Box 15
folder 22

1959

DEC biweekly reports, 1959-1966

Digital Equipment Corporation records
Executives' papers: Harlan Anderson papers
X2675.2004, *Box 15; 16* 102750017

1 of 8

THE COMPUTER HISTORY MUSEUM
1 027 5001 7

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER 2

DATE December 31, 1959

M. Sandler

Status of Finished Goods

	ON HAND	ON ORDER	AVAILABLE	IN PROCESS
Test Equipment	418	32	386	500
System Equipment	787	397	390	840
Blue Line (Test)	56	10	46	77
Blue Line (SPU)	34	64	-30	170

Blue Line (Test) Awaiting release: 3301, 3410
Blue Line (SPU) Awaiting release: 4209, 4301
Units to Stock during Month: 705

Inadequate delivery of 2N393 transistors continues to hamper us. During December on-time delivery was endangered. At the moment 32 production lots are on the shelf awaiting transistors. New promises of delivery have been good, but we must wait for the deed to match the word.

We have been pleased that Direct Labor per Unit has not increased during this slowed-down manufacturing period. The "spread-out" comes on assignments to Indirect Labor jobs. This indicates good morale and credit must go to Gloria Porrazzo, Jack Smith and George Geralds for setting business like examples for our production people.

L. Prentice

A three section cabinet rack for a memory tester has been modified, painted and is now ready for electronic assembly.

The silk screen frame mentioned in the last report has been completed and tested. Stock to make 10 more has been purchased.

Mr. Waino Honkala started work 12/29. He has had several years experience in sheet metal work and should be an able addition to our shop.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

E. Harwood

PDP-1

Since the last biweekly we have had one plug-in failure. This was one of the iniciters in a 1607 P.A.

We spent one week checking the wiring and getting all the wiring diagrams and block schematics up to date.

For the past two weeks the computer has been on most of the day.

John Conley has been using some of this time checking and converting programs, and I have been using the rest of the time checking margins on the memory and making plots of sense amplifier voltage versus drive voltage.

New Computer

I sent a complete set of wiring diagrams to production, and they have already started wiring the panels for the new computer.

B. Gurley

A special power supply has been built for the PDP memory drive currents. This supply has separate outputs for the inhibit drivers and for the Read-Write drivers. The latter output is current limited so that damage to the drivers is greatly lessened.

Automatic adjustment of the drive currents to compensate for temperature changes has been studied. It appears that this will be quite easy with this new supply. We shall see as soon as the thermistors ordered for the purpose come in.

I have spent considerable time in preliminary design of the magnetic tape system for PDP-1 and PDP-3. Our Ampex tape unit is suppose to be compatible with IBM units. Several points of discrepancy have shown up and Mr. Moore of the local Ampex office is checking into them.

R. Best

New Product Committee

The 1547 Difference Amplifier is an experimental unit for use in analog-to-digital conversion. It was used in the A-D converter that we demonstrated at EJCC.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

R. Best (Cont)

The 1678 Bus Driver is a unit designed for the Daystrom memory tester. It contains 3 power inverters able to drive a 180 ohm load to -3.5 volts, with provision for varying, with external power supplies, both the ground and the -3.5 volt levels.

The 1972 Read-Write Switch has a formula price of $200. It contains four 2 input AND gates and the switches that follow them.

The 1973 Memory Driver has a formula price of $118. Two of these are needed for a core memory; one for READ and one for WRITE. Both the 1972 and 1973 have formula prices only for our own cost estimating; it is not planned to sell these separately.

The 1310 Delay is priced at $91. This contains a series of delay lines with taps brought out so that any delay up to 1 microsecond can be had in steps of 0.05 microseconds.

The 1311 Delay ($78) is similar to the 1310 except that there are two tapped delays variable up to 0.2 microseconds in 0.05 microsecond steps.

The 1974 Sense Switch ($132 formula) has been designed for switching the sense amplifier input to the many different sense lines on a word address type of memory

The 1975 Read-Write Switch ($104 formula) will replace the 1971 Read-Write Switch in future memory testers. The only difference is that the input gates are 3 input instead of 2 input. The third input is necessary for word address memory testers, and adds a trival amount of cost where only 2 inputs are needed. The formula price for the 1971 is also $104.

The 4677 will sell for $75. It is important to not confuse the 4667 with the 4677. The 4677 is a single ended bridge for use in driving digital-to-analog converters such as the 1561. Its output is a saturated transistor to ground in one state and a saturated transistor to a negative reference voltage (such as -10V) in the other state.

The 1561 Digital-to-Analog Converter ($133 list price) contains a resistor ladder network with adjustments for aligning and with sufficient flexibility so that it can be a single converter of up to 12 digits in length or a pair of converter up to 6 digits in length. When the 6-digit convertion is used (as in memory tester display) and when the output is driving a high-impedance load and effective shift left can be performed by opening one lead (useful in quadrant expansion in memory testers).

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

R. Best (Cont.)

The 1562 Reference Supply ($140 list price) provides a very stable -10V source for use with the 1561 and the 4677 described above. Its ripple is less than 5 mv, and is a shunt regulating supply using -15 volts as the primary power.

The 1673 First Level Select ($134 formula) is used in memory testers only.

The 1906 Patch Cord SPU Mounting Panel will sell for $190. It is like a 1903 with patch-cord blocks added.

The 1675 Indicator Driver Remote ($58 list price) is the same as the 1669 except that it can only be driven by the indicator output terminal on flip-flops that are so equipped. It can be located any distance from the flip-flop; hence its name.

J. Fadiman

During the past three weeks work has been concentrated on the MT-1513 system for Daystrom. During that time the machine has been completely constructed and wired. Preliminary check-out has been completed, using the high-speed logic units instead of the low-speed units which were not yet available. All the logic appears to work properly and there were very few wiring errors to be corrected. Final check-out of the Memory Tester will take place next week with the low-speed units and the Bus drivers.

Some final engineering work was done on the following units which were released: Bus Driver 1678; Pulse Generator 4410; Pulse Amplifier 4603; Delay 4301. The construction of all these units in sufficient quantities for the Tester will be completed by Monday P.M.

J. Brown

Sales for DEC were encouraging. Most of the business was of a general building block nature, with everyone closing out yearly budgets. Next month, however, will be slightly different. I suspect sales to be more in the system units and to fulfull specific needs on which we have worked with customers.

We will have an opportunity to bid on a memory system for Remington Rand which may prove very advantageous. I plan trips to Washington next week, Florida the week after, and then New York area, and finally to Texas for the Instrument show and missionary work. Leads are welcomed.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER

S. Olsen

New Employees

12-7 George Colangelo Technician
12-12 Allan Swift Engineer Associate
12-29 Waino Honkalo Sheet Metal Worker

Job Offers Made

12-28 William Davison Maintenance Worker
Accepted offer- will start January 4.

Left Employ

12-18 John Bubnowicz Accepted job with Raytheon.

STL

The Space Technology Lab. bid went out Thursday, December 30. The bid was for five (5) Digital units with about a hundred system building blocks (500 kc) and about 400 diode logic circuits in each unit. From here on it is up to Ted to nurse it it on.

Production

We haven't ordered the eyelet machine yet to replace PC board lugs. At present United Shoe Machine Company is working on the problem.

J. Atwood

From Dec. 1 through 30, a total of 598 inquiries were logged in by Advertising. Of these, 398 were reader inquiries, and 200 were direct inquiries. The feature article on PDP in DATAMATION accounted for 274 of the reader inquiries; the building block ad in CONTROL ENGINEERING, 31; the core tester ad in ELECTRONICS, 21; and the 3000 Series news release in ELECTRONIC DESIGN, 19. EJCC reply cards accounted for 124 of the direct inquiries, and the mailing to the CONTROL ENGINEERING list brought in 17.

Since only a portion of our direct inquiries are forwarded to advertising for logging, it is not possible for us to make a definitive evaluation of the response to various products or the performance of various advertising and publicity media.

COMPANY CONFIDENTIAL

J. Atwood (Cont.)

However, the figures we do have show widespread interest in both our building blocks and our special systems. They also show that the three types of trade publications we are using -- computer books, control systems books and electronic books -- are getting our massage through to potential customers.

The next mailing, due to go out within a week, will include the 3000 Series catalog, a newsletter featuring a suggested selection of 3000 Series units and accessory equipment, and a reply card. Addressees in the Southwest will also receive a complimentary registration to the I.S.A. Instrument-Automation Conference in Houston, at which we will be exhibiting.

Our next space ad will start appearing in January issues. It introduces our two new lines of low-speed, low-cost building blocks. With a little luck, it may help us sell some of these units. Also in the works is a full-page ad for the 1960-61 ELECTRONIC ENGINEERS MASTER. This publication has very quickly bocome one of the most, if not the most, influential of the electronic directories.

Current news releases concern the 3000 Series catalog and the Type 4209 Dual Flip-Flop. The latter should help drive home the idea that the low-speed building blocks offer a lot for the dollar. Additional publicity is in the making on PDP, although we are hard pressed at the moment to keep up with the inquiries produced by the EJCC exhibit, the DATAMATION article and Ben's sterling TV performance. The DATAMATION inquiries are being handled with a special form letter and reply card intended to further qualify the prospects before we spend too much time following up.

Some of the miscellaneous items completed during the month: a new replacement parts list, several new schematics, illustrations for the STL proposal, a new masthead for the employee publication, help wanted ads, sales department customer record sheets, and a technical information request card to be sent out with all shipments as a means of learning who the end users are.

In various stages of active preparation are: product bulletins on the 202, 1202, 667, 1667, 1906, and our complete line of System Building Block mounting panels; the 4000 Series catalog; a "brochure" on the 1500 Series Memory Testers; and applications table on the 3000 Series units; and a reply card intended to clean our mailing list. Also in the works: modifications of the booth designs worked up for NEREM and EJCC in light of the late word from I.R.E. that we will only be allowed a single booth

COMPANY CONFIDENTIAL

J. Atwood (Cont.)

again this year. In our spare time, we have been getting the "Proceedings" of the 1959 EJCC ready for publication. The best that can be said for this is that it is an interesting job. Any stories about our submitting a bid to handle the 1960 WJCC "Proceedings" are, however, strictly inaccurate.

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER 2

DATE December 11, 1959

M. Sandler

Status of Finished Goods

	ON HAND	ON ORDER	AVAILABLE	IN*PROCESS
Test Equipment	499	43	456	390
System Equipment	875	230	645	815
Blue Line (Test)	56		56	57
Blue Line (SPU)		8	-8	10

Blue Line (Test) awaiting release: 3301, 3401, and 3410
Blue Line (SPU) awaiting release: 4209, 4401, 4410, 4603
System Equipment awaiting release: 1403

E. Harwood

PDP-1

At my last biweekly we just got the computer going and we're checking it out.

Since that time we installed and checked out the Flexo and its control, the display and its control, and we also finished all the cabling to the console.

Since the show we have been trying to get all the computer drawings corrected and up to date. We also have been running the computer and doing minor modifications. One of these was to move the display transformer panel under the table and away from the display tube to eliminate the 60-cycle ripple on the display. We also built and installed a new -10 volt memory power supply to replace the Harrison Labs. supply we had been using.

On Thursday December 10, we heard an arc in the display area and the result of this was seven plug-in's had to be replaced because of shorted transistors.

At the present time we are running test programs and terminating all the External Equipment pulse lines we had not gotten to before the show.

J. Fadiman

MT-1512

On November 17, 18, and 19 the completed Memory Tester for Telemeter Magnetics, MT-1512, was exhibited at the NEREM Show

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

J. Fadiman (Con't)

In Boston. It was then sent out by airplane to Los Angeles, California, where I installed it at Telemeter Magnetics. The power supplies, which had been sent separately, were put in, and the machine was immediately operable with no difficulties. The following few days were spent training people at TMI in the use of the machine. TMI was very pleased with the machine, their only comments being:

1) There should be a variable width strobe pulse;
2) There should be an easy means of calibrating the sense amplifier so that one could tell exactly when all the core outputs are greater than a given voltage.

There is a possibility of selling a second Memory Tester to TMI.

Sales

I spent one day in San Diego visiting the Navy Electronics Laboratory. We lost the contract for the Low Speed Buffer Control Unit to NAVCOR because they underbid us by about $7000. Some time was spent discussing out equipment with several engineers at NEL. They are interested in our Low-speed line.

MT-1513

On November 13, we received the contract for the Daystrom Memory Tester, MT-1513, and work began on it that day. This is a 33 digit memory exerciser and is entirely different from our previous memory testers. The promised delivery date is December 28. The system involves about 100 plug-in units. We are using a mixture of low-speed and high-speed systemsplug-in units.

The rack and all front panels have been painted and delivered. The design of the machine is complete, and all block schematics have been completed. Wiring diagrams have been completed for three of the five chassis, and the diagrams for the other two will be completed today. The wiring of two chassis has already been finished. All plug-in units and power supplies have been ordered.

S. Olsen

New Employees

11-23 Robert Sanders - Technician
11-30 Jane Veo - Executive Secretary
11-30 Robert Borella - Draftsman
11-30 John Bubnowicz - Sheet Metal
12-7 George Colangelo - Technician

Left Employ

11-27 Dick Kruauchune - Entered Service

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER

B. Hughes

The blue line is now completed. There are now 21 plug-in units in the 3000 and 4000 series. Replacement schematics are underway.

The third draft of the 4000 series literature is now being studied.

The 403 and 1403 clocks are being modified to prevent burn out of the output stage. Dissipation wasn't claculated in the initial design.

L. Prentice

The hardware for PDP-1 was fabricated and painted in time for E.J.C.C. Not every detail on some items would be made in this manner as a final design.

The racks for Daystrom memory exerciser have been assembled and painted.

A writing surface (Desk top) has been designed and is now being fabricated for the new memory tester 1512-B. Modification of metal racks for this tester are complete and they are now being painted.

A metal silk screen frame, first of several, is being made.

K. Olsen

The Flexowriter fell flat on its face during the EJCC, and we cannot tolerate it from now on. For a tape reader, we are considering the Digitronics photoelectric tape reader with thyratron drive which costs about $1,800 and looks quite neat. The other contender is the Ferranti photoelectric tape reader. We are also considering making a simple-minded tape reader of our own which we simply drive the tape without a clutch so that you read simple tapes with extreme speed and don't try to stop between lines. If you have to stop, you must be sure there is a long enough gap between information.

For a typewriter, we have tentatively decided on Soroban. Another possibility is the AutoTypist made by American Typewriter Company, in Chicago, which is the standard electric typewriter with a very simple-minded, but rather large, mechanism.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

K. Olsen (Con't)

If we have a separate keyboard, we can use any electric typewriter that has electronic drive, such as the IMB output writer. Soroban makes a separate keyboard but it's such a simple job we might consider doing it ourselves. One keyboard which we thought about is a set of iron bars, one for each key that closes a magnetic circuit for each of the appropriate code groups. This mechanism would have the advantage in not having electrical contacts.

We talked to the man from IBM about card readers and card punchers but, in general, were quite discouraged because most of their mechanisms have so much more equipment than we really need; but we requested operator manuals and maintenance manuals on each of the possible contenders. The nicest unit is the 026 or 526 key punch which have reading stations and punching stations on them and very nice card handlers, but these mechines are very slow and can only read or punch about 15 cards per minute.

CONSOLE FOR PDP-1

We were surprised to find out how much equipment was necessary in the console and so we are redesigning the table. The trend in design of modern tables now is to have the legs extend all the way to the corners. This will make it powerful for us to fit more equipment in. The back side will contain space for eight 19" x 5¼" power supply type panels or system mounting panels and four 3½" panels. This will allow us to put filtering, contactors, typewriter control panels, and high voltage power supplies and anything else we need back there and still keep the top of the console quite free.

S. Olsen

Production

We are still working on the problem of replacing the P.C. board lugs with eyelets. At present it looks like Stimpsom has the most to offer with an $850 power machine and a $90/100,000 eyelet.

Building

We will be installing a new PA System. It is expected to have four inputs, music, paging mike, chime, and front door signal.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER

J. Atwood

During November 446 inquiries were received -- 291 through trade publications and 155 direct to the company. Our building block ad produced 68 inquiries from Datamation, 66 from Electronic Design, 12 from ISA Journal, and 7 from The Reflector. Other heavy-pulling items were an item on current drivers in Datamation, one on the System Building Block catalog in Instrument & Apparatus News, one on the material in our July mailing in Military Systems Design, and the feature article on breadboarding in Electronics. The NEREM show accounted for 62 of the direct inquiries. Our September mailing and our mailing to IRE representatives in colleges and universities pulled 19 and 13 additional inquiries respectively.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER 02

DATE November 13, 1959

L. Prentice

The display chassis design is complete except for the circuit section. Design is such that it may be produced in two versions: console mounted or rack mounted. The console version is being built in the shop and if no flaws develop, the rack mounted version will be built soon.

A termination panel for PDP-1 racks has been laid out and is now in the shop for fabrication.

A new machinist, Mr. Valton Green, has joined our organization and some of the improvements we have been dreaming of may become realities. The first of these is better fitting back panels for H.S.B.B.'s. The tooling for this has been completed.

Mr. Green has completely refitted our cut-off saw. This should eliminate a costly operation in the fabrication of cases for test equipment. He is presently working on automatic stop for the power punch press.

M. Sandler

Status of Finished Goods

	ON HAND	ON ORDER	AVAILABLE	IN-PROCESS
Test Equipment	559	55	504	460
System Equipment	824	79	745	605
Blue Line	-	-	-	53

Blue Line: 3101 Inverter and 3110 Diodes in Test; 3201 initial lot in Assembly; 3601 initial lot in Assembly; final release on all other units still forthcoming.

PDP-1: 1310 and 1311 Delay Lines in Assembly; additional 1105 Inverter units in Test.

New Memory Tester: 1971 Read-Write Switches in Assembly; Mounting Panels in Assembly; 1673 First Level Select units in final Assembly.

E. Harwood

PDP-1

The computer check out proceeded very well. We were able to run the computer, with a stored program, four days after the power was turned on. Since that time we have been making minor

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

E. Harwood Cont.

modifications such as changing clear accumulator from bit 5 to bit 10 and adding skip on In-Out bit Zero.

At the present time we are in the process of terminating all the pulses in the machine to make them meet our specifications for minimum & maximum amplitudes and width.

J. Brown

Sales outlook is brighter than it has been since the summer. Equipment is on loan to two locations, and there are several people actively interested. The lack of large ticket orders is still discouraging, but we are beginning to get a reasonable number of small accounts. My immediate plans are NEREM & local calls this week, Philadelphia next week, and EJCC the following week.

J. Atwood

The 3000 Series catalog is scheduled for delivery on Monday. A news release on the new line has already gone out, and multilithed product bulletins on the individual units have been completed. Other promotional materials in the works: a product bulletin on suggested assortments of Blue Line units and accessory equipment, an application note on the units required for various logical operations, a newsletter, and a special mailing reply card.

A news release on the 1512 Memory Tester has also gone out, and operating instructions for the new machine have been prepared.

The PDP brochure has been started. This folder, a newspaper feature story on PDP and DEC, and trade paper release must all be ready in time for the EJCC.

During October, 343 requests for information were processed. Reader inquiries accounted for 147 of this total. The other 196 requests were from prospects who had already received some DEC literature. An editorial mention on the binary coded decimal counter application in ELECTROMECHANICAL DESIGN produced nearly half the reader inquiry requests. Other good "producers" were an item on the Dual Flip-Flop in ELECTRONICS, our "Building Block Concept" ad in CONTROL ENGINEERING, and the feature article on breadboarding in the same magazine.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

J. Atwood Con't

The September mailing and the ISA Show each produced about a quarter of the direct inquiries. Eighteen inquiries came from people who attended the Magnetics Conference, and twelve of those who received the July mailing finally sent in reply cards.

B. Hughes

Blue Line

All designs completed except: 4607 Pulse Amplifier, 4111 Diode, 3401 Pulse Generator, and 4410 Pulse Generator.

S. Olsen

New Employee

Valton E. Greene 11/2/59 (Machinist)

Left Employment

11-6 Wilfred Jackson
11-6 Barbara Bowse
10-23 Anita Millett

J. Fadiman

During the past two weeks some finishing work has been done on MT-1512. Checkout has been completed with a 64X64 Memory stack from Telemeter Magnetics, Inc. The addition of 8 additional diodes to isolate capacitance in the switches has resulted in an improvement in rise time through the stack form 0.6 usec. to 0.3 usec. The addition of a decoupling unit to the -15 volts used in the Digital-to-Analogue.

Decoders has removed the 120 cycle ripple from the display. The Instruction Manual and book of MT-1512 drawings have been completed.

Another Memory Tester is now under construction. The panels are about to be wired up, and some of the units have already been made.

During the past week we have had visitors to see the Memory Tester from Ferroxcube and Philco. The tester will be shown at the NEREM show next week, and AMP and IBM will see it there.

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER

DATE November 13, 1959

J. Fadiman Con't

The bid to the U.S. Navy Electronics Lab. in San Diego for a low speed control unit is going in today.

We definitely have the job for Daystrom Instruments, Inc. for a Memory Exerciser, known as MT-1513. Work will start on this today.

B. Gurley

The status of the central portions of PDP-1 is well covered by Ed H. In the past week I've had many phone conversations with Dick Bennett. He is doing some programming of PDP-1. In general he very much likes the order code of the computer although he had some well thought out criticism which he recorded in a letter to Harlan.

The Flexo should be on the machine next week. I've had a conversation with Cardarella of Flexo and he is talking of an interesting offer. If I specify the Flexo we want, and we order about 12 machines, they will make up the 12 to the point they become non-standard and stock them at the factory. Upon request for delivery for 1 or 2, they will finish the required machines within less than 60 days. At any time we could cancel the remaining portion of the order.

S. Olsen

Sales Trip to Chicago and Ft. Wayne weren't terribly successful. Western Electric should be ready to buy Test Equipment December 1 to January 1. ITT in Ft. Wayne, have already committed themselves to Epsco, but they have fallen in love with our equipment. There is still some chance of conversion.

Building The new computer room is under way and should be done soon.

Production A new eyelet machine and eyelets have been ordered from Stimpson. They will replace the solder lugs on the P.C. boards.

COMPANY CONFIDENTIAL

AVERAGE RESPONSE COMPUTER

Dr. Weinstein is very enthusiastic about the use of ARC's in medicine. If he can foresee one in every hospital, if they are technically well developed and not prohibitively expensive. I've been working on one and I think we should be able to sell it for 25-$30,000, which is just the price of a good x-ray machine.

I think an ARC should simply add, and not average. Each signal added would be less than an observable amplitude. After many of them are added the signal will stand out.

Because averaging is part of the process, I think any great precision is needed either to measure it. In fact, I think that one part in 64 or one part in 32 would be good enough. So I would propose that 6 digits for amplitude be used, and 9 digits for summation or total of 15 bits. 256 points per sample is apparently desirable, so the memory would have to be 256 by 15.

There are infinite ways which we could make the memory, and we should take a quick look at storage tubes, coarse shift registers, diode capacitor memories, and farro-electric, but core storage seems so straight forward. I would propose a linear selection memory with several turns of digital winding to make the digit drive low and the sense amplitude high, though at a single turn on the word selection line. Then I would drive the word line with a transformer, which in time, would be driven from a simple diode matrix. We would drive hard for the right and let the ring of the transformer produce the right current. This memory cycle can afford to be slow, in fact, we would like to make an addition between the time information is read out and the time it is written back in again.

The Analog Digital Converter, because it only needs 6 bits of precision, can be simply a Digital-to-Analog Converter with a comparison circuit and a counter connected to a free running clock arranged so that the countable count up and down and follow the analog voltage. After previous sum is read from the memory, the contents of the converter are added to it, and replaced into the memory.

We would use our 17" TV display, but we have to study the timing, to be sure that we don't run into trouble there. In fact, the whole device needs careful study of timing, because of the wide ranges that people want in Delta T and in intervals between triggers.

A drum is not satisfactory for this device, because a device should be asynchronous in order to be run from asynchronous devices as such as hammers.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

COMPARISON CIRCUIT

We are laying out a comparison circuit on an etched board to be used in the analog-to-digital converter for our PDP-1 demonstration. This converter consists simply of 2 DC coupled difference amplifiers followed by a pair of standard inverters.

The adc we planned to put on the computer will consist of a 6 flip-flop up-down counters, a standard dac plug-in unit, and 1 standard clock. The comparison circuit will compare the output of the dac with the input signal and gate the pulses from the clock to the counter. If the dac is too small the counter will count up, if the dac is high the counter will count down. I figure that for a 5 kilocycle band-pass this adc will have to count at about a 2 megacycle rate. We may have to synchronize the computer sampling with the clock that we do not read from the adc during a count period.

Grass Instrument Company in Quincy has a very high gain amplifier that MIT is using for their electroencephalographic work. It has an input impedance of about 2 megohms and a gain of 20,000. This unit uses batteries and costs about $150.00. It appears that if we buy one of these we can demonstrate actual electroencephalographic work on people's heads.

We sent a proposal to Sydney Weinstein that he buy PDP-1 with an adc like the one described so that he can start doing electroencephalographic work immediately. I have no idea what he should do for a magnetic tape unit because the Ampex units are very big, heavy and expensive and are not practical to take to other hospitals to make recordings on patients.

A friend showed me a very quick and inexpensive way to get from La Guardia Airfield to downtown Manhatten by public transportation. A bus leaves the front of the Airline Administration Office regularly, more regularly than the airline buses, and stops at Broadway and 74th street in the Queens. The elavated train there will bring you into Grand Central in 15 or 20 minutes. This line also continues on to Time Square. While I was leaving New York I asked a subway man in Grand Central how to get to the airport and he gave me the same instructions as if everyone knew about them, except those of us in the country.

There are several other variations of this which might be worth trying out. If one's in a hurry, he could take a express train from Grand Central and get off at either Woodside or Junction Boulevard and take a cab to the airport. There are two other lines that go over to the Queens in this area that might be more convenient depending on where one happens to be. I think the bus number is 33. It's important to be sure because there are two terminals in La Guardia one at the seaplane Base and one for the Airlines Officers.

COMPANY CONFIDENTIAL

R. Best

New Product Committee

The prices have been established on the 3000 Series "blue line". The brochure describing this series will be off the press on Monday.

3101 Inverter $47 (equivalent to 101)
3110 Diode nor $43 (equivalent to 110)
3201 Flip-Flop $63 (equivalent to 201)
3301 Delay $74 (equivalent to 302 except that there will be 5 scales, with delay from 2.5 to 200,000 microseconds)
3401 Clock $67 (equivalent to 402 except that there will be 5 scales, with frequency variable from 500 kc to 5 cycles.
3410 Pulse Generator $57 (equivalent to 410)
3601 Pulse Amplifier $43 (equivalent to 601)

Prices have also been established in the 4000 Series (a system plug-in unit version of the 3000 Test Equipment Series). Some of the inverter numbers have been changed since the previous bi-weekly.

4105 Inverter $44 (equivalent to 1105; 5 inverters and 3 load resistors)
4106 Inverter $49 (equivalent to 1103; 6 inverters with load resistors connected with jumpers on the card)
4110 Diode Nor $43 (equivalent to 1110)
4111 Diode Por $43 (equivalent to 1111)
4201 Flip-Flop $69 (equivalent to 1201)
4209 Flip-Flop $79 (equivalent to 1209, except that complement inputs have been added to pins J and U in place of the indicator light drivers. There is no P pulse out. Inside the package, complementing is done by differentiating the positive-going input.
4301 Delay $80 (equivalent to 1304 except for 5 scales from 2.5 to 200,000 microseconds. The extra scales have been brought out on pins that are unused in the 1304)
4401 Clock $72 (equivalent to 1402 except 5 scales from 500 kc to 500 cycles. The extra scales has been brought out on a pin that is blank in the 1402)
4410 Pulse Gene ator $59 (equivalent to 1410)
4603 Pulse Amplifier $89 (equivalent to 1607; that is, 3 pulse amplifiers and 3 inverters)
4667 Level Amplifier $70 (equivalent to the 1667; six inverter amplifiers with variable clamp voltage)

R. Best Con't

Two more units in the 1000 Series have been priced:

1607 Pulse Amplifier $130 (3 pulse amplifiers and 3 inverters in one package)
1105 Inverter $98 (5 inverters and 3 load resistors in one package)
70 Current Calibrator $400 (measures precisely currents up to 1 amp)

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER 2

DATE October 2, 1959

B. HUGHES

The first lot of 202 Flip Flops tested out Ok. The usual "first lot" lot troubles were present. The only component which gave trouble was the 2N588-W inverter. They gave trouble because we are exceeding the emitter to base voltage rating (0.5 volts). Future lots will have tested 2N588Y's in the two inverter sockets (IEBO ≥ 100 Micro amps.)

The 10 Megacycle crystal clocks Model 403 worked out ok. and it is planned to have the 403 cover the frequency range 4 to 10 Megacycles. The only differences in the different units will be a transformer capacitor combination (tunable tank.)

The 1607 Pulse Amplifier breadboard tested well. This P.A. should be an aid to system design, since three gateable P.A.'s will be in one package.

The 1209 has been modified to use 4-2N588-W transistors.

The 302 delay was modified to eliminate a short between the mountive bracket and the cord.

Delay lines 1310 and 1311 have been designed and will be layed out as soon as the delays arrive from the vendor.

E. HARWOOD

MEMORY

The Memory System was run with the aid of a temporary control and same haywiring. We test ran it for about a week and then disassambled it to mount it in the PDP-1 frame.

PDP-1

We have the PDP-1 frame and have mounted about 10 panels in it. At the present time we are rewiring the Memory and we are doing the same for the Register transfer wiring.

I have completed the block schematic for the AC control and we will start wiring it as soon as possible.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER

DATE October 2, 1959

S. OLSEN

Production

In the past three weeks our etched board rejects have jumped to about 11%. Rejects on 6000 588's are about 21%. A lower grade of silk screening has been evident the last few weeks. The lot troubles seem to be running normal.

The first lot of etched circuit Model 50's are through production, 2nd. dilivery finally made. Thank Heaven!! The 60's are following close by.

We are studing the possibilities of building, and making a proposal for the IBM Dynanic Q-Pac Drawer tester.

Personel

Helen is busy working on the production of a "House Organ". Everyone's help and Co-operation is needed.

We are planning to work October 12 and in its place have the Friday after Thanksgiving off.

L. PRENTICE

New drill jigs for the front and rear terminal boards of Building Blocks have been delivered to production, there are approximately 1400 drilling operations monthly.

One of our greatest needs is multiple punches for tube rockets, receptacle,etc. They will be made up as soon as help is available. A die staff has been ordered. This will cut in half the time now required to punch vent rolls in chassis.

New Rocks for PDP#1 have been modified, painted and delivered to assembly. The terminal panel for PDP#1 has been placed on order.

M. SANDLER

Status of Finished Products

	ON HAND	ON ORDER	AVAILABLE	IN-PROCESS
Test Equipment	527		527	640
System Equipment	704	17	687	820

Units complete to Stock, September: 755

Inadequate deliver of 2N393 continues to be a problem. The outlook for improved delivery, however, is brighter. The stock of transistors and the stock status has led us to utilize our labor hour to capacity to produce etched boards and from panels in anticipation of future demand.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER

M. Sandler Cont.

It is planned that we will complete the Memory Tester for Telemeter Magnetics in October. To this end, all procurement is being heavily expedited and the Shop and Production groups are working to deliver all units and parts within two weeks.

S. OLSEN

New Employees

Frederick H. Gould	Std.	September 14	Technician Trainee
Nancy M. Byers	Std.	September 25	Office Worker
Lewis M. Yeager	Std.	October 1	Advertising Department

Employees Left

Charles Gordon	September 15
Donald Larson	September 25
Sandra Gregaire	October 2

J. BROWN

Trips since my last Biweekly have been numerous but sales slight. On the average I have found potentials interested in our line (specially test equipment) in a general sense, but with no particular present need. Such door knocking will undoubtedly prove advantageous in the long run, but produce little immediately. Dick Best is presently reviewing the desirability for taking on a sub-contract (30-50 K) for an IBM Sage Building Block tester and trainer. Main advantages of the job are loose specs and flexible delivery.

The Washington Magnetics show was a failure. Total attendance is estimated at approximately 400, people. Of this 400, 80% were theory inclined with little interest in hardware. Of the remaining 20%, only a few were actually in the computing field. Net results were that only 15 men were interested enought in DEC to fill out reply cards. Our Current drivers stimulated what little interest there was.

Trips to North Carolina, and New York are planned for the near future. Although there are a couple of irons in the fire for these trips, the trips are primarily of the door knocking type. Any contacts from other departments here at DEC would be welcomed.

digital equipment corporation
MAYNARD, MASSACHUSETTS

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

R. BEST

NEW PRODUCT COMMITTEE

New Circuits Under Development

1675 Remote Indicator Driver: will be like the 1669 Indicator Driver except that it will be driven from the indicator output terminals of a 1201 or 1209 flip flop. Both units will use the same etched board; the input base resistors used in the 1669 will be replaced with wire jumpers in the 1675. This will be a stock item.

1111 Diode: is like an 1110 Diode with the diodes turned around, and uses the same pin connections as the 1110. This will be a stock item.

111 Diode: Is the test equipment equivalent of the 1111 Diode. It will be made all ready for production, but will not be produced, If a customer wants this "110 with the diodes turned around" so bad that it becomes a significant factor in a sale, we will make them.

1310 Delay Line: This will contain two tapped delay lines that will each allow delays up to 0.2 microseconds in steps of 0.05 microseconds. Each line has a pulse gate output suitable for driving a 1606 or 1607.

RECENT ENGINEERING CHANGES:

749 Power Supply: An embarassing error has been discovered. A filter choke and extra filter capacitor were thought to have been put in the 135 volt supply that supplies the output current of the 50 and 60 current drivers. After shipping out the first 20 of these units we found that the extra filtering was in the wrong supply. Correction of the error greatly improves the P.R.F. response of the current driver and reduces the 120 cycle ripple on the output current at high average output currents.

K. OLSEN

We have tentatively decided to use a 17 inch 90° deflection television tube for the display. We will use a standard television yoke for the vacuum tube circuit. The Victoreen Corona Regulator Tube works very well and we will build a simple R.F. high voltage power supply regulated with this tube.

If this television tube with yoke doesn't work out well, we will be forced to use a conventional cathode ray tube with a Syntrox yoke and a deflection of only 70°. The main reason we haven't used that tube to start with is that it is significantly longer and makes the console an awkward size.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

J. FADIMAN

Memory Testers

Our third Memory Tester is now under construction, this one for Telemeter Magnetics, Inc., in Los Angeles, Califronia. The MT-1512 will be similar to the MT-1511; the only change being that it will have the ability to select any one line and count along it, or any one Y line and count along it.

So far the block schematic and wiring schematics have all been brought up to date, and all eight 1903 mounting panels are not in the process of being wired. All outside parts have been ordered and expedited for quickest possible delivery. The Switch Panel has been altered and the new one had already been punched and painted. Almost all the other front panels have been punched out and painted. They will be silk-screened on Monday. Our time schedule calls for the completion of the actual construction of the machine by October 31st, and delivery of the completed machine, all tested by November 25.

ITT Contract

The bid for the two Memory Exercisers for ITT was sent in on Sept. 28. We have promised delivery on December 15, provided that we hear from them by October 1st. So far we have not received any answer from ITT.

Sales

I spent two days at the Washington Conference on magnetics. There was not a great deal gained from this. We may sell some Current Drivers and Decoders to Bell Labs. at Whippany. They were interested in our Read-Write Switch 1971. However, since the switch has to work at a 5 usec. timing cycle, they could not use our switches.

A demonstration of our equipment was given at Westinghouse Air Arm in Baltimore which was quite well attended. I also visited NSA at the same time.

J. ATWOOD

The current mailing, now going out, includes a new "Digital Developments," Product Bulletins on the Level Standardizer 501 and Binary to Octal Decoders Types 1150 and 1151, and Application Notes on the Core Tester and on Logical Operations with DEC Building Blocks. The reply card is designed to pinpoint the respondents' specific function in the computer industry and to produce new prospect names for our mailing list.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

J. ATWOOD Cont.

Said mailing list has now reached 4849 names in 44 states, 5 Canadian provinces, and 10 foreign countries. California, with 1086 names, and New York, with 1028, are well ahead of the pack. Other high-rankers are Massachusetts, New Jersey, Pennsylvania, Illinois, Maryland, Ohio, Texas, District of Columbia, Florida, and New Mexico.

The last mailing and mention of our Decimal Counter Application Note in ELECTROMECHANICAL DESIGN are producing the most inquiries at the moment. Other worthwhile publicity has appeared recently in ELECTRONIC DESIGN, I.S.A. JOURNAL AND CONTROL ENGINEERING, the latter being a particularly favorable report on our Test Equipment line in an article on breadboarding control systems.

The girls have finished the combined job if putting the mailing list in order and compiling a geographical list of organizations from which we have received inquiries. The latter will, we hope, be helpful to the Sales Department in planning sales trips and evaluating the potential of some of the outfits with which we are not too familiar.

B. GURLEY

The frame for PDP-1 is now on the floor. All of the main registers are assembled and in the frame. The wiring between registers is started. The frame and the wiring both look very handsome. Most of the control has now been worked out. The control is going to take quite a bit of space. The command pulse gating for the in-out register, the memory buffer, the program counter, and the memory address register are all quite simple. Each takes five or six plug-in units. The control for the accumulator, however, takes about 25 plug-in units. The timing chain takes a full box also. All told, the control for the whole machine will take nearly all of the empty space in the first bay of PDP-1 rack.

W. WEETON

DEC exhibited during the week of September 21 through 25 at the ISA Show in Chicago. The show was quite well attended and while there was never any large quantities of people there at one single time, the show was so long that it tended to get a simple mass reaction.

While the majority of the show involved hydro-mechanical devices, considerable electronics was beginning to appear there. 3C's had an exhibit which was quite interesting and Pannelit was there exhibiting a computer manufactured by Elliott of England. This particular computer had a 4096 word memory, 38 bits deep, but was exceedingly slow. The access time for the memory was 720 microseconds. It was a magnetic core memory. Over all, I think that this show was worth while.

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER

DATE October 2, 1959

..W. Weeton Cont.

Autometic Telephone or General Telephone Laboratories in Northlake, Illinois. GTL was visited during the period of the show and appears to be quite interested in our equipment. They have a requirement for about $6,000 worth of the equipment in the near future and have been considering Harvey-Wells units. At the present time I feel that they are more interested in ours.

Delco Radio in Kokoma, Indiana was also contacted. They are interested in obtaining or building a memory core tester and will, within a month, probably purchase a minimum of four current drivers from us.

AC Spark Plug in Milwaukee was contacted by Mr. Anderson and a demonstration was also set up for their people.

RCA in Camden. One segment of RCA in Camden is planning on a tie in with the Foxboro Corporation in Maynard, Massachusetts who will be involved with the manufacture of the RCA Model 110 Computer. This area is interested in obtaining material for assembly of this computer very quickly. They are working against time and there is some probability of getting our equipment into this computer.

RCA Data Processing Laboratory in Camden is also considering, at a very early level, the purchase of one of one of our memory testers. They, however, are interested in obtaining one which is capable of driving 128 by 128 memory stack.

Philco in Camden is quite interested in obtaining a memory tester. They, however, have a requirement for a word address memory tester.

Sylvania in Muncy, Pennsylvania. Sylvania is interested in obtaining a Memory tester, however, they are just beginning to get into this type of equipment, having assembled only 40 planes. I am quite doubtful of their obtaining such a unit in the near future. They may require some of our building blocks to operate with their Rese testers to make the decision as to core acceptance or rejection, automatically.

H. R. B. Singer Company in State College, Pennsylvania is very interested in our equipment and while the job they had initially considered using has petered out, they have a new job which they are now making the logical diagram of and will send it to us for us to try to establish what building blocks would be necessary to do this job.

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER 2

DATE September 11, 1959

B. Gurley

The final command list for PDP-1 has been finished. These commands are not very different, except in name, from the commands we've been talking about for some weeks. There will be a full complement of shift and rotate instructions that enable you to shift right or left; Accumulator only, B register only, or Accumulator and B register connected together. I've worked out the end coupling gates for all these conditons and it doesn't seem to be particularly bad. A total of 20 extra transistors are required to make all of the shift couplings at each end of AC and BR. A considerable amount of time was spent working out the divide process for PDP-1. The divide step instruction is based on a technique developed by Dick Bennett, and seems a little odd, but it appears to work quite well. One of the main troubles is fixing up the remainder at the end of the division steps. The main reason that this has proved troublesome is that it is very desirable to have the dividend include the full Accumulator and B register so that double precision division can be performed.

A pricing estimate has been made on a 36 bit PDP 2. This is the machine for the Navy people. We arrived at the tentative price of $120,000 for the central machine. Memory units of 4,000 words -each- $70,000. The flexo-system - $10,000 and a photoelectric tape reader system - $10,000. These figures are being reworked for greater accuracy and a similar set of figures is being prepared for an 18 bit PDP-1.

J. Fadiman

Last Thursday (Sept. 3) the Memory Tester, MT-1511, was shipped to General Ceramics in Keasbey, New Jersey. I installed it at General Ceramics on Friday, and it is now in satisfactory operation. The only damage during shipping was that the 732 and 740 Power Supplies pulled off from their front panels by bending the panels and shearing the screws. This damage was easily repaired at General Ceramics.

The first draft of the MT-1511 manual has been completed, and the final version should be ready within a week.

We are now waiting to hear from possible new customers for the Memory Tester. The possibilities are: General Electric (Syracuse), I.B.M. (Kingston), Sylvania Electric (Muncy, Pa.), Telemeter Magnetics. Many new inquiries for information have come in, and some of these will be followed up shortly.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER

DATE
September 11, 1959

While in New Jersey I visited the Signal Corp Labs at Fort Monmouth, and spoke with someone in Test Equipment Headquarters.

We have been asked to bid on two Memory Exercisers for I.T.T. Labs in Nutley, New Jersey. The specifications are being worked over, and a bid will go out next week.

M. Sandler

Status of Finished Products:

	On Hand	On Order	Available	In-process
Test Equipment	535	2	532	710
System Equipment	559	31	528	810

Units complete to Stock, August: 1121

L. Prentice

The first week was spent getting acquainted with DEC people and their Mechanical problems. Some time was devoted to design work. Model of switch mounting and light indication mounting were made for PDP-1. Tooling and stock have been ordered for these items.

An investigation has been made of customer compliants about the difficulty of removal of the building block from their receplicals. Two changes have been made, the screws holding the back panel have been counter sunk to avoid interference, and the drilling for the rear terminal of the block has been change to increase the clearance.

These will be fully tested in production in the coming weeks.

The display rack for the Washington show has been reworked.

E. Harwood

Sales Kit

The drawings for the Power Supply have been completed and are waiting to be checked. We are planning to build five supplies.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

E. Harwood Con't

Memory

We are wiring the Memory to the Sense Amplifier and Read-Write Switches. We should have most of this wiring completed by the end of next week. The Memory Power Supply ordered from Harrison Labs has been returned after being repaired and now seems to work properly.

PDP-1

The first four panels have been received from production. They are the Memory Buffer Register Panel, the Memory Buffer Gate Panel, the Memory Address Register, and the Program Counter.

They are all mounted in the temporary frame and we plan to start wiring them together next week.

R. Best

New Product Committe Minutes

New Circuits Under Development

1607 Pulse Amplifier will have 3 pulse amplifiers in one package with 3 standard inverters. There will be one pair of output pins for each amplifier, able to drive 16 units of base load (same as a 601).

Recent Engineering Changes:

Flip-Flop 201: A change was made some time ago to decrease its sensitivity. The new cards have finally arrived in production, and the first lot shows that they are now too insensitive. A change is now necessary in component values to get the desired sensitivity.

901 Mounting Panel: Changes were made some time ago to tighten tolerances to insure that all Test Equipment units would fit. The first production run showed that things still weren't right; Loren Prentice is solving the problem.

1151 Binary to Octal Decoder: The layout was modified so that both the 1150 and the 1151 use the same pin connections.

50 and 60 Current Drivers: The chasses were modified to provide more ventilation and an extra tube socket. There was an error in the 60 chasses drawing that has just been fixed. Both units now have etched card layouts for the circuitry.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

R. Best Con't

Production Releases:

202 Flip-Flop, a 10 MC unit that will run up to 20 MC under the right conditions is being produced. We are down to board letter E already.

403 10 MC Crystal Clock: layout is complete, and the model should be here soon.

S. Olsen

New Personnel

9/8	Madeline Fracey	Assembly
9/9	Roberta Hiltunen	Assembly

Personnel Left

8/28	E. Benoit	Accepted other position
8/28	T. French	School
8/28	W. Baker	School
9/4	L. Colleton	School
9/4	R. Reed	Military Obligation
9/11	D. Witherell	Accepted other position G.R.
9/11	C. McCartney	Family Obligation

N. Bromberg

The necessary circuity for the reader and typewriter output has been completed and tested. All the cables have been connected and the logical control timing is now being developed for the reader and punch. The typewriter functions have been completed.

B. Hughes

Hi Speed Building Blocks

The 202 Flip-Flop Model is being tested and results look promising. One problem we may have is narrowing off the P pulse in each flip-flop. This is being investigated.

The 403 10 MC crystal clock has been designed and we are expecting a model soon.

The 100 megacycle scope has arrived and now we have an idea of how our pulses really look.

The new system plug-in unit pulse amplifier is being built.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER

DATE

B. Hughes

Test Equipment Headquarters

Several scopes have now been calibrated and we are gradually learning how to calibrate instruments. Seven defective scope probes have been returned to Tektnonix for replacement this week. We have ordered a new probe, the P 600, which Tektronix tests by whipping it for 4four hours. These new probes should have greater reliability than the old ones.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER 2

DATE August 28, 1959

T. JOHNSON

I am sending along a packet of information gathered at the show. This principally consists of two Biax folders as distributed by Aeronutronics at their hotel session. In the Aeronutronics brochure you will find samples of the new biax memory element. Magnetic rod logic as presented by NCR and Biax were the two techniques of any interest in the computer sessions. Biax attracted the most attention because, 1) it was the most interesting, holding promise as a new memory device for non-destructive read-out and as a high speed logic element, 2) because it was much better presented and obviously a big play by Ford to attract attention to their Aeronutronics, and 3) it was a controversial subject as raised by Dr. Englebark in the course of the presentation.

Although some reference is given in the brochure to previous work done on the Biax, Englebark passed judgement on Wanless and the Aeronutronic people for claiming this invention was their own and pointed to the work of Dudley Buck and other people at Lincoln Laboratory in 1954. For this reason it would seem that the patentability which the Aeronutronics people claimed by imprints, if not statement, should not be too strong protection for Aeronutronics.

Another indication of this, I believe, is their present policy to not sell either the basic elements or logic or memory planes composed of groups of these elements. Instead they are planning to sell whole systems and can only say that they will be quite competitive with memories at a third of the speeds now available.

There were varied statements here but they said they would be able to offer a one microsecond memory at a comparable price to four microsecond memories available. Timing on their program would be to have a small amount of this work done later this year and really get rolling sometime next year. They plan to make memories of standard size at 4,000 words. I discussed this idea with Floyd Humphrey of Bell Labs. and he had a certain amount of misgivings when looking at the required circuitry of this new technique. I have some scratch notes I will try to make some sense out of but the major problem at first glance would seem to be the number of transistors required for buffering between the biax elements. The elements themselves have no gain. They would seem to be more useful as memory devices. Two outstanding features are they can be packed tightly together with great reduction in space where one cubic foot could hold 200 Flip-Flops or 3,000 gates. They require very low power and essentially no dissipation with a very square hysteresis sloop. They are able to operate at extreme conditions and environments with wide margins. The maximum signal as I understand it for an element would be 4/10 of a volt and there is a very good signal to noise ratio in the order of 100 to 1. Note that the logic element and memory element are the same except that one hole is elongated in

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

Ted Johnson - con't

the memory element so that the adjacent parallel planes of the orthogonal holes coincide. Ferroxcube Corporation developed the production metal and it is essentially pressed ferrite of the same material that is presently used in cores.

Other statements by the Aeronutronic people were that they are proceeding on engineering and production studies of the requirements for manufacturing buffers and control circuits. They stated they had no general purpose computer hopes and are looking for one of a kind or other special purpose computer jobs. They are interested in a number of types of computers and despite their present policy, they are giving some consideration to packaging Flip-Flops, gates, etc., with Biax. The only deviation from their policy is that they will make some elements available to scientific laboratories, etc., but this was definitely a commercial presentation.

It is worth while to note that Tony Gallopin was on the panel discussions and is head of the memory development group there. I talked with him on several occasions and understand his telephone conversation with Mr. Anderson was between our two meetings. He apparently is quite interested in our memory tester, presumably for testing larger memory arrays made up of the Biax element. I said I would drop down in the near future and would like to receive a proposal copy on the memory tester. I don't believe I have one at the office. I talked to Rese Brown about this element also and he thought it was of more academic interest, not understanding all the problems it applies. It does look as though this element holds real promise, particularly for memories and there were several good people although not of a real majority among the people in Aeronutronics presentation.

Although it was a loss not to have a booth at the WESCON Show I don't think it was that great a tragedy. There was quite a low session attendance in the computer groups and the attitude of people in the various booths was quite pessimistic, I thought. Without a really novel display item I don't think too much attention would have been gathered but it definitely is a thing to schedule. The other side of the coin is that there was a higher ratio of interested people to total attendance at this show with not the milling crowds as evidenced at the IRE Show in New York. Other interesting items might be the CCC educational computer which they had in their booth playing a little tune. I have a brochure in the packet which is on its way. Harvey-Wells didn't have a booth, but I saw their Sales Engineer Strolling around the first day. General Ceramics didn't have a booth either, but had a suite in the Palace Hotel where they had their new miniaturized memory displayed. Jim Shaller was in charge of the suite.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

Ted Johnson - con't

Perhaps the most interesting bit of news I heard was that there is another Digital Equipment Corporation recently formed in the San Diego area by people who manufacture magnetic drums. I heard this from some Alwac people who by the way are interested in some of our blocks, and corroborated it with an acquaintance from the Naval Electronics Laboratory. These people apparently have no literature and are strictly in magnetic drum work, but they were both sure the company's name is Digital Equipment Corporation. I will check into this immediately.

Another note on the show. The truckers were on strike in San Francisco. The WESCON People apparently did a bang-up job in getting this situation aleviated and getting the booths up. This is the second time that has happened in San Francisco for WESCON.

H.E. ANDERSON

PDP-1

Several drafts of a specification for PDP-1 have been prepared. A reasonably firm specification should be available by September 1.

Key features that are new are deferred addressing, 31 index registers in core memory, and the Buffer Register. All of these appear to make PDP-1 significantly more capable. Multiply subroutine can now be operated in less than 500 microseconds.

Standard bit length alternates are 18,24,30 and 36 bits. The 18 bit version can have up to 4096 words of memory, limited by address bits available. All instruction features are completely specified in the 18 bit configuration. Additional bits are available only for arithmetic operations, with extra memory address bits as the one exception.

M. SANDLER

Status of Finished Products

	On Hand	On Order	Status	In Process
Test Equipment	401	28	373	759
System Equipment	488	107	381	860

Units Delivered to Stock	Previous Ave.	July	Aug. to Date
	1035/mo.	668	914

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

M. Sandler - con't

The problem of inadequate delivery of 2N393 transistors continues to hamper us. Frequency and severity of expediting action has not given us improved delivery. The use of 2N588's in some units enabled us to get along for approximately 2 weeks longer than if we had been using 2N393's.

We are building up our board and panel stock pending receipt of transistors.

B. GURLEY

The system design of PDP-1 seems to be settling down. The word length is now 18 bits, rather than the original 20 bits, and models will be available to customers of 18, 24, 30 or 36 bits. The feature of deferred addressing will be built in the machine, and up to 32 registers of the memory would be available for easy use as index registers.

These changes, together with the addition of the B register, make a significantly more powerful computer.

The design of the registers is not greatly complicated by these changes. However, the control design time will be increased.

Ed Harwood has started to lay out the wiring for the program counter, the memory address register, and the memory buffer register. This wiring will not include the pulse amplifier packages at the end of the register for driving the various command pulses. This wiring will have to be added later.

We are anxious, however, to get some of the registers built as soon as possible to test out various driving problems in the actual wiring used in the machine. Ed Harwood and I have also spent some time investigating problems of driving pulsed emitters over relatively long wires. It appears that the problem is not difficult for the lengths that we are going to be running into. We will, however, have to add diodes at the end of some of the longer lines.

The design of the control element in the machine has not seriously been started. However, flow diagrams for some of the more complicated paths, such as the deffering and deffering with index have been done.

We also looked at our thousand word memory stack on the memory tester and the signals of the memory look very good. The memory tester itself looks superb!

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER

DATE August 28, 1959

W. BAKER

In order that a standard size attache case may be included in the Sales Kit, the dimensions of the large carrying case have been changed. At present, luggage for five sales kits is going to be ordered. We are awaiting quotations on the order before giving the final go ahead to the manufacturer of the bags.

Technical write-ups have been completed for the Level Standardizer Type 501, the Binary to Octal Decoder Type 1150, and the Binary to Octal Decoder Type 1151. The Core Tester, demonstrating one of DEC's wide variety of applications, is being investigated at present in order that a technical bulletin may be written on it. The Tester now is set up in Ken's office for display to the plant's visitors.

The problem of insufficient electrical power has been investigated and found to be highly inadequate. In particular, three twenty amp circuits on the third floor were expected to supply thirty and forty amperes. The situation is now well in hand and in the process of being remedied.

J. FADIMAN

MT 1511

The General Ceramics Memory Tester, MT-1511, has been fully checked out and put into operation testing a memory stack. The modified Model 50 and Model 60 Current Drivers were installed. A few minor additions were made as per the request of General Ceramics last week. The intensification amplifier now gives out a negative gate so as to modulate the cathode of a scope. The checkerboard program beginning: 0011 (instead of 0110) was installed to take care of the way in which General Ceramics orients their cores for stringing. The machine will be shipped to General Ceramics on Tuesday, Sept 1, (3 weeks before the promised delivery date).

During this week the machine has been on display in Ken Olsen's office for interested visiters. Mr. Ross Holtz and Mr. Schultz of G.E. were here on Wednesday, and expressed considerable interest. Mssrs. Nottingham, Holmes, and Love of I.B.M. were here on Thursday, and also expressed considerable interest. On Friday, Mr. Crowell of Sylvania Electric, Williamsport, Pennsylvania, will be here.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

J. Fadiman - con't

Test Equipment

The Pulse Generators 410 and 1410 have finally been made to work satisfactorily by again adjusting the values of the resistor network. The latest modification brings the pulse amplitude and trigger points within specifications according to the newly calibrated scope.

S. OLSEN

New Personnel

8/3	Benjamin Gurley	Engineer
8/24	Jean Lorentson	Assembly
8/25	Arthur Clockedile	Sheet Metal.
8/31	Gertrude Loynd	Assembly
9.1	Loren Prentice	Engineering

J. ATWOOD

The next mailing, now under way, will include a "Digital Developments," an Application Note on the Core Tester, and Product Bulletins on the Level Standardizer 501 and Binary-to-Octal Decoders 1150 and 1151. The next space ad, also in preparation, will feature the Core Tester as an example of the versatility, economy and ease of assembly of Digital Test Equipment.

Replies to the last mailing continue to arrive in encouraging quantities. The total to date is 97, the majority coming from people who took the trouble to check their specific areas of interest in Digital Building Blocks. The tabulation below indicates just how widespread the interest is in the various applications mentioned.

CIRCUIT DEVELOPMENT	44		
MEMORY PLANE TESTING	19	MAGNETIC CORE TESTING	15
SYSTEM TESTING	28	MAGNETIC TAPE TESTING	15
AUTOMATIC CHECK OUT	22	TROUBLE SHOOTING	16
PERMANENT SYSTEMS	16	TELEMETER DATA HANDLING	18
SEMIPERMANENT SYSTEMS	13	BUFFER DATA HANDLING	24
PARALLEL CONVERSION	20	PATTERN GENERATORS	15
MEMORY TEST SYSTEMS	16	SHIFT REGISTERS	33
CODE CONVERTERS	39	COUNTERS	32
ERROR DETECTING	32	OTHERS	11

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

J. Atwood - con't

Office forms work is still part of our day to day operations. The purchase order form is due to be delivered next week, at long last, and we are setting up the new requisition form to be used with it. We are also setting up a quotation request form, an information request form, and a payment authorization form, as well as doing the final art and stencils for instruction sheets on the various forms. Beth Fitz has submitted an initial draft of the Office Manual, and this will be ready for final approval with very few changes.

The latest Help Wanted Ad, which was given pretty general circulation in newspapers throughout the area, brought in about two dozen applicants. Two of these were hired -- one for assembly and one for general factory. We may have to use press gangs next.

# # # # # #

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER 2

DATE August 14, 1959

S. C. OLSEN

PRODUCTION

I previously mentioned problems with humidity and now find that some of the General Radio variacs develop a fungus on the silver-plated wiper contacts. The offending units have been sent back to G.R.for investigation. After over two months of fooling with Components Manufacturing we still are in the same bind so we have decided to go ahead and purchase banana-pins and wire and investigate the possibility of molding jumpers ourselves, this probably being the most reliable way at least of getting it done. I made a trip the other day to Sloane Plastics in West Concord to investigate the different plastic forming methods and study the possibility of molding our front and back panels on test equipment units to determine whether we could obtain them more cheaply and get better quality. We haven't received the quotes as yet but it would seem from my conversation with Mr. Sloane that the mold costs would make them prohibitively expensive. There are also other problems in injection molding, that is, shrinkage of material after it has cooled down. Also trimming of the gate after the plastic is set and removed from the mold. It would then seem that compression molding is a more acceptable means, the problem there being that the method applied by Sloane in compression molding involves too much manual labor and therefore a much higher cost. The other problem is the availability of material and also color consistency may be a problem. I am investigating a transfer press by Hull Manufacturing which may do the job of compression molding automatically.

Under the suggestion of the State Department of Labor, we tried Chlorothane as a solvent in removing flux rather than our present Trichloroethylene. It turned out that we had results the opposite to what we would normally expect and that is that the girls became nauseous to the Chlorothane whereas were not bothered by the Trichloroethylene at all. Therefore we will continue with Trichloroethylene but being careful to enforce the regulations about keeping the solvent out in the open with the windows opened and the ventilating fans running.

BUILDING

In the past several weeks it seems we have leaked water down to Capital Plastics -- six times, which tends to be annoying to them and embarrassing to me and at one time, embarrassing to the tune of $205.00. I am not sure what the whole answer is but it would seem we should try and discipline ourselves a little better in regard to the possibility of creating leaks. One of the problems is that Wednesday evening, August 12, the power was shut off on the first floor, including the night light power which defrosted the refrigerator and the water leaked down to Capital Plastics.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

This also happened one other time in which the third floor refrigerator leaked but down to the second floor only, causing no damage. However, this is something that should be kept close tabs on.

Pretty soon, and that is in days, we will have an electrician and carpenter in, for several jobs. Not that we are looking for work to do, but if anyone has any particular job that has to be done if we could know in advance it might help our planning somewhat.

PERSONNEL

New Employees:

Carole McCartney	Assembly	July 27
Mae Wuorio	Assembly	July 27
Barbara Eddlem	Assembly	July 27
Wilfred Jackson	Sheet Metal	July 27
Mary Tobin	Secr. - Engr.	July 27
Benjamin Gurley	Engineer	August 3

Job Offers Made:

Jean Lorentson	Assembly	August 24.

We now have joined the National Metal Trade Association which is an organization to help small companies like ourselves in many of the major problems with labor and so forth. It is surprising the number of small different services they can perform and if you have need of such services you could contact Helen perhaps to see if she has the service listed by the N.M.T.A.

H.E. ANDERSON

PDP-1 and 3

Logical design and applications have been studied. The most significant change in PDP-1 is the inclusion of a B register and tentative planning of instructions suitable for use in multiply and divide subroutines. They can be performed in about 0.5 milliseconds compared with the original 6 to 8 milliseconds. Biggest planning problem in PDP-1 is the selection of a magnetic tape unit and details of the instructions dealing with the tape. Dick Bennett, programming consultant, has strongly urged that we provide for changing bits lengths on PDP-1 fairly easily. Indirect addressing may be provided also.

PDP-3 looks like it will have most of the features of large high speed computers. Floating points, index registers, ability to work with a large number of magnetic tapes, 36 bits, memory in units of 4096 words, etc. The two main differences will be less on-line in out equipment and price. We hope to be able to specify this machine in more detail by 1 November.

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER

DATE August 14, 1959

R.L. BEST

New Product Committee Minutes

First lot sizes were decided on the following units:

1546 Sense Amplifer: 30. 20 for PDP-1, 2 for RCA, and 2 for MT1511.

1672 709(Converter): 20.

1674 Intensity Amplifier: 10

749 Power Supplies: 40. We won't count on Acme to deliver new transformers in time, so that Sola and Triad transformers will be ordered for this lot.

71 Current Calibrator: 5

New numbers assigned:

1105: An inverter package with 5 inverters and 3 loads. Pin connections are the same as the 1104 except that the load connected to pin L is used (with the 2 spare pins E and F) for the added inverter. It has not been decided whether or not we will advertise this unit; the primary use for it is the PDP-1.

1973: Memory driver, needed for the new memory; one will supply all the READ current and a second will supply all the WRITE current. We do not plan on selling this as a separate unit.

71: Current Calibrator: This will be similar to the model 70 Current Calibrator in the Memory Tester, but with a box chassis and some minor front panel changes.

Recent engineering changes:

The output transformers on the 410, 1410, 402, and 1404 are being changed to widen the pulse.

All SPU Mounting Panels are being wired with red for the voltages, and black for ground (pin D).

CURRENT DRIVER PROBLEMS

Both the positive (model 60) and the negative (model 50) were plagued by overshoot problems, caused by the forward recovery time of a germanium diode. This was easily remedied in the model 60 by the addition of a vacuum diode, and all model 60's have been so modified except the one that has been shipped to IBM. We will replace that one.

COMPANY CONFIDENTIAL

The problem was a bit more complicated in the model 50, and has finally been solved by the use of an additional 6BA8A (dual pentode and diode), one half of which is diode connected (to replace the germanium diode) and one half of which is triode connected as a cathode follower for powering up the variable grid clamp voltage. Modification of all model 50's is about to start. The only one I have shipped also went to IBM; we will replace it also.

TEST EQUIPMENT HEADQUARTERS

A test equipment headquarters has been organized in the engineering department. Mel Arsenault has been placed in charge, and will enroll in Techtronic's course for scope maintenance in two weeks. The course takes part of a day, one day a week, for 8 weeks. This knowledge is badly needed. We have just been embarassed to discover that the two scopes being used in final test had 8 and 10% overshoots, of about the same time constant as our pulses. This has led to all kinds of confusion regarding the pulse amplitudes of our various pulse-producing products. Scopes will be checked for overshoot, voltage calibration and sweep calibration once a week.

Simpson-type meters will be periodically calibrated, and our mirror-scale Westons will be periodically sent outside for calibration.

CUSTOMER COMPLAINTS

Capozio, from IBM, returned from vacation and turned on his 721 power supply. He hearding some arcing inside and naturally shut it off. 18 flipflops were burned out and several rectifier diodes in the 721 were discolored. Furthermore, somebody else later got a shock from the main switch on this supply. The supply and the 18 flip flops are being returned for repair. He also had trouble with bad contacts in the General Radio power jacks in his 901 mounting panel. He replaced all of them with a better type of jack that he obtained from a local distributor. He has also had some intermittent contact problems with his miniature banana-jacks, and is returning some of his good bad examples.

Sylvania has had some trouble with dying pulse amplifiers. It seems that we were optimistic about how many capacitor-diode gates we could drive. We feel that a more conservative estimate would be that each output from a 1606 can drive the shift input on two 1210 triple flip flop packages. This amounts to a total of 12 capacitor-diode gate loads, 6 of which may be enabled.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER

DATE August 14, 1959

JON FADIMAN

Progress Report on MT-1511

During the past two weeks the final construction of the Memory Tester has been completed. All plug-in units, switches, and current drivers have been installed. The final d-c and a-c power wiring has been completed. All the logic has been dynamically checked out satisfactory. On Friday the first memory stack will be tested.

Test Equipment

The output transformers for the clocks models 402 and 1404 and the Pulse Generators models 410 and 1410 have been changed to a 2003. This change has been made to increase the output pulse amplitude and width. The output pulses appear now to be satisfactory.

Sales

Ross Holtz of General Electric and Jim Nottingham of IBM both appear to be very interested in our Memory Tester. Mr. Weintrob of Bosch Arma is also interested. There is a possibility of building a memory excercisor for IT & T Labs.

M. SANDLER

Status of Finished Products

	ON HAND	ON ORDER	STATUS	IN PROCESS
Test Equipment	334	179	155	842
System Equipment	449	36	413	680

Units Delivered to Stock	Previous Aver.	July	Aug. to date
	1035/mo.	668	395

WES BAKER

The Power supply has been completed and is now ready for use. I am still awaiting quotations on the cases for the sales kit. The new portable Stenorette, viz., the "Stenorette-B", was supposed to arrive here Monday or Tuesday, but it didn't. This device is normally battery operated and may be run for four hours each time the batteries are recharged. I have hopes that we may be able to recharge these batteries with the power supply just completed for the sales kit.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

The new dictating machine, employing transistors, is about the size of a book and weighs only 6 pounds. The same tape, reels, and magazines are used for this machine as are used for standard office-size Stenorette.

J. BROWN

A Trip to Sprague and IBM last week didn't produce much. Sprague didn't like current drivers (they have since had an engineering change) but nevertheless are happy with other equipment. Will probably get in systems blocks in distant future.

Some interest in Memory Tester was expressed by IBM Kingston, but nothing concrete. A new IBM Poughkeepsie group has purchased a small quantity of Test Equipment. IBM Yorktown interested in 10 megacycle gear and duplicating a test set up with systems blocks.

Other companies visited have little potential in immediate future.

Local trip to AFCRC proved more fruitful. Original purchaser has changed to another group and new men are just beginning to set up system. Promised one of our new notebooks which went over very well.

Feedback Controls have shelved our test equipment for lack of funds. We will return to project as soon as new money is available.

Trip to G.E. (Pittsfield and Syracuse) is planned for next week.

We got our first lead BIA Ham Radio from Bob Reed.

NATHAN BROMBERG

The Flexowriter

To date, the typewriter and punch have been driven by DEC Equipment. Ten "Clare" mercury relays are used. Two relays select either the punch or the typewriter and the other eight determine which bit is selected. The present effort is directed towards the typewriter output unit. The selector switches are wired internally, directly to the output plug. A cable has been designed and built for this plug. The switch which is open during a carriage return has been wired externally. The logic required to receive the typewriter's output is currently under develop ent. When this is completed, the only unit left to be wired is the reader. Tests will then begin on the timing tolerances of the flexo-writer.

Automatic Control

No further work was done in this area since the last report.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER

DATE August 14, 1959

E. HARWOOD

Memory System

The back panel wiring for the Read-Write Switches and the Sense Amplifiers has been given to production and is almost completed. The Memory Mounting panel and resistor board are finished and we will start wiring as soon as the panels come up.

PDP-1

Some of the block schematics have been started.

B. GURLEY

The design of the PDP-1 computer has progressed quite well. Most of the instructions had been specified by the 11th of August, and details for handling the test cycles and examine were being explored. It became necessary to consider an in-out buffer for the computer to handle magnetic tape. This buffer, together with several sensing flip-flops, made a large part of another register. It was decided to consolidate these flip-flops and add the few necessary to make it a full machine register. This register will be a combination of the B-register, in other words, an extension of the right hand end of the accumulator, and a live register and in-out buffer register. These functions are similar to those performed by the MQ register and the I.B.M. 70f. The addition of this register changes a fair amount of the machine. The large number of gates that had been on the accumulator to accept input data now all will appear on this new register. It will also be necessary for this new register to shift, probably both right and left, to make it very easy to perform multiplication. Dick Bennett's study of programming with the initial instructions for PDP 1 showed that the multiplication might take as long as six milliseconds. With the addition of this register, multiply will take fewer instructions and would only take in the order of five hundred microseconds, a factor of ten increase in multiplying speed. A similar increase in speed might be expected on divide. The addition of this register will probably cause the selling price to increase less than ten percent.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER

DATE August 14, 1959

J.L. ATWOOD

The first of our regular space ads on our regular product line is done and on its way. It will appear in September issues of ELECTRONIC DESIGN, CONTROL ENGINEERING, I.S.A. JOURNAL, and DATAMATION; Also, the next available issues of IRE local publications in Boston, Los Angeles and San Francisco. The second ad, on Test Equipment, is being prepared.

Also completed is an ad on the West Coast Field Office (and our standard line) for WESCON Issues 2 and 3 of ELECTRONIC NEWS.

Four reference books are being set up: (1) a scrapbook of all printed material, (2) a loose leaf binder of current material, (3) a scrapbook of promotional advertising and publicity, and (4) a scrapbook of public relations, advertising and publicity. If you're looking for a particular item, these books will be a good place to start.

The vinyl-applique decorated vinyl binders have arrived, and plans are being made to distribute them to customers and good prospects. They are intended to serve as a handy guide to our equipment and its use and upkeep.

Artwork for the new logic stamps has been completed. These should be available shortly.

We have bought a small Addressograph addressing machine. A number of longer, regularly used lists - such as the personnel and publicity release mailing lists, will be set up on plates for rapid processing.

Two projects of special urgency are our new trade show booths and our standard literature. The availability of extra space at several shows and the fact that some shows run concurrently (actually or to all practical purposes) make it necessary for us to have an extra booth and a larger one. The rate at which we are making and handing out literature is rapidly exhausting our supplies, and we have to reprint or revise a number of pieces.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER 2

DATE July 31, 1959

H. E. ANDERSON

Sales

Systems selling is progressing in two major areas. The first is an application of PDP-1 to a simulation problem of a toss bombing technique. We have engaged a programming consultant who is writing some feasibility programs to demonstrate to our potential customer how PDP-1 could be used to do the job.

The second is still in its earlier stages and perhaps is for too large a computer for us to undertake at this time. It is desirable for this system to work with analog computers and to have floating point and magnetic tape.

Auditing

The annual audit work in the plant has been completed. Some revisions of our handling of paper work were suggested by the auditor. These will be studied in more detail and implemented where they will make a contribution.

R. BEST

New Product Committee Minutes

The following units were priced:

667 Level Amplifier	$120.00
1667 Level Amplifier	$145.00
1150 Binary-to-Octal Decoder	$140.00
1674 Intensity Amplifier	$ 60.00

First lot sizes were decided on the following units:

1906 (1903 mounting panel with patch blocks): Make a model with chocolate blocks and white paint instead of present caramel blocks and chocolate paint.)
1907 Cover: 20
1972 Read-Write Switch: 25
1151 Binary-to-Octal Decoder: 10
1950 SPU Extender: 50

New numbers assigned:

202 Flip Flop, a 10-mc flip flop with a P-pulse output.
403 Crystal Clock.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER

DATE July 31, 1959

R. Best Con't.

A request for quote has been received on the above two units, with a 10 mc crystal in the 403 clock. A Price of $160.00 for each unit was quoted early in June, with six weeks delivery. We plan on having a model of the 202 in two weeks. In the future, no new unit such as this will be delivered to a customer until a whole lot has been built and tested.

R. HUGHES

Lot trouble reports from Quality Control are being studied so that Engineering may take corrective action on circuits which have high component rejects VIZ. 5-2N588's were replaced in one lot of 1304 Delays due to low output pulse width. Many diodes have been replaced due to leakage in 110's, 1110's 1606's. The leakage spec has been 10 microamps at 3 volts. This has been changed to 20 microamps at 3 volts.

The 201 and 1201 flip flops have been modified. Both units have damping added to the pulse output. This prevents backswing of the over shoot which can appear as two pulse outputs from the P out terminal of the flip flops.

Test specs. have been written for the model 50 and 60 core drivers and the 749 Power Supply. A ground wire was added from the ground output terminal to the tube socket of V3 (an output tube). This was done to prevent the units from oscillating. An 82 M.M.F. capacitor was changed to 470 M.M.F. in the base circuit of a 2N588 in the core drawer. This prevents 2N588's which have low hole storage from turning on again and causing oscillations.

M. SANDLER

Status of Finished Units:	On Hand	On Order	Status	In Process
Test Equipment	239	38	201	680
System Equipment	371	15	356	660

Units delivered to stock	Ave. Last 4 mos.	July to date
	1035/mo.	668

COMPANY CONFIDENTIAL

J. BROWN

Trips were made to American Standard (Boston), M.I.T. Instrumentation Lab., L.F.E., and Wayne George. L.F.E. purchased 1 clock and 1 flip flop to gain experience with our equipment. Possible sizeable order from L.F.E. American Standard may be interested in the future. M.I.T. is having trouble with Level Amplifier 666 transistor. Problem appears to be power line coupling within laboratory resulting in high supply voltage transients. Wayne George is somewhat a competitor but primarily in the control field as opposed to the computation field. Plan trip next week to I.B.M. and/or G.E.

E. HARWOOD

The Read-Write Switch 1972 was tested and released for production. This same unit, minus four output transistors, will also be used as the digit driver for the memory.

The drafting room is drawing the mounting panel and resistor board for the stack and I have started work on the block schematic for the memory system.

N. S. BROMBERG

Flexowriter

Some discouraging news about the delivery date of the Flexowriter we have on order prompted us to investigate two other possible electrical typewriters. Soroban and Remington Rand were contacted. The former manufactures a very good mechanical unit with a binary code which is available immediately, had too long a lead time for delivery. The latter had a possible three week delivery on a typewriter unit. However this unit would require an encoding logic circuit and a decoding logic circuit since the typewriter rarely served as a convenient location for forty-four contacts which developed the out-going signal from the typewriter and there are forty-four solinoids, one for each key. After some further soul searching it was decided that a unit could be constructed using clare mercury relays which would be able to drive either the ninety volt Flexowriter system or the forty-eight volt Flexowriter system. This seems to be an even more flexible approach than was originally anticipated. It will be possible with such a scheme to perhaps drive the soryan units too. The present effort is directed towards developing a logic for typewriter-to-computer, punch-tape-to-computer and computer-to-typewriter, computer-to-punch or any combination of the latter two. The problem here is to get a mechanical unit, whose timing is relatively unstable to synchronize with our DEC equipment, whose timing is rather well regulated.

N. Bromberg Con't.

The typewriter-to-computer circuits are relatively simple. Contact bounce problems are relatively eliminated since we sample the typewriter output at a time when the contacts have settled down. The computer-to-typewriter logic is slightly more complicated and is currently being developed. When the above work has been completed the typewriter, the punch, and the reader will operate as separate units for on line operation. The computer will make the decision as to which units are to be operated. We also have a second schematic similar to the Flexowriter which we have on order.

We have been receiving some very good technical assistance from the Feiden company in spite of the fact of our late delivery date.

Automatic Control

The last biweekly report mentioned that I was going to investigate the use of simple relay control systems. To date I feel that the present systems employing simple relays as on-off controllers do not warrant the complexity which a Digital computer might afford. There are simpler standard feed back techniques which would yield more accurate control as opposed to a relay unit being used as a power amplifier. However, traffic systems much as pipeline routing and railroad car storage yard routing seem to be well suited to relay applications. The important characteristics of these problems are that; 1.) there is a necessity to transmit control information over a distance, 2.) there is a relay operation to be performed at the end of the control line. These problems do not fall in the feedback class unless you consider the return signal indicating that the action has been performed as feedback. This is rather a safety or blocking signal.

The following is a result of a discussion with several members of the Electronic Systems Laboratory at M.I.T. There seems to be a need for Digital computers capable of performing the following operations. The solution of a boundary value problem is very important for controlling chemical processes. To date there is no simple and rapid digital computer technique for solving such a problem other than by long involved programing. The ordinary differential equation also requires considerable programing for solution. One method to attack this problem might be to build a computer capable of working with high speed analog units. It is possible to construct high speed modular analog units which simulate simple analytical transformations, the results of these modular units can be stored in a digital computer's memory. The complexity of a program will be greatly simplified since the necessity for making numerical approximations would be virtually eliminated when the analog units were employed. All this points

N. Bromberg Con't

to the necessity for accurate high-speed analog-to-digital and digital-to-analog converters. Another approach to the problem of solving differential equations and boundary value problems with any great speed might be to logically design a computer so that with relatively simple program instructions the computer would handle the necessary difference equations or other numerical approximations. This second approach requires a system of logic especially suited to the numerical approximation techniques which would be employed in a solution of these problems.

Interest by some members of the Electron Systems Laboratory at MIT was also expressed in the DEC equipment. I believe the project concerned with aircraft simulation on a hybrid computer, (ie. analog-digital computer) was the group interested in our equipment.

W. BAKER

The system model of the digital-to-analog converter has been tested and found satisfactory. We were able to get a raster of 4,096 dots on the scope at low frequencies only. The fact that this could be done at low frequencies was due to the limited passband of the scope's horizontal amplifier and not the decoder.

The sales kit is nearing completion at this writing. The heating difficulties of the power supply have been solved. The output voltages now have very low ripple. Provision has also been made in the sales kit for a portable Stenorette which may be carried on long trips.

J. ATWOOD

Among the jobs completed since the last biweekly: printed replacement schematics on 12 Test Equipment units, 13 System Building Blocks and two power supplies; inquiry code cards for Sales Department use in identifying the source and nature of inquiries by specific mail respondents; Stanpat stick-on drawing labels for the drawing identification panel, Test Equipment back panel and System Building Block pin connections; news release on the West Coast office and Ted's assignment there; Special stationery and sales promotion supplies for El Segundo; coded mailing list cards for the western states, which will serve as Ted's prospect file; and improved label for the patch cord boxes, replacing the previous label which happily was destroyed in the "flood".

BIWEEKLY REPORT

COPY NUMBER

DATE July 31, 1959

J. Atwood Con't.

Jobs currently in the works include: new logic stamps; employee absence record card for Personnel; purchase order form and two companion forms -- a requisition form and an estimate request form -- which will correspond in appearance and format with the purchase order; application note on our line of mounting chassis for Systems units; and additional replacement schematics.

During July we have serviced 521 reader service requests for information about our products. Five publications accounted for the bulk of these requests: ELECTRONIC DESIGN forwarded 185; MILITARY ELECTRONICS, 167; AUTOMATIC CONTROL, 56; ELECTRICAL DESIGN NEWS, 39; and DATAMATION, 28.

We have also serviced 247 requests for further information or for mailing list additions. Of these, 137 resulted from our June mailing. This represents a return of about 4% on the mailing, which is not bad for an effort which was intended to get us better acquainted with the people on our list rather than to produce mail orders for equipment.

Biggest response came from California, with 188 inquiries and requests, as compared with 113 from New York, 76 from New Jersey, 51 from Massachusetts, 40 from Illinois, and 32 each from Maryland and Pennsylvania.

The current mailing should hit the post office next Thursday. It will contain a new "Digital Developments," an air mail reply card (in deference to the West Coast branch of the family), and four product bulletins -- Triple Flip-Flop 1211, Decimal Decoder 1671, 709 Converter 1672, and Power Supply 730.

Our new space advertising will break the trade papers in September. The subject of the initial ad will be DEC Building Blocks -- specifically our Test Equipment and Systems lines. It will appear in DATAMATION, ELECTRONIC DESIGN and CONTROL ENGINEERING.

Previous to this, there will be a special ad in the WESCON issues of ELECTRONIC NEWS on the West Coast operation.

Two other special projects are proceeding space. Beth Fitz has begun work on the draft of the Office Forms and Procedures Manual, guided (?) by the suggestions of the OFPM Committee: Helen Leblanc, Maynard Sandler, Henry Crouse, Jim Myers, John Conley and Jack Atwood. And the Outing Committee has polled all employees on program and menu preferences for our August 29th do. The next committee meeting should produce a reasonably firm plan for the event, based on the results of the poll.

digital equipment corporation
MAYNARD, MASSACHUSETTS
DF109

BIWEEKLY REPORT

COPY NUMBER

DATE July 31, 1959

J. Atwood Con't.

Several advertising agencies have been interviewed to determine whether they have anything to offer us which our present affiliation does not (and which we are interested in accepting). We are also trying out various free lance artists with a view to finding a man with sufficient experience and talent to serve us as a consulting art director.

#########

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER 2

DATE July 17, 1959

KENNETH H. OLSEN

We are studying a way of assembling memories based somewhat on the work of Al Guditz at Lincoln Laboratory where he mounted the cores in a phenolic plate and played windings through the cores. He had trouble because he tried to put four windings through small cores which meant that each conductor was very small and the tolerances were just about impossible. We propose to put just one winding through a core so that the whole inside of the core can be a conductor. We also propose that the conductor be large on the phenolic board so that it will help radiate heat from the cores. This one winding will be both the sense winding and the digit winding. Because the sense winding has to have half the cores in one direction and half the cores in the other direction and the digit core winding needs all the cores in the same direction we plan to center-tap the winding and use two digit drivers during the write, one on each side of the center-tap and feed these windings pushed full into a sense amplifier to take advantage of the cancelling which will come between the two sides. With transistors having two digit drivers it is not very expensive, particularly when they are to be driven from the same voltage source and consist of only a transistor with a series resistance.

The interesting advantage of this system is that each plane will have just three windings going from it as opposed to 256 plus 4 for a conventional type plane. When the conventional memory is assembled these 260 wires have to be soldered together for each plane, but with the new proposed system the X and Y wires will be threaded through the cores as the final assembly operation and only one set of X and Y terminals will be necessary for the whole memory.

Changing the defective core would be the difficult part. With the protection of a plastic spray and a heavy copper plating; it would seem that there would be little danger of damaging the core during stringing. It would be very desirable if the whole stack after testing could be vacuum impregnated with epoxy resin. The problem with this is in getting the heat out from the inside and controlling the atmosphere if this is desirable.

Library books, in general, should be kept in the library and should not be kept on personal shelves. People can go to the library to do their research work. If however, people are using a book continuously, we will order them a personal copy if they will request it.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

H.E. ANDERSON

Case Institute of Technology

The summer program at Case in **Numerical** Feedback Control was a very active course. Three lecture/demonstrations of our building blocks were made for the students and much interest in our equipment was evident.

A specially prepared booklet containing 10 problems in logical design was distributed by DEC. Some of these (particularly the Gray to Binary Converter) were particularly well received.

SABRE

The chances of being asked to produce a SABRE unit are all but non-existent at this point and no further work is contemplated on it.

Systems Selling

Due to limited engineering capacity to do special system work, we are attempting to concentrate the main sales effort of Weeton, Brown and Johnson on building blocks only.

I will attempt to coordinate any systems type selling activities for the immediate future. These will be quite limited in scope.

Jon Fadiman will coordinate all customer contact on the Memory Tester. Please call to his attention any information that may be useful to him in this area.

JAMES MYERS

The following new books have been received by the library:

1 Principles of Servomechanisms by Brown & Campbell
1 Switching Circuits & Logical Design by S.H. Caldwell
1 Servomechanisms & Regulating System Design Vol. 1, & 2 by H. Chestnut & R.W. Mayer
1 Handbook of Engineering Fundamentals by Eshback
1 Design & Production by Colin Cormichael
1 Penders Electrical Engineers Handbook (1 each of) Electric Power & Communications-Electronics
1 Handbook of Automation, Computation & Control by E.M. Grabbe
1 Basic Electronics by Bernard Grob
1 Electronic Communication by R. Shrader
1 Handbook of Semiconductor Electronics Ed. by L.P. Hunter
1 Mathematics for Electronics by Nodelman & Smith

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

Wally Weeton

DEC will be the low bidder on the I.T. & T. project. Other new possibilities are for Western Union and Republic Aviation.

Dick Best

There is a strong possibility of a job for Marvin Deutsch of M.I.T. involving the design of circuits to drive an Ampex Tape Recorder. We might get the loan of an Ampex to do this job.

There is also a strong possibility of a job from David Caldwell of M.I.T. for a TX-0 transistor computer but the job involving Digital-to-Analog Converters for Caldwell is definitely dead.

As yet nothing has been heard from Technical Operations Company concerning the Binary Coded Decimal Light Driver #1671. An order from them would probably be for plug-ins not systems.

Jon Fadiman

Jon begins his two weeks vacation Monday. When he returns the General Ceramics Memory Tester should be ready to be checked out.

Wes Baker

Wes will be working on the design of a suitable sales kit.

Nathan Bromberg

The Flexowriter's operations have been studied. Nathan will now work on the method of connecting the Flexowriter to a computer.

S.C. OLSEN

The summer humidity is slowing up our production of printed circuit boards. The paint just won't cure.

Incoming inspections seems to indicate that the Taylor Fibre boards are superior to the formica from Insulating Fabricators.

Six out of a lot of twenty 1410's had to have 2N588's replaced.

With our new tumbling barrel (A Sears Cement Mixer) we managed to salvage many brackets rejected for salt corrosion spots. All future production runs will be tumbled.

Plant

Our security seems to be in good shape. Some people still leave the side door open though.

The Reception Room floor is all ready to receive the new green and beige tile.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

New telephones and change requests should be made about a week ahead, and not when the phone man is here to work on other phones.

Our new 400 Amp service is installed. It will be a while though, before the overloaded lines are shuffled.

Power turn-off procedures are written up, and will be posted at each main switch. Be sure to turn off power at BOTH the third floor (behind purchasing) and at the first floor (cafeteria) when leaving.

We have established credit with Gatley's Shell Station across the street for our Volkswagon truck. They will only service the truck on our credit. Our signed copy of the receipt must be given to the receiving clerk as received goods.

Personnel

The following people are scheduled to start on the dates indicated:

Ed Harwood	August 20
Ben Gurley	August 3

The personnel market has tightened up and is supposed to get worse by fall. We will need quite a few production workers during this period, to balance our organization. Any new ideas of particular persons, or new sources to be tapped would be appreciated.

MAYNARD SANDLER

Status of Finished Units:	On Hand	On order	Status	In Process
Test Equipment	263	37	226	495
System Equipment	312	--	312	460

Current Drivers and Power Supplies in production, but slow progress being made. Delays (302 and 1304) released to production. Pulse Generators (410 and 1410) released to production.

Inventory pricing and reconciliation goes on satisfactorily. The June 30 inventory unearthed areas of omission in execution of our system. New Purchase Order forms and centralization of issuance of orders should correct this.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

Walter Weeton

Ted Johnson finally left on his way to California last Tuesday. Unfortunately he got as far as Worcester, Massachusetts and had a car accident and was delayed. He is now on his way to Michigan for a short vacation and will be in California about the end of the month.

Mr. Jack Brown has finally arrived at DEC. He is part of the sales activity. Jack's chief interest will be in selling our standard products along the eastern sea coast.

Stan Olsen has supplied me with a sample 1201 type of Flip-Flop mounted on a glass melamene board. The material used was FF-91. This presents a very nice looking package, but the glass melamene is rather difficult to work with. This particular unit comes as a result of an inquiry from Melpar in Watertown, where they have a requirement for some 250 Flip-Flops of this general type.

My visit to Western Union On Wednesday with R. C. A. was very interesting. They have a requirement for a system which includes two small memories. The memories would be 80 words, 8 bits deep. They are essentially interested in obtaining the unit with the address registers, digit drivers, x y drivers. And a selection, and output register. Space is left in the unit for a parity bit, and all parity checking will be done by them. They would be in a position to design their units so that it would be compatible with our levels. The unit is very slow using only 15 words per second. Some rewrite circuitry is involved in the two units. The most interesting part of the unit is that they require an approximate 200 of these units for their first five systems. The total plans are to build eleven systems. In addition to this they have a memory requirement for a 1024 word syste, this unit, their fast on one, has to have a capability of handling 300 words per second. The output of this unit could be used on a magnetic tape, and for this application it has to be able to send information to the tape unit at 20,000 words per second. Other than these changes, the two units are very similar. The total requirement for this system is approximately 50 units.

At Republic Aviation, we discussed with them our new PDP unit. They are interested in obtaining some small computers and feel that this may be similar to what they want. They are interested in obtaining a multiplication function in the arithmetic section. Also, they do not want any input and output equipment. They are operating on an essentially small budget and are interested in knowing how much equipment they could obtain for a $45,000 to $50,000 order.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

John Fadiman

During the past two weeks all interconnecting signal wiring has been completed. This includes all the logic, switch control and timing control panels, read-write switches, and their connections to the Output Plug Panel. All of the d-c power wiring which can be done without the power supplies has also been completed. The Sense Amplifier panel has been built and installed.

The remaining panels are now under construction: the Current Calibrator 70, Alarm Panel, and Power Control Panel. All drawings and design work for these have been completed.

The Sense Amplifier 1546 and Intesity Amplifier 1674 PIU's have been checked out and are now in production.

Holes are being cut in the top of the console in order to mount the three cooling fans. Everything is ready pending the production of Power Supplies and Current Drivers.

Work On High Frequency Building Blocks

Certain changes in resistance values have been made on the Pulse Generators 410 and 1410. These changes have been made to correct both the pulse amplitude and the trigering points of the Schmidt trigger circuit. The unloaded pulse amplitude is now 3.0 volts, and the circuit triggers at -2.1 volts when the input is going negative and 1.1 volts when the input is going positive.

The clocks, Model 1404, have been held up in production because of the lack of a good trimpot. The Allen Bradley 25,000 ohm carbon trimpot has turned out to be unsatisfactory because of a discontinuity at the low end, which makes it impossible to set the clock for exactly 5 mcps. The Comp-U-Trim potentiometers made by Eastern Precision have turned out to be unsatisfactory because of erratic behavior at the low end, and because each step in the wirewound potentiometer is too coarse. Therefore we have gone back to using Bourns 20,000 ohm wirewound Tripots. These appear to be the best available. The 1404 will then go down only to 300 cps instead of 250 cps.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

Wes Baker

The digital to analog converter is no longer seriously sensitive to temperature changes and has been released for production.

The sales kit has been receiving a considerable amount of attention. The possibility of using silvercadmium batteries, or the like, for the power supply was looked into. This idea was found to be inadequate mainly on account of re-charging complications. The present power supply we are planning to use is still undergoing rapid changes, but nevertheless is progressing very well. A weight analysis was performed in order that we might lighten the kit. This has been accomplished somewhat in that parts of the test equipment covers have been removed, eliminating six pounds. Means of carrying the demonstration equipment is still being investigated. The dimensions beneath a seat of an airliner for storing the test equipment were obtained to help in planning the Kit's Size and Shape. These dimensions, in case anyone is interested, were 8"x13"x21" for D.C.-6's or -7's.

Ken Olsen

Visit from Galileo Corporation

Mr. Barti of Galileo Corporation visited us on July 15, 1959 to discuss replacing an analog computer with a digital computer in an anti-aircraft tank which they are proposing to bid on for NATO. We told him that we felt it would be of no improvement to digitalize this computer and that our equipment would be too big and not rugged enough for the job. He is, however, interested in developing digital knowhow and capability within the company and so they are very interested in buying our Test Equipment. I promised to send him literature on our memories when they are available. In a week or two we should follow up with a good sales letter to them.

Republic Aviation Computer

Republic Aviation Corporation needs a general purpose computer to try out various control techniques that would eventually be installed in airplanes. This computer would do such things as bombing control and navigation. We feel they need something like our PDP because this would give them the general purpose characteristics they are interested in. They have only about $45,000 with which to buy the computer, but they do have more to buy analog to digital converters. This thing is not supposed to look like a computer but as a piece of Test Equipment for developing and proving systems. He gave me several formulas which I told him we would demonstrate the solution of on paper.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

NATHAN BROMBERG

Flexowriter

The flexowriter has been disected and its functional operations are understood. The offline operation is no problem and a full load of extras, punch, read, etc. is needed. The necessary connections for on line operation are quite easy to make. For on line use the typewriter, the readers, and the punch can be physically separated. We already have ordered a separate punch. These units could be called in separately by the Flex. The typewriter can be just a typewriter with a coding mechanism for selection and in some cases, for going into the computer, but should contain no extra buttons and no relays.

As soon as we can make the specification we should ask for a price of a Flex Writer on a typewriter which is stripped down and a bare minimum. It seems that this would cut a significant part of the cost and we ought to find out about this. We also should get a price on a Flex Writer tape reader.

If we plan to use the on line machine in this way, we can still run all our experiments on the present machine and in fact use the present machine as if the three were separate.

Input-output plugs may be used or the existing punch and reader plugs may be connected to a black box which acts as central mode selector. The following modes are easily selected:

A) Input to DEC

1) Paper tape to computer

2) Type to computer

B) Output from Computer

1) to punch

2) to type

3) to both 1 & 2

The possibility of using lower voltage for the reader and type input is being investigated. This might simplify conversion equipment. A more detailed analysis will be made when the blue print of the "ordered" machine arrives.

An experimental circuit to drive the punch and translater coils has been developed. A Philco 2N224 used as an inverter drives an amperex 2N284A which can supply the maximum 100 ma required.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

Automatic Control

A brief study has indicated that DEC building blocks might enter the automatic control field in the area of relay control. The chief advantages of mechanical relays are their cheap and rugged characteristics. Diode and transistor switches may be very competitive since contact point failure is eliminated. Many industrial applications are low speed-below 500 cps and in this frequency range solid state devices are inexpensive. High ambient temperature conditions appear to be a possible restricting factor. The necessary engineering time is a further consideration. Relay control was chosen for the following reasons:

1) Simple to build and demonstrate

2) Control at a distance is a natural for digital data transmission, and the relay unit as a power amplifier requires no digital to analog conversion.

3) It is a good place to start work in nonlinear control which is well suited to digital techniques.

A literature search is currently under way. Much theoretical work has been done but practical applications are few and far between. The first goal of this study is the selection of a simple control problem which would benefit from digital relay control.

R.L. BEST

New Product Committee Minutes

The following numbers have been assigned:

1151: Binary-to-Octal Decoder with selected output at ground. (1150 has selected output at -3V.)

1906: A 1903 mounting panel with patch panels added.

1907: A cover for the 1901 or 1903 mounting panels.

1901A, 1903A, 1904A, 1905A: The same as the 1901, 1903, 1904 and 1905 except that the end plates are reversed.

The following units were priced:

709 Converter 1672: $120.00 We will make one lot.

Plug-In Unit Extender: $20.00

Clock 1404: Same as 1402 $130.00

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

The following units will be priced at the next meeting:

1150 Binary-to-Octal Decoder

1674 Intensity Amplifier

1904 Mounting Panel (30 inches wide, 43 sockets)

1906 Mounting Panel

First lot sizes were decided on the following units:

1560 Digital-to-Analog Converter: 10

709 Converter 1672: 20, tentative

1905 Mounting Panel: 10

Replacement Schematics will be made for all units sold. The units that are sold in the largest quantities will have inked schematics made from which copies will be run off on a printing press. The smaller quantity units will have modified sepias, and prints will be made of these as needed.

All 1901 and 1903 Mounting Panels will use end plates with the nuts added that allow the use of 1907 covers.

J.L. ATWOOD

Reaction to the initial direct mail effort has been good, with a steady volume of reply cards coming back. Publicity placements are picking up. ELECTRONIC NEWS, for example, ran both the Weeton and the Current Driver releases. We got our first mention (a good one) in PROCEEDINGS OF THE I.R.E. We also made MILITARY ELECTRONICS. The blurb on the Memory Tester in DATAMATION is turning up some leads, as is DATAMATIONS's mention of our System Building Blocks catalog.

Recent specials include: the preparation of new product bulletins in mimeograph form to provide a source of information until the regular printed bulletins are available; the reissuance of the Memory Tester Type 1511 specifications as an information piece to be mailed to prospects; and the assembling of kits for the successful Case Institute session.

The bulk of the replacement schematics have now been printed. Dottie Spaulding has shown so much proficiency in making corrections on the inked originals that we will try doing our own schematics here in the future.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER

DATE July 17, 1959

Two major projects to be undertaken immediately are (1) the start of our space advertising program and (2) the splitting off of the purely office service functions which we have been handling in Advertising. Both are basic to carrying out an expanded and intensified sales effort.

##

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER 2

DATE July 2, 1959

KENNETH H. OLSEN

We started a project to develop a magnetic core handler which will be used in production testing of single ferrit cores. We came up with a handler just simple, straight forward, and inexpensive. We will market it as an accessory to the rest of our Test Equipment. We have already bought the vibrating feed mechanism for this. The Account Number for this job is EN101.

MAYNARD SANDLER

Status of Finished Units:	On Hand	On Order	Status	In Process
Test Equipment	274	14	260	460
System Equipment	350	180	170	420

Units Delivered to Stock:	JAN	FEB	MARCH	APRIL	MAY	JUNE
	608	409	1176	1052	873	1040

Thanks to the cooperation of all departments, our inventory-taking program was carried on smoothly and, we believe, accurately. Special thanks to Henry Crouse, John Conley and Jim Meyers for volunteering their time. We expect to complete pricing and extension of inventories next week.

ROBERT HUGHES

An oven for making engineering experiments was ordered and received. We are attempting to stabilize the characteristics of 2N224 transistors by heat treating them in the oven.

The engineering stockroom has been reorganized making things easier to find etc.

We have received 20 Clare mercury relays and tested them. Most of these relays will operate on 1 or 2 milliwatts of power at speeds up to 300 cycles per second.

We are now building our own chokes, a 56 micro Henry choke consists of 14 turns of #25 wire on a ferramic H core. This item is used in the 667 and 1667 Level Amplifier.

Delays 302 and 1304 have been modified in hope of eliminating a noise sensitivity problem.

Flip-Flops 201 and 1201 are being modified to eliminate overswing after the overshoot on their pulse output. This will be done by damping the transformer.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER

DATE July 2, 1959

WESLEY BAKER

An accurate means for measuring incremental inductances in saturated cores is being looked into.

The power supply for the sales kit is progressing. The type of transformer and zener power diodes to be used is being investigated.

The display decoder was found to be sensitive to ambient temperature changes which alter the reference voltages. Consideration is being given temperature compensating devices at the present time.

HELEN LE BLANC

New Employees

Susan Jobin	Typist-Advertising Dept.	6/29/59
Richard Bank	Rec. & Shipping Clerk	6/29/59
Dorothy Spaulding	Tracer-Drafting Dept.	6/24/59
James Myers	Administrative Assistant	6/22/59

Offers made and accepted

Nathan S. Bromberg	Starting 7/6/59
John B. Brown	Starting 7/13/59
Ed Harwood	Starting 7/13/59

JON FADIMAN

Progress Report on General Ceramics Memory Tester, MT-1511

The Switch Panel and Timing Control Panel have been constructed and wired up. The 744 Power Supply has been completed. The other power supplies (5 type 749, 1 type 740, and 3 type 732) are about to be produced. All final drawings for these have been completed. Final drawings for the Current Drivers have been made, and these units are about to be made in production.

All four logic panels have been completely wired and checked out. Of the four panels containing the Read-Write Switched, two have been wired up, and two are in the process of being wired. The Sense Amplifier Panel and Output Plug Panel have been made, and are about to be wired up. The Current Calibrator 70 has been drawn up.

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER

DATE July 2, 1959

The Sense Amplifier 1546 PIU has been checked out satisfactorily, and is about to be put in production. The Intensity Amplifier 1674 PIU has been designed, and a model is being made. The Read-Write Switch 1971 PIU and First Level Select 1673 PIU are now in production.

Two Memory Tester Consoles arrived yesterday, and they are being put together today. Interwiring of the panels will start this afternoon.

J. L. ATWOOD

Digital publicity items spotted recently in trade publications include two each in ELECTRONIC DESIGN and DATAMATION, and one each in AUTOMATIC CONTROL, INSTRUMENTS AND AUTOMATION and the ISA JOURNAL. As usual, ELECTRONIC DESIGN is producing a large response.

Special jobs in process include the new purchase order form, back-panel and drawing identification stick-on labels for Engineering, vinyl decorated ring binders, a Digital secretarial manual, and equipment photos for the reception room. Preparations are made to stock the West Coast office with a supply of suitable sales promotion material, and work is underway on the July mailing.

Among the new equipment items we have to work with are: (1) a laminating machine to use for report covers, drawings, identification badges, and other objects which can be made more permanent, more attractive or more useful through the application of plastic lamination; (2) a mimeoscope to facilitate the production of stencils for test data sheets and similar forms and tables; (3) an air brush for photo retouching; and (4) a tripod, contact print dryer, printer, easel, projection screen, print washer, print dryer, flood and spot lights, and miscellaneous darkroom supplies.

A "DF" numbering system has been established for all printed materials, with a DF (or Digital Form) number assigned to each printed item we produce. This will help us to maintain more accurate inventory controls, and it will be particularly useful in identifying changes in the contents of our various manuals when they are issued.

The first round of the "Computer Training Class" has about been completed. We will have one more session, probably in Engineering where we can see DEC equipment in operation, and then it will be time to survey the results.

digital equipment corporation
MAYNARD, MASSACHUSETTS
DAP-971

BIWEEKLY REPORT

COPY NUMBER

DATE July 2, 1959

The Company Outing Committee has met and organized, with August 29 selected as the initial target date. Stan Olsen and Bob Reed are working on program plans, Marty Ring and Don Witherell are checking on available locations, Gloria Porrazzo and Dick Krauchune are planning a menu, and Catherine Snow and George Gerelds are looking into the catering situation.

R. L. BEST

Voltage Converter 1672 will convert from IBM 709 levels (+10 and -30) to DEC levels and vice versa. Four circuits will be in each package, 2 for 3-40 and 2 for 40-3 conversion. (PR1161).

Sense Amplifier 1546 was designed specifically for the Memory Tester 1511, and has been made more flexible so that it can be generally marketed. It will have gain and slice controls that can be replaced by external gain and slice controls. (PR 1158).

We now make a 57 uh choke on a Ferramic H core; much cheaper than buying them. It is used in the new Level Amplifiers 1667 and 667, to slow down the 2N501 transistor. (PR 1157).

Intensity Amplifier 1674 is for the MT1511; it contains a 6 input AND gate (like the 1110) and puts out a positive 60V gate.(PR1156).

1905 Mounting Panel will be 24 inches wide and have sockets on 5/8 inch centers. (PR 1154).

SPU Extender 1954 is a new design to replace the 1970 sold to MITRE. The new unit has an etched card. (PR 1152).

Digital-to-Analog Converter 1560 is specifically for MT1511 display. It may be used in conjunction with an additional somewhat similar converter in the PDP-1 to give a 10 bit conversion. The 1560 does a 6 bit conversion. (PR 1151).

The Flip-Flops 1201 and 201 are having damping added to the transformer to eliminate an embarassing second overshoot on the carry output pulse. (PR 1149 and 50).

The new Level Amplifier 667 is finally becoming a reality. It will replace the 666, and will contain 4 separate amplifiers and no logic. The output will be 0 and -15, with a provision for reducing this voltage by clamping to an external supply. (PR 1146).

digital equipment corporation
MAYNARD, MASSACHUSETTS

DAP-971

BIWEEKLY REPORT

COPY NUMBER

DATE July 2, 1959

A Level Amplifier 1667 has also been designed; same circuits as the 667, but six to a package. Nobody seems to want it real bad right now, so it is moving very slowly. (PR 1147).

Current Drivers Models 50 and 60 are now being produced along with their special power supply 749. (PR 1143-5).

A lot of 801 Relays has been made. It differs from the first lot (made a year ago) in that full size boards are used. A new angle bracket was needed to make this possible. (PR 1129).

Changes started since June 5

Pulse Generator 410 has a new front panel allowing option as to pulse polarity. An improved circuit makes for more reliable operation. (EC 1125).

Pulse Generator 1410 has the same new circuit as the 410. (EC 1126).

730 Power Supply has a new terminal board screen so that it is clear that neither ouput terminal is grounded. (EC 1133).

740 Power Supply has a new terminal board of the same style as the 730. (EC 1134).

The Delay 302 and 1304 have had a bias circuit added to prevent their being triggered by capacitive coupling through the input transistor when it is cut off. (EC 1137-8).

The Tube Pulser 650 now has a modern output stage as to other pulse amplifiers. (EC 1140).

digital equipment corporation
MAYNARD, MASSACHUSETTS
DAP-971

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER 2

DATE June 19, 1959

M. SANDLER

Status of Finished Units	On Hand	On Order	Status	In Process
Test Equipment	317	--	317	620
System Equipment	344	203	141	570

Units Delivered to Stock to date: 720

Tuesday, June 30, marks the close of our fiscal year. We will take physical inventory as of the close of business that day. Normal operations will continue during inventory taking. Starting Friday, June 26, the Production Stock-Room will be closed to all personnel other than Production Control, but issues and receipts may be made by contacting Bob Graham or Maynard Sandler.

S.C. OLSEN

Production

We are getting ready to start system production utilizing the girls for back panel wiring.

I hope winter is finally over so we can depend on more than 60% attendance in assembly.

Building

The new entrance is finished now, so we can tighten up security on the building. All employees will enter and leave by the front door. All other doors will be kept locked. No outsiders will be allowed beyond the reception desk without an escort.

Personnel

The following people have accepted positions with DEC:

Susan Jobin	June 29	Typist
Nathan Bromberg	July 6	Engineer
Ed. Harwood	July 15	Engineer Associate
John Brown	July 13	Sales Engineer

H.E. ANDERSON

Two alternative lease plans are now available for use with DEC equipment. In general these can be offered to customers for purchases of over $5,000.00 subject to customer's credit rating. We

digital equipment corporation
MAYNARD, MASSACHUSETTS
COMPANY CONFIDENTIAL

have never used either of these arrangements as yet and you can see me for the details. No publicity concerning the availability of lease arrangements will be released at the present time.

A rather long list of new products "sans literature" was made at the first meeting of the New Product Committee. Priority attention will be given to these units since some of them are already in the stock-room.

Our new two-page listing in the Electronic Engineers Master (EEM) came out recently. A copy is in the catalog file.

New books received for the Library during the past two weeks.

1 "Marks Mechanical Engineers' Handbook" by T. Baumeister
1 "Handbook of Physics" by Condon & Odishaw
1 "Feedback Control Systems" by O.J.M. Smith
1 "Automatic Feedback Control System Synthesis" by J.G. Truxal
1 "A Manual of Engineering Drawing for Students & Draftsman" by T.E. French & C.J. Vierck
1 "Electronic Digital Computors" by C.V.L. Smith
1 "Servomechanism Fundamentals" by Lauer, Lesnick & Matson
1 "Graphical Communication" by E.D. Black
1 "Control Engineering Manual" By B.K. Ledgerwood
1 "Components Handbook" by J.F. Blackburn
1 "Process Instruments & Controls Handbook" by D.M. Considine
1 "Random Processes in Automatic Control" by Laning, Halcombe & Battin

JON FADIMAN

Progress Report on General Ceramics Memory Tester: MT 1511:

The Switch Panel and the Timing Control Panel have been drawn up, and are now being made in the sheet metal shop. The special power supplies 744 and 732 have been laid out and drawn up, and are about to be manufactured. Both the Sense Amplifier Panel and the Current Calibrator Panel have also been drawn up.

The Final Block Schematic for MT-1511 (D-00419) has been completed showing all pin connections, etc, for the logic and switches in Rack 1. A wiring diagram for the Switch Panel has also been completed. Complete point-to-point wiring diagrams for the four mounting panels in Rack 1 have been finished, and wiring will commence today.

BIWEEKLY REPORT

COPY NUMBER

DATE June 19, 1959

Models of the First Level Select 1673 and the Read-Write Switch 1971 have been received and tested out. With some very minor modifications these are satisfactory. The Sense Amplifier 1546 has been designed, drawn up, and laid out. A model will be made next week. This unit is designed to be used in the Memory Tester and in future memory systems. It will also be available as a commercial item. Provisions are made for both internal and external gain and slice controls. The first stage is a linear difference amplifier with a gain variable from 5 to 85. The sense amplifier will amplify slice signals from 10 millivolts up to 1 volt.

J.L. ATWOOD

Of most immediate interest is the mailing now going out to some 3800 people on our mailing list. It contains a "Digital Developments" newsletter, an "Applications Note" on decimal counter application of DEC Building Blocks, a sample of the imprinted tracing paper of 1903 pin connections, and "Product Bulletins" on the 50 and 60 Current Drivers, 1210 Shift Register and 1669 Indicator Driver. It also contains a reply card which can be used for such benign purposes as asking for a salesman to call.

New circuit schematics on test equipment units, system building blocks and power supply are being fed to the printer as quickly as the final corrections are made. Within three or four weeks, we should have completely up-dated schematics on hand for all production units.

Other projects are edging forward -- none as fast as we would like but some much faster than we could normally expect.

T. JOHNSON

Trips were made to I.B.M. at six locations, Bell Laboratories, Republic Aviation, Kearfoot, Columbia University and others in the area. Our equipment is being actively used for classroom instruction at R.C.A. Institute. Possible large order from Bell Laboratories in the future. Sanders will be placing order for new group and seem pleased with their experiences with the equipment. Kearfott ordered small quantity for magnetic head test. Scheduled tovisit to Martin, Orlando, Florida and Cape Canaveral in the coming week. Republic Aviation possibly interested in a computer.

COMPANY CONFIDENTIAL

KENNETH OLSEN

We bought a new deep throat Alva Allen Press for doing our light sheet metal work. This unit is weighted at three tons which is big enough for most of our work.

We are looking at a used 10KW Spot Welder which we would use to spot weld up sheet metal jigs for our press work.

We are looking into tumbling for all our sheet metal work to remove burrs. Right now deburring is a very expensive and tedious operation. With the tumbling we should be able to do a good job with very little effort. Our System Building Block panels, right now, are being wire brushed which is not completely satisfactory but the combination of sanding and tumbling should take care of all scratches and burrs.

MAGNETIC CORE MEMORY

We have ordered some thermostats from Fenwall to be used in our experimental oven, to temperature control the memories so that it will be operated at about 130° F, independent of ambient temperatures.

HUGHES

The 650 Tube Pulser has had a 2N588 transistor installed in it in place of a 2N393 (H).

A 20 megacycle clock and 3 20 megacycle flip flops were built in order that we may design our 10 megacycle line of equipment.

The 667 and 1667 level amplifiers are held up temporarily for a slight engineering change a choke is being added to the input circuit to slow the input down a bit. This is being done because the 2N 588's have so little hole storage in them that very fast "ringing" of the input signal appears in the output circuit. The replacement transistor which we will use in this circuit is the 2N393H.

COMPANY CONFIDENTIAL

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER 2

DATE June 5, 1959

KEN OLSEN

Programmed Data Processor-1

As part of our Advanced Development program, we have scheduled a high speed digital computer which we hope to have operating by fall. We have already bought 20 planes of 1000 bits each for the memory and the cabinet is set up. The block diagram and timing charts are completed in the first draft.

This machine will be 20 bits in length, 14 of which will select memory and six will be used for addressing orders. It is patterned somewhat after TXO in that it has no multiplication or division and contains only a memory buffer register, an accumulator register and a program counter register. We will also have an operate instruction that will use the memory address portion of the word to select unaddressed orders.

For a while the only in-out equipment will be a Flexwriter which we have on order and which should be delivered within the month. Later on we will use this machine for developing our magnetic tape circuits and oscillascope display equipment.

We always were convinced that our circuits were very economical to use even though the prices may appear high at first but when we laid out this machinery we can see how economical they are. The machine will take just five 1901 mounting panels for the arithmetic elements and control and just four for the memory. All this and power supplies can fit in one rack but we are putting it in two to have room for expansion. We plan to sell the memory as a building block. It will be possible to fit three of these memories which in production will contain 4000 words in a standard 6 foot rack.

H.E. ANDERSON

Two significant sized orders for System Building Blocks came in during this week and each was shipped "off the shelf" on the next day. We are hopeful that this can become a standard procedure before long.

It was decided that we will exhibit our products in the Instrument Society show in Chicago in September. This appears to be a well attended show which reaches a potential market not well worked by DEC.

Recent publicity promotion and general interest in the "NOR circuit" have prompted consideration by DEC of another sales

COMPANY CONFIDENTIAL

approach. This will center around our Diode Units (110 and 1110) which are essentially NOR circuits with diodes in place of the usual resistors. If it looks promising this added sales approach would consist of two main ideas.

1.) Lower the price of our 110 and 1110 significantly (perhaps around $50.00).

2.) Advertise (direct mail and maybe space) that DEC has "NOR type circuits" as one member of our logic family.

3.) The objective would be to get more people to investigate our products in detail. (Particularly people who previously dropped further consideration because of price or prejudice for NOR circuits.) This plan if used, does not necessarily imply a change in opinion concerning overall economy of NOR circuits.

The first step in this program is to make something such as a counter etc. out of "NOR circuits" to increase our understanding of the principles. Ted Johnson is doing this.

Library

During the past two week period we received the following books for our library.

"American Institute of Physics Handbook" by Dr. E.E. Gray
"Engineering Manual" by Robert H. Perry
"Industrial Inst. for Measurement & Control" by T.J. Rhodes
"Automatic Control Engineering" by E.S. Smith
"Servomechanism Analysis" by G.J. Thaler & R.G. Brown
"Essentials of Industrial Management" by L.L. Bethel
"Introduction to Industrial Management" by F.E. Folts
"Mathematics for Engineers" by R. Dull & R. Dull
"Principles of Mathematics" by C.B. Allendoerfer & C. Oakley
"Mechanics" by J.P. Den Hartog
"Electronic Instruments" by I.A. Greenwood, Jr. & D. MacRae
"Increase Your Sales Volume" by M. Leffler

STAN OLSEN

Production

Eddie Nashawaty of Nash Mfg. is now helping us out in the sheet-metal shop on a part time contract basis. The arrangement seems to be working out well.

Component Manufacturing fouled us up by shipping faulty material.

BIWEEKLY REPORT

COPY NUMBER

DATE June 5, 1959

It seems they are making their own banana pins, and used the wrong berilium copper. They also neglected to spin the end.

U.S. Rubber and AMP have come out with a new shrink fit tubing that looks interesting. The heat shrinking seems to be a lot easier than our present dialation in Zylol.

Have you seen the new smocks?

Building

Well, we missed the May 1 deadline, but it looks like by Friday, June 12, our major leasehold improvement program should be over.

The red tape for getting 400 amp service to the building has been started. Boston Edison changed the 25 KVA transformer on our Pole to 50 50 KVA.

Personell

The following people have accepted positions with DEC:

Walter Weeton	June 15	Sales Manager
Melvin Arseneault	June 15	Technician
Hyman Comer	June 15	Technician
J. Wesley Baker	June 15	Engineering Aide (Summer)
James Myers	June 22	Sales Assistant
John Brown	July 13	Sales Engineer

HUGHES

The addition of 2-2N588 transistors in the internal flip-flop was a success. Flip flop performance has been improved (better trigger sensitivity, more consistant delay time and faster total transition time. This change is also being made on 201 Flip-Flops.

A new 2^6 Digital to Analog converter has been designed and performs quite well.

Our new level amplifier model 667 was compared with the model 650 tube pulser to see if the 667 could replace the 650. Results indicate that the 650 can drive much heavier capacitive loads. The 650 circuit will be brought up to date. (a little more internal beef)

Some of the parts for the power supplies which will be used in

digital equipment corporation
MAYNARD, MASSACHUSETTS
DAP-971

the sales kits have arrived. We hope to eliminate the battery packs which our salesmen now carry with equipment.

Work is starting on the 10 and 30 megacycle flip-flops.

The 410 and 1410 Pulse generators one being modified to use 2N588's throughout. (In addition to cutting costs performance will be improved!)

SANDLER

Status of Finished Units	On Hand	On Order	Status	In Process
Test Equipment	207	114	+93	740
System Equipment	269	--	+269	480

Units Delivered to Stock:	March	April	May	June to date
	1176	1052	873	240

FADIMAN

The past two weeks have been spent almost entirely working on the Memory Tester, MT 1511, for General Ceramics. A time schedule has been worked out calling for the completion of the construction of the machine on July 31st, and the completion of all debugging by August 21st. We have promised to ship the machine on September 14th at the latest, but an earlier delivery date is planned.

All outside parts have been ordered, and a complete list of all DEC parts needed has been prepared.

All logic has been decided upon, and the old MT 1510 block diagram has been marked up. The new block diagram is now being drawn.

The First Level Select Circuit, 1673, has been laid out, and a model will be produced shortly. The Read-Write Switch, 1971, has been designed is now being laid out. The Current Calibrator has been designed. The Switch Panel has been laid out, and the drawing is now being completed. The other front panels will be laid out in the next few days.

R. BEST

General

The new clocks, 1404 and 402, go down to a lower frequency than

the older types 401, 1401, and 1402. We will have to wait for a production run to determine the lower limit that we can guarantee. It will be somewhat higher than the 250 cycles mentioned in the May 24 biweekly.

New Items Under Development since May 22

1904 Mounting Panel: A 30-inch wide mounting panel for SPU with the same spacing as the 1901. It holds 43 plug-in units. (PR 1109)

732 Power Supply: Same as 730 Power Supply but without meters or knobs. Voltage is varied with a screw driver control from the back. (PR 1117)

744 Power Supply: A dual 8 volt floating supply for use in the Memory Tester. (PR 1116)

1673 First level Select: a Half of a binary-to-octal decoder for use with the Memory Tester; standard input levels, but output levels of 0 and +23. (PR 1115)

1971 Read Write Swit : For the Memory Tester. (PR 1114).

667 Level Amplifier: Work started on this April 14; the current PR is 1111. It now contains 4 2N588(U) transistors instead of 2N501's. It is intended to replace the 666, and has 4 channels in it.

Engineering Changes started since May 22

1901 Mounting Panel: Being modernized to have eyeleted solder lugs and the new cable clamp. (EC1123)

201 and 1201 Flip-Flops: The internal flip-flop transistors are changed to 2N588(W). This is a 2N588 which passes the 2N501 beta and saturation specs. A much more consistant FF performance is obtained along with lower cost. The circuit is otherwise unchanged; if 2N588 (W)'s are in short supply, 2N393's may still be used. (EC 1121)

302 Delay and 1304 Delay: A capacitor was added, shunting the input transformer. This is to filter out the capacitively-coupled input pulse that would sometimes trigger the delays when the input transistor was gated off.

BIWEEKLY REPORT

COPY NUMBER

DATE June 5, 1959

ATWOOD

Since the last report on advertising we have added two people -- Elaine Benoit and Frank Howland -- who are working into our operation very nicely. Both have helped us get underway a number of important projects which had been hanging fire.

We have also added some badly needed new equipment -- a manual typewriter with several particularly useful special features, a more adequate postage metering machine, a view camera and enlarger for product promotion and publicity photos, a more versatile photocopying machine, and more Leroy lettering accessories. All of these items should contribute to shortening the time lage between original idea and completed literature.

The kind of material being handled in Advertising runs the range from office forms to prestige mailing pieces. Among the jobs recently completed are: materials for setting up the library, biweekly report forms and binders, a special file folder for DEC literature sent to customers and prospects, a new company logotype, new mailing labels, new proposal covers, interoffice memo forms, and forms to be used in informing our mailing list about new developments, new products and new product applications at DEC.

In the works are: imprinted tracing paper for standard A and B size drawings and for 1901 and 1903 wiring diagrams, a new employment application form, photos for the reception room, up-dated Test Equipment and System Schematics, a purchase order form, property and back panel labels, vinyl ring binders for customers and good prospects, a quotation rejection notice, an application note on BCD counters, and product bulletins and news releases on Current Drivers 50 and 60, Indicator Driver 1669, Three Digit Shift Register 1210, and Decimal Decoder 1671.

A number of other jobs such as a complete new set of logic stamps, new instruction sheets, a combined catalog, a design for enlarging our trade show booth, a special artype sheet, and a pictorial research report by United Press on our installation at IBM -- are just waiting to be launched.

The present schedule calls for a good amount of activity in all areas of advertising and promotion. In direct mail, the aim is one mailing a month to the complete mailing list (which numbered 3297 persons in 1171 firms and organizations at last count). In sales literature, it is the issuance of up-to-date instructions, schematics and catalogs; an instruction manual; a set of parts lists; and other key materials. In trade shows, it is to exhibit at WESCON, the I.S.A. Show, EJCC, NEREM, and possibly, the Automation Show. In publicity, it is to get proper attention for new products, new applications, new people, and new facilities.

digital equipment corporation
MAYNARD, MASSACHUSETTS
DAP-971

BIWEEKLY REPORT

COPY NUMBER

DATE June 5, 1959

In space advertising, it is to establish a regular schedule in at least two of the major trade papers and a number of the specialized regional or professional publications.

All in all, it could be a busy summer.

JOHNSON

We will have to check on patch-cord situation among those who received recent shipments. Undersupply coupled with faulty plugs rates patch cords as the present major problem.

Current drivers will be of interest to several people on planned trip next week to IBM and Bell Labs. Florida will be revisited soon, pending Martin, Orlando arrangement. Itek undergoing reorganization. (Some people left) and is delayed as potential

##########

digital equipment corporation
MAYNARD, MASSACHUSETTS

DAP-971

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER 2

DATE May 22, 1959

SANDLER

Status of Finished Units:	On Hand	On Order	Status	In Process
Test Equipment	236	96	140	480
System Equipment	445	3	442	300

Units Delivered to Stock:	Jan.	Feb.	March	April	May to Date
	608	409	1,176	1,052	714

BEST

Circuits under Development

(1) Voltage Converter 1672: For converting between IBM 709 levels and DEC levels. It contains two circuits for converting IBM +10 and -30 volt levels to 0 and -3, and two circuits for converting DEC 0 and -3 volt levels to IBM +10 and -30. It is in the bread-board stage, and is for a Lincoln application which involves connecting a real-time clock to the IBM 709.

(2) Binary to Octal Decoder 1150: Has six inputs from three flip-flops driving + diode AND gates (like the 110) giving eight inverter outputs; selected output is negative. Has been laid out in SPU package, and the model has been built. Not yet tested. To be used in our computer for decoding commands, and possibly also for decoding memory address. A companion unit is under consideration which would contain eight -3 input negative AND gates.

New Production Releases since May 1

1092: Pulse Transformer T2014-an 8:7:7:7 transformer on a Ferramic H core for new 1201 Production. It increases the trigger sensitivity of the flip-flop.

1091: Clock 1404 - a new improved clock which will replace the 1402 (same pin connections.) The 1401 uses different connections, and has the old 1402 circuit. The 1404 is so much better, with respect to freedom from susceptibility to ripple on the power supply, and also with respect to frequency coverage (250 cps to 5 mc instead of 500 cps to 5 mc) that we should encourage all customers to switch to the 1404. The new Clock 402 uses the 1404 circuit.

COMPANY CONFIDENTIAL

BIWEEKLY REPORT

COPY NUMBER

DATE

May 22, 1959

Engineering Changes Completed since May 1

1103: The Flip-Flop 1201 had some capacitors modified to shorten its delay. We overshot; change 1105 returns to a compromise value.

1097: The Flip-Flop 201 had some capacitors modified to shorten its delay.

1094: The Flip-Flop 1201 had a new transformer installed, T2014 (see New Product Release 1092 above).

1093: Flip-Flop 201 had 2 capacitors increased to improve the set and clear sensitivity.

1090: Power Supply 721 had a minor change in a resistor value to make them give +10 volts at ½ rated load (80 ma.)

Engineering Changes Started and Not Yet Completed (since May 1)

1105: Flip-Flop 1201 - change capacitors to correct delay (see change #1103 above).

1104: Clock 402 - an extra hole is being eliminated in the card.

1102: 901 Mounting Panel - the mounting holes in the phenolic board are being shifted to minimize the shorts from +10 to ground.

1101: Pulse Generator 410 - card is being relaid out to eliminate crossed transformer leads.

1100: Pulse Generator 1410 - card is being relaid out to eliminate crossed transformer loads.

1098: Power Supply 730 Front Panel - meters and pots are being moved slightly to allow space for the trade mark. No drawing existed for this panel.

1095: 721 Power Supply - a hole was added to mount a power resistor in a more satisfactory manner. The 110 VAC connector was changed to a three pin type which allows grounding the chassis through the power cord.

HUGHES

20-Clare mercury relays have been ordered for use in current calibrators, transformer testers, and hole storage testers.

digital equipment corporation
MAYNARD, MASSACHUSETTS

DAP-971

BIWEEKLY REPORT

COPY NUMBER

DATE May 22, 1959

These relays can be driven directly from our flip-flops or may be driven from 6.3 volts A.C.

2N588's are being tested to see how many of them can pass 2N393 and 2N501 specifications the results look promising.

A 26 digital to analog converter was built and worked but had a thermal time constant in it. It took five minutes to warm up. The trouble was traced to a change in the 2N167 transistor. A few drops of ice water on each transistor would knock the converter out of alignment. A new approach will be tried.

FADIMAN

The past two weeks have been spent doing mostly memory work. Dick Best and I have worked out a switching circuit for a memory using a General Transistor NPN bilateral transistor for the switch, and two other NPN transistors for driving the switch. We have also considered a similar scheme using PNP transistors, and we are now obtaining data on these. The present scheme indicates a turn-on time of 0.2 microsecond, and a turn-off time of 0.6 microsecond.

The decoding circuit and Read-Write switch for the Memory Tester Type 1511, has been designed. This circuit uses two Philco 2N671 transistors for switching, and Amperex 2N284A transistors for driving them. This switch will handle currents up to 800 ma., and will tolerate a back voltage of 20 volts. It appears that the turn-on time at this current level will be about 12 microseconds and the turn-off time about 6 microseconds.

On Monday, April 20, Harlan Anderson and I visited General Ceramics Corporation in Keasbey, New Jersey, to discuss selling them a Memory Tester. The sale was successful. We also visited I.T. & T. Laboratories in Nutley, New Jersey, and discussed our line of Test Equipment with the computer group there. Some interest, but nothing definite.

The new clocks, Model 402 and 1404, are now in production.

Coils have been received from the R.D. Brew Company for making a 1 microsecond tapped passive delay line.

digital equipment corporation
MAYNARD, MASSACHUSETTS
DAP-971

BIWEEKLY REPORT

COPY NUMBER

DATE May 22, 1959

JOHNSON

Sales Trip

Covered Key places in San Francisco, Los Angeles, San Diego and Chicago. We have lost out at Berkeley to current switching logic. One reason was new RCA npn transistor, TA 1868 and TA 1875. Some chance to do buffering part of their job with our units. China Lake small order is definite but delayed. JPL has dropped transistor program, going to magnetic core logic. JPL and NEL potential customers which could pop through any time. General Telephone (Automatic Electric), Cubic Corporation, small group at Hughes, and Arnold Electric on more immediate potential orders. Current drivers will be of interest to many of people I visited.

#########

digital equipment corporation
MAYNARD, MASSACHUSETTS

DAP-971

H. E. Anderson

Subject: BI-WEEKLY REPORT, FEBRUARY 17, 1959

To:

K. Olsen	Johnson	Fadiman
Anderson ✓	Sandler	Hughes
S. Olsen	Best	Atwood

FADIMAN

Work has continued on the RCA Memory Tester. The new re-write switches #1970 have been built, tested and installed, and they operate satisfactorally. The logic for the autostart switch has been wired in, using two delay units in series. This is now satisfactory. The dual -20 volt supply was installed in place of the -15 volt supply.

The final sense amplifier panel was built and installed, using two sense amplifiers on etched cards. The panel was installed containing a meter for the -70 volts and banana jacks for looking at the sense amplifier output and strobe. Four jacks are also provided for scope sync. The new alarm panel has been installed. This will indicate an alarm either by sounding a buzzer or by lighting a red light.

The present decoder has been modified so that the voltage input is from the -40 volt supply. This gives good spot resolution without the use of the very large capacitor previously required. The intensity amplifier consisting of one Philco 2N671 transistor has been mounted inside the decoder.

An extra flip-flop has been wired in for the double complement, but this operation still needs further work in order to operate properly. The final models of the current drivers are now under construction. One further Bismack 64 X 64 stack was tested out during the past two weeks.

ANDERSON

A quotation to Holloman Air Force Base has been submitted. This is interesting because a man out there with no more than our old blue literature generated a design using several hundred units (total value about $34,000). This is dangerous, however, to go so far based on so little information.

The need for more and better types of literature, particularly instructional and application, is becoming more and more important. New visits from people inspecting our facilities are being made constantly.

The replacement of 1201 flip flops in the field is going to involve a fair amount of coordination with customers.

SANDLER

Status of Finished Products

	On Hand	On Order	Status	In Process
Test Equipment	135	231	-139	160
(201, 302, 410 held for change or release)				
System Equipment	77	326	-267	344
(1303, 1410 held for change or release)				
System Specials	3	593	-593	210
(1207, 1302, 1602, 1604 held for release)				
Totals	215	1150	-999	714

Units Delivered to Stock

To February 13	184

JOHNSON

Spent over two weeks calling on various potential and active customers. Key places in my trip were China Lake USNOTS, JPC, Sandia, Holloman AFB, AE Phoenix, Remington-Rand Minneapolis, and NCR in Dayton. We expect orders from Sandia, Holloman, and China Lake.

Autonetics indicated need for setting up incoming inspection. We are arranging a documentation of test procedures which will possibly tie into the literature crash program.

ATWOOD

Geographical breakdown of 1958 trade show and publication inquiries indicates - (and is only an indication) - that New York and California each accounted for approximately 20% of the inquiries received. Massachusetts (10%), New Jersey (8%), and Pennsylvania (7%) ranked third, fourth and fifth. Maryland (4%), Ohio (3%), Illinois (3%), and the District of Columbia (2%) rounded out the top nine.

The direct mail list has been set up to provide maximum utility. Cards are filed by states, and cards for each state are arranged alphabetically by city, then by company, and finally by person. As a result, it is reasonably simple to assess the amount of "documented" interest in our products in a specific locality. This should be very helpful in planning sales trips and localized direct mail campaigns.

The Rex Rotary silk screen mimeograph has been delivered and installed. (Hopefully this report will be run off on it.) We expect this to make a big difference in the legibility, quality, quantity, and variety of our home-done printed matter.

Recruitment continues on a somewhat reduced but certainly more selective basis. This week we are pulling out of the Framingham and Clinton papers in order to probe the Fitchburg-Leominster area. Rough copy and layout have been prepared for a general purpose recruiting folder describing in brief what our organization is, what it does, and what opportunities it offers the qualified applicant.

STANLEY OLSEN

Personnel- Since Miss Murphy has come with us the Personnel office has come into being. Her experience is: an Associate Degree as an Executive Secretary and several years with General Electric, International, and Bradley Container as an Executive Secretary. Some of her previous work experience has been personnel in nature and therefore she falls right in line with her required activities here. These activities include the setting up of a permanent personnel file, screening all job applicants, checking references on prospective job applicants, investigating sources of specialized personnel, and handling Blue Cross and Blue Shield.

Production- The Production Department now has a full-fledged Quality Control Section under the leadership of George Geralds. We are hard at work solving the many problems of centralizing all inspection. One of the biggest contributions so far is the investigation and correcting the reasons for some of our large reject rates.

BEST

Pulse Transformer Tester

Two Pulse Transformer Testers have been completed - one for the 2-winding and the other for the 4-winding transformers.

1201 Flip-Flop

The 1201 Flip-Flop has been modified in order to make it more stable. This went into production last week and a second change was needed in order for units to pass test. An Engineering Change has since been made to cover this latest change.

HUGHES

Ken Olsen and Robert Hughes have given some thought to plating a photo-cell on an Ne-2 type neon lamp as an inexpensive way to make a bi stable device which we call a "Lumistor".

The batch of 100 2N588's have undergone some tests (Vce at 8MA. and lo current beta) and have considerable spread in their characteristics.

The following units have been modified during the past biweekly period:

Pulse Amplifier 1602-04	CN # 1020
Pulse Generator 1410	CN # 1022
Flip Flop 1201	CN # 1024
Flip Flop 201	CN # 1025
Flip Flop 1201	CN # 1026

In brief, the pulse width on the 1602-04 was widened from 0.06 microsecond to 0.10 microsecond because it is nice to use a wide pulse on low frequency circuits.

The 1410 Pulse Generator now has (we believe) a normal output pulse at push button frequencies. (Some units in the past have had low output amplitude at P.B. frequencies).

The Flip-Flop 1201 has two 320A diodes added to bias the bases of the flip flop transistors. This will prevent flip flop from "sticking" in the future.

Subject: BI-WEEKLY REPORT, JANUARY 30, 1959

To:

K. Olsen	Johnson	Fadiman
✓Anderson	Sandler	Hughes
S. Olsen	Best	Atwood

SANDLER

Status of Finished Products

Test Equipment

ON HAND	ON ORDER	STATUS	IN PROCESS
137	125	-35	200

System Equipment

ON HAND	ON ORDER	STATUS	IN PROCESS
97	218	-132	250

System Specials

ON HAND	ON ORDER	STATUS	IN PROCESS
11	420	-409	130

Memory

ON HAND	ON ORDER	STATUS	IN PROCESS
--	(70)	(-70)	(70)
TOTALS 245	763	-576	580

Units Delivered to Stock	To January 28	December
Test Equipment	161	200
System Equipment	274	200
Special	103	90
	538	490

HUGHES

The following units have been modified during the past bi-weekly period. Interested parties may find out in what manner they have been modified by referring to the Change Notices.

Flip-Flop 201	Change Notice 1019
Pulse Amplifier 605	Change Notice 1018
Delay 1303	Change Notice 1017
Delay 302	Change Notice 1016
Delay 301	Change Notice 1015
Flip-Flop 1201	Change Notice 1014
Pulse Amplifier 1606	Change Notice 1013
Diode Unit 110	Change Notice 1012

The following units for SABRE have been released for production:

Flip-Flop 1208
3-bit Shift Register 1206
Low Speed Logic 1120

We have used an inexpensive drift transistor type 2N588 (Price $1.88) in the 605 Pulse Amplifier. This transistor is a nice high frequency amplifier and it will be used in other places such as the Clock, etc.

ANDERSON

Sales: New orders were received from M.I.T. Servomechanism Lab, AC Spark Plug, MITRE, Sanders Associates, RCA (Camden), and Electronics Systems, Inc., (Boston). Nothing is known about this latter customer. He has ordered two units of test equipment.

New quotations have been submitted to MITRE, IBM, and Daystrom that are expected to become orders before too long.

Facility inspections have been made at DEC by Raytheon (Wayland) and Sanders Associates.

New potential customers that are not mentioned above but are likely to place orders in the near future include Navy (China Lake, California).

Ted Johnson has spent this past week in California and will be spending the next week with potential customers between there and here.

Several new units intended to aid in 10 megacycle counting have been requested by Consolidated Avionics Corporation (Long Island). We have tentatively planned on finishing the engineering on these soon. They are:

1.) 10 megacycle crystal oscillator with pulse output (free running type).
2.) 10 megacycle counting flip-flop to be the first stage of a counter.

General: Gen. Dorior, President of A R & D and his associates, along with several officers of the National Shawmut Bank and the senior partner of Lybrand Ross Bros. and Montgomery (our auditors), paid us a visit. They were favorably impressed, and thanks to everyone for helping.

ATWOOD

Still devoting much time and effort to basic organizational matters-obtaining necessary materials, locating competent suppliers, setting up working files, and initiating production, cost control, inventory, and evaluation systems. Major problem in this area is to obtain a reproduction machine for instruction sheets, schematics, parts lists, forms, news releases,

and the like which will do a respectable printing job but will also be sufficiently uncomplicated so even I can run it.

A quick survey of our present personnel helped in the selection of four additional newspapers to carry our restyled employment ad, with results which you may have observed.

Also surveyed: reader response to information about DEC products in trade publications. This will serve as one guide in placing up-coming advertising and publicity.

Specific projects underway include: a two-page spread in "Electronic Engineers Master", a third-page in the March "Proceedings of the IRE," and three editorial blurbs in "Electrical Design News." Due shortly are the new nine-part invoice forms and labels for the patch cord boxes.

BEST

We have increased our list of 2w resistors in Engineering stock, adding all of the values from 10 ohms to 33,000 ohms in the 20% RMA sizes. We have added an assortment of 2w Allen Bradley type potentiometers and some 4w wire wound pots.

The Engineering Change and Production Release procedures are gradually being shaken down. Out of this effort has come some auxillary decisions such as: (1) A circuit schematic will use dash numbers, not dash letters, (2) The etched boards will use letter and will also have on them the drawing number of the circuit schematic with no dash number. The reason for this is that sometimes the circuit schematic is changed without the layout being changed, or the etched board is changed without the circuit being changed. On the models which are being used by production, an additional "Model" label is added which should include the circuit schematic and dash number so that the girls will be sure to be assembling the up-to-date schematic in the units they are currently building.

The present procedure for an Engineering Change or a Production Release is to get one of the forms from Mrs. Fitz and to fill in all the blanks indicated. For all releases or changes, no matter how trivial, the drafting department will add the circuit schematic number and the etched board number to make sure that the latest unit is being constructed to the correct numbers.

The only units which have the "Release to Production" block signed are those which are production releases. Engineering Changes do not require production release, and an Engineering Change can only be made on a unit which has been released to production.

RCA Memory Tester: We have the circuits tentatively figured out for the Read, Write and Digit current generators. The Read current generator is being constructed at this moment as well as the power supply which will supply +150, -150 and -300 volts to the current drivers.

Power Supplies: The Sales Department recently requested Engineering to give them some data on our stock supplies. The immediate result of our data was an Engineering Change to reduce the ripple on the +10 output on the 721 supply. The ripples on some of the other supplies are still on the high side and might be improved in the future. On the 721, as modified, the ripple on the -15v supply is 0.6v p-p. The -3v tipple is 10 mv. On the +10v supply, it is 0.45v p-p. The 740 dual -15v supply has 0.9v p-p ripple. There is no more room in the unit for another capacitor. We might be able to improve things with a choke in a pie-section filter. This willbe looked into sometime. The 730 variable +10 supply has 0.4v p-p ripple when supplying 1 amp at 20v.

FADIMAN

Several difficulties in the RCA Memory Tester have been cleared up. We were experiencing difficulty with the machine not stopping on error with checkerboard program. This was caused by the alarm Flip-Flop not being set on error because of the fact that there were too many transistors in series, and the logic input to the Flip-Flop was not getting up to ground. This has been corrected. The complement and double complement have been wired in so that they work. The auto-start switch will not work as previously planned. Therefore, some new logic has been designed which will sound the gong on alarm with a delay unit, and another delay unit will provide the delay necessary before start-over.

A new read-write panel for the -8 volt supply was constructed, and has been installed in the machine. The new sense amplifier was designed and the model has been working in the machine for the past two weeks. The final model has been designed with plug-in units for the sense amplifier. The panel has been constructed, and is being installed. The etched boards are also ready.

A model of the new read-write switches (No. 1970), has been built and tested successfully. 70 new read-write switches have been constructed and they will be installed Monday. In the meantime, a quick fix was used by replacing the 2N671 switch transistors with the symmetrical Philco 2N462 in the old switch units. This helped considerably to reduce capacity. The new current drivers and power supplies for them have been designed by Dick Bost and a model is being constructed. The rep-rate sensitivity has been taken care of.

The intensity amplifier for display will consist of our 2N671 transistor mounted to the decoder box.

Two more RCA stacks were tested out during the past two weeks. One was a Bismack 64 X64 stack and the other was a smaller DP stack 32 X 32. The "diagonal" still needs further work as it still does not operate properly. The voltage indicator light panel, the final model of the sync selector switch, and banana jacks for looking at the sense and strobe output are still to be built.

The intensity amplifier for display will consist of our 2N671 transistor mounted to the decoder box.

Two more ROA stacks were tested out during the past two weeks. One was a Diamond 6½ X6½ stack and the other was a smaller DP stack 32 X 32. The "diagonal" still needs further work as it still does not operate properly. The voltage indicator light panel, the final model of the sync selector switch, and banana jacks for looking at the sense and strobe output are still to be built.

Subject: BI-WEEKLY REPORT, JANUARY 16, 1959

To:

K. Olsen	Johnson	Fadiman
Anderson ✓	Sandler	Hughes
S. Olsen	Best	Atwood

ANDERSON

Sales - New orders

New orders were received during the past two weeks from IBM, Western Electric, MIT, and Rex Corporation. We are still quoting 30 day delivery on our catalog models. Recent delivery delays are bringing increasing amounts of customer pressure.

Proposals

We have been reviewing requests for proposals from:

1. I.T.&T. for a demand system for in-out device entry to a TX-2 type of computer. Their requirements appear to have been delayed for this somewhat.

2. Daystrom for plug-in units for their memory for NORC. This involves 1100 special units of 5 types and 350 standard catalog units.

3. General Ceramics for complete automatic core tester except for handles. We have decided not to quote on complete responsibility for this job but instead to try to sell them our logic units.

S. OLSEN

Production

The assembly department is now arranged so that 16 girls can be accomodated with benches. We now have 9 girls. Our aim is to fill these vacancies as soon as possible, with the most talented people. Two new eyelet machines have been ordered from Stimpson Company in Brooklyn. They are expected to arrive next week, giving us a total of four eyelet machines which should allow us to leave two permanently set-up for the most often used jobs, and the other two for various odd jobs. The eyelet machines will be placed in a portion of the area previously occupied by Engineering. The remainder of the Engineering area will be gradually converted into the inspection area of quality control rounding out a quality control department which includes test and all the phases of inspection. We are about to purchase a second drill from the Dumore Drill Company which has a dual purpose. One, to duplex our system and two, to increase our efficiency of drilling by another method.

Personnel

Our vast campaign of recruiting and advertising for new personnel has turned up two new people, (1) a general worker in the production area and (2) a general plant maintainance man and floor sweeper. As soon as Dr. Elicott of Lexington manages to get a new secretary we hope to be taking on his present one as a general office worker. She was recently married and moved into this area.

Music Conditioning

We're trying.

JOHNSON

Visited IBM in Kingston, Poughkeepsie, Yorktown Heights, and Ossining.

Kingston

More orders forthcoming from Input-Output (new) group. Pressure is on for delivery from Engineering Department. - Nottingham.

Poughkeepsie

Looks like large potential in Product Development (in four locations). Little in Research Center. Will require a follow-up to South Road, Special Products Department on North Hamilton, and Main Plant No. 2 in two weeks or so. Literature circulating now.

Yorktown Heights

Little buying activity in Research for last 6 months. Might expect test equipment orders in future. New Industrial Process Control Department just starting there.

Ossining

Equipment is performing well. Tube Pulsers returned for investigation.

We should get into Owego and follow up neglected groups at IBM Poughkeepsie. It is important to see that all these people get covered with literature. They were short at Kingston. Also, IBM is pressing for a Maintenance Sheet. Remark was they are getting too much of literature that does not do a job.

Visited Sanders Associates this morning and will bring a rack of test equipment for loan next Monday afternoon. A rush project (Project Migraine) is putting them on the spot and might put us on one too if we are to be able to help them on delivery. Looks like a good place to be continuing supplier.

California and points east is due starting 1-26-59. Imminent point-of-buy-decision is at China Lake. Schedule not made out yet but considered points of call are: NEL, Edwards Air Force Base, Phoenix GE and Motorola, Sandia in Albuqurque, and Remington Rand in Minneapolis. Also NCR in Dayton.

Need maintainance sheet to finish letters.
Planning call to Raytheon, Wayland.
Call attention to need at this point for applications, literature and a completed sales manual. Particularly the former.
Working on chart to give initiate at-a-glance feel for signals and how to interconnect our units.

SANDLER

Status of Finished Products

Test Equipment

On Hand	On Order	Status	In-Process
108	91	-25	120
		6-103	
		18-201	
		1-301	

System Equipment

On Hand	On Order	Status	In-Process
87	253	-180	220
		23-1104	
		6-1110	
		116-1201	
		10-1209	
		9-1301	
		8-1410	
		8-1606	

System Specials

On Hand	On Order	Status	In-Process
23	470	-447	40
		108-1103	
		53-1120	
		111-1206	
		22-1207	
		31-1208	
		25-1302	
		59-1602	
		38-1604	

Totals:

218	814	-652	380

Special SABRE equipment is to be released to production shortly, and must be to enable us to meet delivery.

There is some technical difficulty with our screening and etching of boards processes and this condition must be investigated.

We are continuing our search for production personnel.

During the coming week the inventory tabulation will be completed.

HUGHES

Work has been held up on the SABRE units in order that we might investigate reported jitter problems in the Delay Units, Model 1301 and Model 301. M-1023 is the number of the memo which describes what has been done to the Delay unit. In brief, the unit has been considerably improved with regard to stability of delay and its recovery time has been improved.

The Clock, Model 401, was also investigated because it had a jittery output. This unit is still under investigation.

Diode, Units 110 and 1110, have been modified to speed them up. In other words, their delay has been reduced. Further consideration may be given to this unit in the immediate future making it faster.

FADIMAN

The chief difficulty on the RCA Memory Job has been the poor wave forms of the read and write currents. The rise times were only about 1 microsecond, and there was much ringing and overshoot. This was caused by the large amount of capacitance in the read-write switch. Each of the Philco 2N671 transistors used for switches has a capacitance of about 80 micro-micro farads from collector to base, and 120 mmf from emitter to base. Thus each switch had a total capacitance of about 200 mmf. Consequently the read-write switch has been re-designed in order to use the Philco symmetrical transistor, the 2N462. This has a capacitance of approximately half that of the 2N671 and consequently we realize a gain of 4 in capacitance since only one transistor is necessary instead of 2. When the switch is de-selected, the base of the 2N462 is clamped to ground by an extra transistor with a diode across it. These new switches will be constructed immediately and will replace the old ones. The turn-on time of the new switch is approximately 7 microseconds and the turn-off time is approximately 3 microseconds.

The sensitivity of the present sense amplifier has been increased by reducing the loading on the input transformer. This change has made the present sense amplifier satisfactory for testing the stack. However, a new sense amplifier has been designed which is direct-coupled and uses two emitter followers. This is about to be constructed and tested.

There is some repetition rate sensitivity in the current drivers which is, of course, important only in the digit driver. An attempt will be made this week to solve this problem.

I have also worked on the logic of the machine and have found and corrected some wiring errors in the "diagonal". However, this still does not work properly.

During the past two weeks we successfully tested one stack for RCA consisting of 29 planes of S-3 cores. The half-select drive current was 200 ma.

ATWOOD

The mailing list has been doubled by the addition of some 1100 names of people who have inquired about our products through trade paper reader service sections. This gives us a good basic list to use in developing a regular mail program.

A new system for processing inquiries will go into effect as soon as the necessary materials can be printed. This system will give us a surer follow-up on all sales leads and will make possible a more accurate evaluation of markets and media.

MEMO:

Composition of Typical Product Installation - Test Equipment

Report on IBM Organization & Sales Status - Ted Johnson