirmed, so will hold until I get more substantial info. Bob Hughes deserves the support of every employee of DEC, and I hope he gets it. It takes but a few direct customer encounters to appreciate what QC can do for you.....or the lack of it. Here's a couple of examples: a competitor in the New England area was recently referenced on a NASA contract as not to be afforded consideration "because of past poor performance". Another competitor is being phased out at NASA principally because of poor reliability.

The nasty thing about reliability is that it shows up only after a company has supplied everyone with their mistakes. (It also takes a long time to clean up these problems.....and one's reputation.)

Plea

To the "harried and hurried 500"_____please answer correspondence from the field offices. We are not a walk or a phone call away like the ad says. If our problem is insoluble or you haven't time to devote to it, let us know. We'll try something else. I've started tagging my letters requiring action with a bright red flag. This isn't done to annoy, but to remind you that the writer is a long way away and is waiting for a reply. TWX and LD does not and will not solve all problems.

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J. Atwood

Six-Months Record of Biweekly Participation

R. Doane	12	R. Blackwood	2
R. Lassen	12	D. Dubay	2
A. Blumenthal	11	F. Kalwell	2
J. Fadiman	11	S. Lambert	2
L. Prentice	11	N. Mazzarese	2
K. Fitzgerald	10	E. Towle	2
D. Adams	9	H. Anderson	1
J. Cudmore	9	L. Butterworth	1
H. Crouse	8	R. Cajolet	1
D. Denniston	8	Barbara Charnock	1
G. Bell	7	L. Cleary	1
J. Burley, DCO	7	K. Doering	1
Judy Ebner	7	A. Falco	1
J. Atwood	6	G. Gerelds	1
Barbera Stephenson	5	J. Hamilton	1
S. Olsen	4	T. Johnson, WCO	1
R. Hughes	4	J. Koudela	1
R. Mills	4	J. MacKeen	1
M. Sandler	4	R. Mangsen	1
R. Beckman	3	S. Miller	1
Lora Dunn, DCO	3	J. Smith	1
W. Farr	3	R. Tringale	1
E. Harwood	3	R. Whipple	1
K. Larsen, WCO	3	R. Winslow	1
R. Savell	3		

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H. Crouse

Computer major component orders have been placed for the next three to six-month period to provide continuing supply.

Memory stacks were an area of concern. General Ceramics' first three stacks had high inductance levels; different wiring techniques will be used on the balance of twenty-five stacks. General Ceramics will be stocking five of these for immediate call.

Ampex appears to be back on the air again and is shipping on a somewhat regular schedule.

Generally, the picture for major components and semiconductors is good.

Acme Electric has proposed to make some of our Power Supplies. They will begin with the 728 supply. The major difference in having Acme Electric supply the units rather than our present outside sources is that Acme will provide all material and testing.

R. Blackwood

Ten operator control panels for the PDP-4 are being manufactured by the Metal Etching Corporation of Ozone Park, New York. These panels are being fabricated on somewhat of a trial basis, as they will be horizontally brushed, clear anodized, and have black etched lettering, as opposed to the normal baked blue enamel and white screening. These panels are due here the week of September 10th, and will provide an interesting comparison with our present panels.

Sheet Metal Fabrication, Machine Shop Work, Painting and Screening, and Front panel wiring vendors are providing us, in most cases, with excellent delivery and quality and no troubles are foreseen in respect to future orders.

N. Mazzarese

Acceptance tests for ADX-6 are scheduled for August 22. The system will be shipped to ITT World Headquarters at 320 Park Avenue in New York on August 24. ADX-7 will be shipped on September 14 to the same location. It will be duplexed with ADX-6 which should take from two to three weeks. This represents a change in our original plans, as both systems were previously scheduled to be

N. Mazzarese (cont'd)

duplexed at DEC, and delivered on October 15.

This duplexed installation is part of an ITT service center where customers will subscribe to computer time. The basic function of the ADX System will be to provide communication between the subscriber and the International Business Machine 7090 computer in Paramus, New Jersey. The first subscriber will be Eastern Airlines which will use the system to handle its reservations.

ADX-3 and -8 are tentatively scheduled to be shipped as a dual system on December 15. ADX-11 is also scheduled for delivery at this time.

Our thanks to Dave Pinkney for his help in checkout while the ADX crew was depleted due to vacations. Leo Gorrel is back from California, and has rejoined the group.

G. Bell

We've been discussing the PDP-4 for use as a general control computer for Foxboro Corporation. The limitations of the machine are that it does not multiply or divide rapidly. We, therefore, will propose some additional hardware, and it looks as if we can get the time down to an average of 60 microseconds for multiply. Two other methods can be used, one yielding about 350 microseconds, and the other 144 microseconds. The cost for a x, ÷ logic box would have to be $10K-$15K. Foxboro feels they need more than 8,192 words of memory. Hopefully, they'll never use it but will have to offer it. The scheme would work exactly like that for PDP-1.

We have proposed a drum system for Foxboro which allows simultaneous computation while transferring data. A block of data, consisting of 256 words around the drum, in serial, would be transferred with each command. The word transfer rate would be 19x3.22 microseconds.

We need to provide reliability data to Foxboro. The data on PDP-1's doesn't seem to be relative. A good exercise routine exists and we'll start running all available machines around the clock.

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R. Doane

VHF Modules	80%
10Mc flip-flop	8%
72 Current Calibrator	5%
Test Equipment Committee	7%

Four of the revised layout VHF flip-flops and one logic module have been shipped to Jim Burley, who will carry them over to the Johns Hopkins Applied Physics Lab. The flip-flops were thoroughly tested complementing at 30Mc, complementing at 50Mc, and being set and reset at 50Mc. Voltage margins were wide (typically +3 to +20 on +10A, +5.5 to +18 on +10B, and -8 to -17 supply limit on -15) at 30Mc, and nearly as good at 50Mc.

A new VHF burst generator with printed conductors for the resonant transmission line and set-reset delay lines allows these three modes to be selected by toggle switches that control electrical delay by operating reed relays to insert or omit extra sections. The use of the old burst generator would have required connecting or disconnecting long sections of cable to perform the same functions. The feasibility of production testing VHF modules efficiently was demonstrated, and I expect that the testing of the remaining seven flip-flops for the test system and of the production lot (for which parts have been ordered) will proceed expeditiously.

The first edition of a variable, multirange VHF clock is under construction. Being considerably simpler than the delay multivibrator, and having inherent neither of the two problems which have plagued it, the clock ought to come along fast.

Fred Shirley, one of our summer students, will continue to carry the new current calibrator along during my vacation, which begins August 20. He has built and tested an engineering model, and is now making a few improvements on it. The parts have been ordered for a new model and for the first "production" unit which must be shipped to G.E. for a system by September 10.

Emile Chevrier is continuing to work towards improvement of the 10Mc flip-flop.

DF633 DIGITAL EQUIPMENT CORPORATION · MAYNARD, MASSACHUSETTS

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J. Cudmore

Testing Development	50%
QC	25%
Others	25%

The following modules may now be tested semi-automatically - 4116, 4117, 4139, 4141. The d.c. tests on all buffered system module FF (except the 6208) may now be tested automatically.

The 1201 switching time tester works intermittently and the problem seems to be noise pickup in the programming cable. This cable is being replaced with one containing shielded wires and should eliminate the difficulty.

This past week Mr. Babineau of Western Electric Suppliers Inspection group was here to witness the testing of W.E.'s latest order. All went smoothly with Mr. Babineau finding no defects.

The second lot of 1538's (D.C. - coupled Sense Amp.) reached test and ran into a snag. This lot and the next two following it were built using a TI. SDA-1 transistor instead of the Fairchild FSP-2 that was used in the first lot. As a result of higher cutoff frequency and higher gain, these modules were found to oscillate. A quick fix has been tried and we will know the results soon. A layout change may be all that is required in the final solution.

A. Blumenthal

There are presently 4 PDP-1's undergoing checkout. Their status is as follows:

PDP-1C-26 (MIT)

The machine with all the options on the initial order is complete and has been accepted by MIT. A minor fault still exists in the display system which will be corrected by installation of a new type of intensifier as soon as they are available. The special IOT's to be used in conjunction with PEPR have been installed and tested. Installation of further options has begun, although the order has not yet been received. Multiply-divide has been put in and checked out using a set of modules from another machine. Installation of light pen is awaiting redesign of some of the

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A. Blumenthal (cont'd)

amplifier mounting hardware. The panels for Type 20 sequence break have not been received as yet. Within a week or two we expect to complete the work and tie the system together with PEPR on the fifth floor of Building 5. After about a month of test, it will be shipped to MIT.

PDP-1C-25 (Minneapolis-Honeywell)

The central processor is fully checked out including multiply-divide. The extra memory will be installed Monday, August 20; Mag. tape is due Tuesday, the 21st. The display will go in Monday, August 27. It looks as though the delivery date of September 1 (changed from October 1) can be met. Work on the special options, to be delivered after the computer, has not yet begun.

PDP-1C-24 (United Aircraft)

Central processor checkout has proceeded as far as possible without the tape reader. This includes memory. The reader has given intermittent fuse blowing troubles and is in Quality Control for repair. The special option design is ready to go to Drafting. The latest delivery date on the Packard-Bell A/D equipment is September 5 and has caused us to delay our delivery date for a couple of weeks.

PDP-1C-22 (Adams Associates)

The central processor is checked out up to memory which is due for installation on Tuesday, August 21. The design work on the options (4 typewriters, incremental plotter) is being done now. The old style typewriter tables will be used because they lend themselves more readily to the mounting of the necessary extra hardware. The plotter has been received but has not yet been tested.

R. Winslow

These semiconductors were tested since the last biweekly.

TYPE	MANUFACTURER	NO. TESTED	% REJECTS
MA 89	Sprague	1000	1.8%
MA 90	"	4000	0.73%

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R. Winslow (cont'd)

TYPE	MANUFACTURER	NO. TESTED	% REJECTS
MD114	Philco	10437	1.9%
MD114	Sprague	6538	0.46%
2N167	Gen. Electric	800	0.63%
2N744	Texas Instrument	37	0.0%
2N1204	Philco	561	13.2%
2N1308	Texas Instrument	400	1.5%
2N1310	Gen. Instrument	550	7.5%
2N1719	Texas Instrument	300	1.7%
D-003	Transitron	1039	78.8%
D-003-1	Clevite	8726	2.0%
D-007	Nat. Transistor	1579	8.2%
D662-1	Clevite	41816	4.5%
D-664	Cont. Device	15000	0.28%
IN748	Texas Instrument	402	5.0%
IN750	" "	100	16.0%
IN758A	" "	6	0.0%
IN1217	Westinghouse	791	35.3%

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D. Denniston, NYO

CUSTOMERS

U.S. Military Academy, West Point, New York
We are almost 100% sure of an order for classroom modules. They are overjoyed with the yellow symbology after seeing the old blue symbols at Ft. Monmouth. It looks like about two panels of modules. (They have a limited budget as opposed to Ft. Monmouth.)

Radio Receptor Company, Hicksville, L.I., New York
I made a second trip out to RR recently, at their request, and now I have even stronger convictions about these people than when I made some unpleasant comments about them in the June 22nd Biweekly. I have now talked with two different groups there and wonder if it is possible that everyone at RR is the same type of person.

Bell Telephone Laboratories, Inc., Murray Hill, New Jersey
I have recently visited with two new groups of people here. Of these two, one looks like a certain customer. While I was there, we stopped in to see some of the other groups using our equipment and they got a wonderful sales pitch from their own people. The other group is interested in a system to exercise entire storage systems they are developing. They would prefer to buy an entire system, but might be willing to build it from modules. They would like to obtain between a 2 mc and 5 mc cycle time.

Bell Telephone Laboratories, Inc., Holmdel, New Jersey
Unlike Radio Receptor, I always enjoy visiting at "the labs". The "Electronic Switching Section", recently relocated at Holmdel, is in full swing again. I will be visiting some of our better customers here on August 3rd.

Federal Aviation Agency, Atlantic City, New Jersey
I talked with Ray Ratzloff, the head of their computer section, during a recent trip to southern Jersey. They are interested in both modules, for black boxes, and computers for real time simulation, especially the PDP-4.

U.S. Coast Guard, Wildwood, New Jersey
While at F.A.A., I stopped in to see what the Coast Guard was doing with the modules they recently purchased. They are in the

D. Denniston, NYO (cont'd)

prototype equipment business, especially in the LORAN field. We should never expect any large orders from this location, but it looks like we are in for a number of small ones.

I might mention that we have recently received a number of orders from I.B.M. in Kingston, New York. They are nothing fantastic, but we are glad to see them coming through from this location.

Also, recently I had the opportunity to give a small talk on "Digital" techniques to the I.R.E. Student Chapter at R.C.A. Institutes. This talk made it possible for me to meet some of the instructors at the Institute.

POTENTIAL CUSTOMERS

Capehart Corporation, Richmond Hill, New York
I recently visited Capehart. They have a Marine Corps contract that will involve a considerable number of modules. It is presently between us and 3C, but I am afraid that he is swayed to 3C slightly due to the fact that they can supply him with logical design symbol stickers. He prefers their symbology. However, he did say he would be as open-minded as possible and would do a cost comparison for part of his system.

Data Control Systems, Inc., Danbury, Connecticut
I stopped in at DCS two weeks ago at the request of one of my friends there, although they are not officially in our area. They are just beginning to do more extensive work along the digital line.

We recently sent estimates to both Federal Scientific Corporation in New York City and Bulova R & D Labs in Woodside, New York.

L. Prentice

1000	98%
EN-1019 Advertising	2%

As may have been noted by readers of the Biweekly Report, I have asked all the other engineers in this department to contribute at

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L. Prentice (cont'd)

least once to the report. While I do not think it should be mandatory that people make a Biweekly Report every two weeks, however I think they should be encouraged to write reports of this nature and that they should be urged to write a Biweekly Report whenever they have a project which they think deserves this type of attention. While these last sample reports were rather involuntarily forced upon the people involved, I think they were very well done and show that these people are competent to write this type of report.

For the past several weeks my time has been largely consumed by working out the general plan for relocation in Building 5 and in some detail planning of various areas of relocation, such as Purchasing, Personnel, Inspection and the Cabinet Shop. Ken Fitz-Gerald has drawn up a plan for the Carpenter shop to be built on the top floor of Building 5. This past week nothing has been accomplished because the carpenters have been on vacation and our own carpenters and personnel have been busily engaged in the construction of a display building at the Orange Airport, Orange, Massachusetts. This display building should be completed by tomorrow, with the exception of landscaping and, perhaps, some painting. The last of the primary materials was delivered to the site today.

An Inter-Office memorandum will be issued shortly showing design responsibilities of the various engineers in this department. Drawings have been started and should be complete in a day or so for a new casting for a bus-type plug-in unit for PDP-4. Initial order on this casting is supposed to be for 100 units; pattern charge for this is estimated to be $50.00 and casting should be procured for approximately $5.00 to $7.00. Machine time should run around $2.00 to $3.00 per casting. I believe we have evolved a very inexpensive unit and one that is readily assembled.

N. Mazzarese

ADX-2 was installed and accepted by ITT on July 19th. This represents the second consecutive on time delivery to ITT. Thanks for this are especially due to Don Murphy and Jack Williams for the tremendous effort they made to meet the schedule.

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N. Mazzarese (cont'd)

ADX-6, 7 are presently in checkout and will be delivered as a dual system on October 15th.

ADX-3, 8 are being constructed and will be delivered as a dual system on December 15th.

Poor color match on ITT computers continues to be a problem. In the past month we have repainted 33 doors on computers presently installed, plus all the doors on ADX-2. This is extremely costly in both time and money. Raffi & Swanson have promised to be more consistent in their color output, and K. FitzGerald will be spraying sample chips with incoming paint and comparing them visually to a standard.

It is hoped that these measures will end the color problem.

ITT has two circuit design engineers redesigning the 1973 package. They feel the 1204 is breaking down due to excess Vcb.
John Ackley has personally requested that we redesign this card ourselves on several occasions. In fact, he stated we had promised to redesign it last year. As we have not met our obligation to ITT, they are attempting the redesign themselves. Frankly, I'm embarrassed with this situation and just hope somebody else gets embarrassed by reading this.

R. Doane

VHF Modules	90%
72 Current Calibrator	5%
Miscellaneous	5%

A VHF planning meeting on the morning of August 3, in addition to many suggestions, resulted in the following decisions:

1. At WESCON there will be no big splash, but literature will be available "under the table" in case of direct inquiries. A logic module and a flip-flop module will be shown on the same basis. I will not attend, but my name will appear on the literature to channel requests for more information.

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R. Doane (cont'd)

2. The splash will come after a production run of 20 of each type, and will include a technical paper and a working demonstration. The test system now half done will have been finished. The occasion for the splash was not decided.

Barbera Stephenson

Report on the Analog-Digital Conversion Meeting

A meeting was held on July 31 to discuss the status and future plans for our analog-to-digital conversion circuitry. The meeting included Harlan Anderson, Dick Best, John Grabowski, Ben Gurley, Bob Jankey, Ken Olsen, Stan Olsen, Barbera Stephenson, and Don White.

Ken Olsen opened the meeting by explaining how many of the systems which we are manufacturing include analog-digital conversion equipment. Most of this is presently being purchased from outside firms. Ken emphasized the importance of expanding our capabilities in this area so that we will be able to build this type of equipment ourselves rather than buying it.

We listed the different types of circuits which would be useful and/or necessary and discussed what we presently have available in these different categories.

1. Comparator--We presently have the type 1547 which is able to discriminate between two signals with a difference greater than 10 millivolts. Al Falco is presently working on a new version, the type 1572, which will be more stable with respect to temperature and time. This is also expected to switch faster and be more sensitive.

2. Operational Amplifier (Chopper)--We presently have the type 1706 which is designed for increasing the driving ability of a ladder network output. We will need an operational amplifier which will allow us to expand our range of input signals to include bi-polar signals. The other AD devices will operate on a unipolar range of 0 to -10 volts. For A to D we should have operational amplifiers which would convert input analog signals into this range; for D to A, to convert this range into the appropriate output range.

Barbera Stephenson (cont'd)

3. Sample and Hold--We presently have one circuit of this type which is in the works. Bob Savell is building a sample and hold to inhibit D to A output transients while the digital number is being switched. We will also need a sample and hold which can be used to reduce the aperture on analog-to-digital conversion.

4. Commutator--We do not presently have any switches which can be used for multiplexing signals into an analog-to-digital converter. This can be done to some extent by using a separate difference amplifier for each input. However, since the difference amplifier draws up to 1 microampere, this method is limited by the conversion accuracy which is desired.

5. Power Supplies (Reference)--We presently have only one unit, the type 1562, which has an accuracy of approximately 0.1% at constant temperature. Temperature drift is 2 mv/°C. Bob Hughes is presently working on the new model which will vary no more than 7 millivolts over a sixty degree centigrade range and has a ripple of less than 200 microvolts. Both these supplies are for -10 volts.

6. Digital to Analog Converter Ladder Networks--Five Ladders, using three different kinds of resistors, are presently available. We feel that it would be advisable sometime in the future to obsolete all of the binary ladders and replace them with metal film ladders with some new potentiometers which have better resolution. The two new modules would probably include one 14-bit ladder and a package with two 8-bit ladders.

7. Ladder Drivers--We presently have three single ended bridge packages available, the type 1677, 4677, and 4677A. The accuracy of these is quite well described in the present literature.

8. Ramp Generator--John Grabrowski is presently working on the ramp generator which has a linearity approximately 1 part in a thousand.

To extend the accuracy of our present systems we will need some equipment which is at least a factor of two (or more) better than that which we are working on. Ken suggested Julie and Fluke.

Barbera Stephenson (cont'd)

John Grabowski is checking on what these companies have available in terms of technical specifications, price and delivery.

AIMS

Our present systems have an accuracy of 10 bits ± ½ of the least significant bit. Our aims will be to increase this to an accuracy of 12 bits ± ½ of the least significant bit (this may also be taken as ± 1 part in 8000, or ±.0125%, or ±1.25 millivolts out of 10 volts.) We will aim for a 14 bit resolution (which means ± 1 part in 32,000, or ±.003125%, or ± 0.31 millivolts out of 10 volts).

DEFINITIONS

The phrase "N bit accuracy" or "N bit resolution" will imply the following:

1. If the number system is signed, the sign bit is included in the N bits.

2. It is assumed that the maximum full scale range of 0 ±10 volts is being used.

3. N bit accuracy means that the result is good to within ± ½ of the Nth bit (additional inaccuracy must be stated).

Don White will be in charge of circuit design for the new A-D modules and Barbera Stephenson will be in charge of applications for the new modules. Each will prepare a schedule in accordance with the aims above.

Judith Ebner

"Color Atlas" by Kornerup, A. and Wanscher, J. H.
A color memory in pocket form, it contains 1,266 color swatches systematically organized and identified for easy reference. Practically designed and easy to use, this atlas is meant to be a tool for everyone in all questions dealing with color.

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Judith Ebner (cont'd)

"Europe's Needs & Resources" by Dewhurst, J. Frederic; Coppock, John O.; P. Lamartine Yates and Associates

The "Europe" with which this Survey is concerned comprises eighteen countries: Finland, Sweden, Denmark, Norway, Iceland, Ireland, the United Kingdom, the Netherlands, Belgium, Luxembourg, the German Federal Republic (together with the Saar and West Berlin), Austria, Switzerland, France, Spain, Portugal, Italy and Greece. Eurppe's Needs and Resources represents an achievement in international scholarship. It was planned, carried out and published as a research project of the Twentieth Century Fund, under the direction of Dr. J. Frederic Dewhurst, former Executive Director and Economist of the Fund, with a staff of predominantly European Scholars and specialists from many countries.

"Exhibition Techniques - Traveling and Temporary" by Carmel, James H.

A number of exhibitions, both large and small, have been selected for this book to show the advantageous use of specific techniques; they are discussed in detail in the text and illustrated in more than 300 photographs, drawings and diagrams. The different phases of traveling and temporary exhibitions are explored--from the preliminary planning, through the actual production, to the final presentation. Attention is focused on the importance of reaching the intended audience, both in the planning stage and in the final presentation. Scheduling, contracts, insurance, and other necessary arrangements for the traveling exhibition are covered.

"Handbook of Patents" by Toulmin, Harry A.

The object of this book is to furnish the philosophy upon which the patent law is grounded and an understanding of the relationship of the patent law to manufacturing research and engineering: thereafter, each chapter is a guide to the steps that must be taken, from investigating the novelty of an idea through preparing a patent application, prosecuting it to an issued patent, and thereafter protecting it by litigation in the courts. Also, the international situation in regard to patents is discussed with chapters on foreign patents and the treaties and conventions dealing with patents to which the United States is a party.

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Judith Ebner (cont'd)

"Microminiaturization of Electronic Assemblies" edited by Horsey, Eleanor F.

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.

"Wave Generation and Shaping" by Strauss, Leonard

The objective of this text is to present a logical, unified approach to the analysis of those circuits where the nonlinearity of the tube or transistor is significant. A developmental treatment is followed throughout as it focuses on the essential features of practical wave-generating and shaping circuits. To this end, the text is arbitrarily divided into five sections: models and shaping, timing, switching, memory, and oscillations. It is, of course, impossible not to step across these bounds in discussing specific circuits and examples have been chosen so that the basic ideas will arise naturally from the discussion. In most cases, the analysis is sufficiently detailed so that the techniques may be applied to other existent, and not as yet existent, circuits. Transistors and vacuum tubes are used almost interchangeably to support the contention that the basic mode of operation is independent of the active element employed.

Library Notes

"The Bulletin" - monthly publication of the Better Business Bureau of Metropolitan Boston is now available in the library for reference.

R. Lassen

Interviews have been fairly heavy--results very disappointing, particularly with respect to hourly people. However, we have managed to locate a carpenter, machinist, sheet metal worker and three wiremen recently.

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R. Lassen (cont'd)

On the other hand, we have seen several excellent engineering and administrative people and hope to have some positive results soon.

The general contents of the new employee handbook have been edited and will be ready for printing as soon as the wording has been reviewed by the Personnel Committee with Jack Atwood. Jack has the layout and art work pretty well set up, and the new handbook promises to be more useful and more attractive.

We have prepared a proposed layout of a new Personnel Office in anticipation of a near future move to Bldg. 5. We have outgrown our present facilities and are badly in need of more working space. The new area will provide for better applicant waiting, and interviewing areas and will allow much more privacy. We will also have quieter and better equipped testing rooms and offices.

Telephone calls (internal and external) are becoming a major problem. We are taking steps to have much of our internal communications, particularly notices, handled on a standard form basis. We have reached the point in our growth where it is both impractical and inefficient to conduct our business solely by telephone.

R. Winslow

These semiconductors were tested since the last biweekly.

TYPE	MANUFACTURER	TESTED	% REJECTS
GA212	Texas Instrument	2000	1.7%
MA80	Philco	93	17.2%
MA90	Sprague	4000	8.0%
MD114	Philco	137	2.2%
MD114	Sprague	12578	8.8%
2N398A	Motorola	700	2.7%
2N398A	RCA	2000	0.85%
2N1204	Philco	185	0.5%
2N1304	Texas Instrument	1000	0.7%
2N1496	Philco	125	2.0%
2N2099	Sprague	285	0.0%
2N1600	Transitron	52	13.5%

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R. Winslow (cont'd)

TYPE	MANUFACTURER	TESTED	% REJECTS
D-001-1	Clevite	32134	1.86%
D-007-1	National Transistor	3274	3.67%
D-662-1	Clevite	19620	2.1%
D-662-1	Texas Instrument	1000	100.0%
D-664-1	" "	6904	0.17%
D-664-2	Continental Device Corp.	10000	3.8%
1N3209	Motorola	100	34.0%
Q6-100	International Diode Corp.	200	6.0%