

PDP LOG

PDP-1 RESTORATION PROJECT, COMPUTER HISTORY MUSEUM

POWER	TIME ON				DATE
	TIME OFF				
					October 29, 2003 to Present

USER	TIME ON	TIME OFF	COMMENTS	ELAPSED TIME METER READING AT POWER OFF

PDP LOG

POWER	TIME ON				DATE
	TIME OFF				
USER	TIME ON	TIME OFF	COMMENTS		ELAPSED TIME METER READING AT POWER OFF
Mike Cheponis, Eric Smith, Joe Fredrick, Bob Lash, Lyle Bickley Ratael Skodas, Al Kossow Tim Coslet Dag Spicer			First power-on of PDP-1 after initial restoration work completed by the PDP-1 Restoration Team at the Computer History Museum in Mountain View on 5/18/04.		Meter Reading prior to Power-on: 26468.7 HOURS
			(In preparation, all power supply capacitors were tested for leakage, capacitance, and physical condition. Two failed capacitors in paper tape reader were replaced. Three fans had decomposed AC wiring replaced, and bearings were replaced. Failed indicator lamps were replaced using identical lamps from museums and TUBE 30 CRT and from UART Modules donated by Robert Garner). Visual inspection completed.		

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON				DATE	
	TIME OFF				5/18/04 (cont'd)	
USER	TIME ON	TIME OFF	COMMENTS		ELAPSED TIME METER READING AT POWER OFF	
			TURN ON @ ~ 7:55 PM, PDT			
			ALL FANS OPERATIONAL. PSENSE SWITCHES & LAMPS OPERATIONAL (ALL) ACCUMULATOR LAMPS ALL GOOD. INPUT DATA SWITCHES GOOD. ADDRESS SWITCHES & TEST POINTS GOOD. DEPOSITED ALL ONES & ALL ZEROS & PATTERNS. MEM BUFFER & MEMORY ACCUMULATOR GOOD. PROGRAM COUNTER INCREMENTED CORRECTLY ON DEPOSIT. DOES NOT CLEAR AT POWER ON. 5-SECOND DELAYS AT POWER ON SEEM OK.			
			TURNED ON MEMORY POWER @ 8:47 PM PDT			
			MEMORY OUTPUT VOLTAGES SEEM OK.			
			MEMORY IS !! OPERATIONAL!! TEST LOOP DEPOSITED TO INCREMENT ACCUMULATOR: SUCCESS!		26468.7	

MEMORY POWER OFF AT THIS TIME

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG						
POWER	TIME ON			DATE		
	TIME OFF			5/25/04		
USER	TIME ON	TIME OFF	COMMENTS			ELAPSED TIME METER READING AT POWER OFF
Eric, Bob, Raphael			Eric's Core Dump Program Entered & debugged. Works in single step mode. Test run behaves reasonably. (Program will clock out core data in serial fashion using flag bits).			
Bob, Lyle, Rafael, Eric	20:14	20:50	Entered program to toggle flag 1 and verified logic level at flip-flop output IE22E. Repeated for flags 2 and 3 at IE222 and IE202. Flag 5 at IE18E is stuck, so it is probably a bad flip-flop.			6/1/2004
	21:16	22:24	At 21:19, there were unexpected noises from contactor in PDP-1. Dumped all memory using USB hack. At 22:15 attempted to load memory checkerboard test from paper tape, but it will only read a few characters at a time. It was unclear which side of the tape (channel 1 or 8) goes to the front, so we tried flipping the tape over. The reader advances further at one switch press, but still does			

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POWER	TIME ON				DATE
	TIME OFF				
USER	TIME ON	TIME OFF	COMMENTS		ELAPSED TIME METER READING AT POWER OFF
			not read whole tape.		26471.4
Lyle, Tim, Bob, Raphael, Joe			Paper tape Successfully read last Wednesday (First Maindec instruction test program #1 of 20). However, when longer loads attempted tape would periodically stop mid-way through. Reader channel waveforms & timing examined per Maint. Manual 11-9. Swapped 4214 11A17 w/ 4214 11A19. Trak moved Fm bit 13 to bit 17. 11A17 Repl. w/ 4214 Fm. Mus. Collection Tested w/ Sequential Tape Tested O.K. on Single Step and alpha mode. Looks ok on continuous. Ex. Main Dec #1 Inst. Test. Properly Executed 1-5. Test 6 Failed PC=0-6, MA=0-5, MB=760400, AC=0 ID=700001, IR=76		6/15/04
					26473.1

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG						
POWER	TIME ON			DATE		
	TIME OFF			6/23/04		
USER	TIME ON	TIME OFF	COMMENTS	ELAPSED TIME METER READING AT POWER OFF		
Lyle, Tim, Raphael & Bob, Mike, Joe, Eric, & Dag			<ul style="list-style-type: none"> • Memory Checker - board testing begun tonight, using MAHDEC 2 (1-15-M-RIM). 			
			<p>Discovered <u>GRAY</u> papertapes read perfectly, but <u>CANARY</u> copy is marginal. (Random misreads).</p>			
			<p>* Core bank 0: <u>Passed full checkerboard tests</u>!! (Ran both ends).</p>			
			<p>* Core bank 1: Initially showed random errors, but after allowed to run without error checks for 20 seconds, and then error checking back on, <u>PASSED FULL tests</u> after that!</p>			
			<p>* Core bank 2: <u>PASSED FULL TESTS!!</u></p>			

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON			DATE
	TIME OFF			
USER	TIME ON	TIME OFF	COMMENTS	ELAPSED TIME METER READING AT POWER OFF
(cont'd)			<ul style="list-style-type: none"> • Instruction Test (MAINDEC-2) loaded and fully ran successfully!! All instruction test programs (0-20) <u>PASSED</u>. • Address Test (MAINDEC 3) loaded successfully (both high & low) in all memory banks and <u>PASSED</u>! 	<p style="text-align: right;">6/23/04 6/29/04</p>
	18:10	21:05		26475.7
6/29/04	18:05	21:30	Discovered the MAINDEC 4, 1968 has a different format - A loader is loaded @ 7751 and executed to load in the diag diagnostic. No typewriter was available so the instr CR was patched to a halt	26475.7
Lyle, Tim, Eric, Raphael Bob				

AS

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON				DATE
	TIME OFF				
USER	TIME ON	TIME OFF	COMMENTS		ELAPSED TIME METER READING AT POWER OFF
			1) Location 0464 730003 → 760400 TYO HALT In Future will change 730003 → 760000 TYO NOP		
			2) Examine ⓪ to Reset 3) Start ⓪ to w/switches set to Mult/Divide 4) "Normal" Halt 0464 then executed w/no errors		
			1) Examine ⓪ to Reset 2) Started at 1 w/sys configured for MES/DZS (stop Mult/Div)		
			3) "Normal" Halt 0464 then executed w/o error		
			1) Examine ⓪ to Reset 2) Start ⓪ at ⓪ to create error condition 3) Failed - Attempting to print "D"		
			1) Examine ⓪ to Reset 2) Start at ⓪ w/sys configured for Mult/Div 3) Running for extended time w/o error		
			1) Cycled Power on system 2) changed 464 to NOP 3) Examine ⓪ to Reset 4) Start started at zero		

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG						
POWER	TIME ON				DATE	
	TIME OFF				6/29/04	
USER	TIME ON	TIME OFF	COMMENTS		ELAPSED TIME METER READING AT POWER OFF	
			10-11 minutes w/o error the Divide Error Occurred (Letter "D")			
			Power Cycled and Restarted - Ran For 30 minutes w/o Failure		26478.1	LAB
7/6/04 Lyle, Tim, Bob			Began analysis of Deposit Failure. Bit 10 appears to be the "magic" bit that makes the deposit work. w/o the "magic bit on" the remainder of the bits work erratically. Swapped 2c16 & 2c17 and the "magic" bit moved to position 11. Replaced 2c16 w/ archive module. "magic" bit now bit 13 or 14; intermittent. Tends to read switches from Right to Left. Replaced 2c16 w/ original. "magic" bit reappeared.		26478.1	LAB
Tim, Bob, Lyle 7/14/04			② Traced Test Switches to logic panel 2C next to card #25 ① Scoped TW → 2C, 0 → AC Pulses - looked O.K. Noted that signals from TW 15, 16, 17 OK 14 varies, 18 → 0 varies as well as IF resistance pull not working.		26480.0 26480.0	LAB

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG						
POWER	TIME ON			DATE		
	TIME OFF			7/14/04		
USER	TIME ON	TIME OFF	COMMENTS			ELAPSED TIME METER READING AT POWER OFF
			Traced per #2 - led to testing of common bus of TW switches - Found to fail. Pulled Front Panel to repair Pulled TW from Front Panel - wire between 14-15 open (Top row of switch is Black Middle row is Red)			26481.2
			Started de-soldering TW Switch Buses.			
7/20/04 Raphael, Lyle			Finished removing bus wire from Test Word Switches. Eliminated (Resolder) cold solder joints on resistor side of TW. Cleaned around switches w/ alcohol. Replaced Two TW Switch Buses. Reinstalled Panel. Power up - All switches tested O.K. manual deposit Ran TW → ac Program All switches tested O.K. w/ Single Bit, Every other Bit, Groups of Three.			26481.5

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG						
POWER	TIME ON				DATE	
	TIME OFF				7/27/04	
USER	TIME ON	TIME OFF	COMMENTS			ELAPSED TIME METER READING AT POWER OFF
Tim, Lyle	8:05		Tim + Lyle Traced the "space war cable" prints and documented same. Tested voltages with power on and determined the input and output prints. Wrote program (below) to test all space war signals. Found the bit 2 of the I/O Register indicator is "stuck" on. Changed Program to Load I/O Reg into accumulator to "get around" stuck indicator. Test Program 0 764000 CLF 1 720011 Sel I/O 11 2 320010 DIO 3 200010 LDA 4 600000 JMP 0 Tested all print - All Documented and work!!!			26481.5
Lyle, Bob, Eric	14:50		demo for Volunteer Appreciation Day Ran Mem Dec memory Test as Demo.			26482.6
	15:05					26483.6

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON			DATE
	TIME OFF			
USER	TIME ON	TIME OFF	COMMENTS	ELAPSED TIME METER READING AT POWER OFF
Bob, Eric, Lyle	15:35	15:41	another demo for Volunteer day	on 26483.1 off 26483.1
Bob, Eric	15:40	15:51	yet another demo for Volunteer day	on 26483.1 off 26483.2
8/17/04 Restoration team Bob, Raphael, Tim, Lyle	19:00	21:00	trying to diagnose/repair I/O reg bit 2 indicator. Repaired Console - Bit 2 - 2N527 bad Replaced, Tested OK	on 26483.2 off 26483.7
8/31/04 Eric, Lyle	18:34	20:55	Lyle and Eric and Tim determining pinout of Type 30 interface connector	on 26483.7 off 26486.1
9/7/04 Mike			Took 4 PDP-1 Type 30 lamp housings to investigate relamping procedure. Returned all lamps	
9/15/04 Mike				
LO 04 Mike & Lyle		2:50pm	Bill Gates visited & flipped (as did Sellman) power switch	off 26487.0
LO 04 Lyle			Borrowed BRPE-11 Belt.	
10/5/04 8 PM Lyle Power on Eric			Removed all load indicators Replaced with rebuilt bulbs (Raphael). Eric wrote prog. to move test word to punch (No wait I/O) to test lamps and punch FF. All tested OK. Tested NAC with I/O wait. Discovered NAC reset only on I/O cmd. (Not Exam or Start)	26487.0

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PDP LOG

POWER	TIME ON				DATE
	TIME OFF				
USER	TIME ON	TIME OFF	COMMENTS	ELAPSED TIME METER READING AT POWER OFF	
10/5/64 Continued	Lyle, Tim		Ran MAINPDC I Instruction Test Through Several CPU Drags to Test observe Indicator Lamps, etc. All lamps observed to be O.K.	JRB 264881	
	Power off				
10/13/64	Tim	14:30	Found MA10 LAMP does not light Returned with Lamps	26488.1	
		20:11	developed 1A inst, "lamp test" prog.		
21:04				26489.5	
10/19/64	Bob, Rafael, Erik, Tim	18:25	Ran Tim's lamp test program again as demo for guest at Fellow's Reception Running Instruction Diagnostic - OK Rdr OK Diag	OCT-19 26489.5	
	LYLE			264.924	
	Power off				
10/26/64	Tim	18:25	Passed Extended Lamp Test after some initial repeat of the strange problem on PC. added code to manually test all 16 PC lamps in single step mode.	26492.4	
		19:35		264935	

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POWER	TIME ON				DATE
	TIME OFF				
USER	TIME ON	TIME OFF	COMMENTS		ELAPSED TIME METER READING AT POWER OFF
	19:25	19:29	Lamp + P&Y mass		264935
					264936
Bob, Mike, Eric Lyle	15:11		Demo for VLF		26493.6
			↓		26495.1
Lyle, Eric			Fixed console typewriter connectors. Eric wrote program to test Read/Write to typewriter. Read showed 2/4 bit always on dependent on shift. Discussed pins 37 and 38 of shift cam contacts shorted.		26495.1
			Also tested out put -		
			no extra typewriter output. Test solenoids in typewriter - appear to be O.K. Test Drive current next session		26496.2
Lyle, Tom Eric			"Tweaked" "Shift Cam" Top contact w/ relay tool to fix (elom note) former contact. Ran Eric's Input Test Prog - All Keys tested - all input O.K. Output Fails. Checked voltage for solenoid - was meas. to be -15 - should be -30. P.S. found to be wired wrong - fixed by changing jumper on PS Lin. Good to -15. Voltage now		26496.2
			correctly reads -30.		26498.3

11/2

11/7

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

Typing 27 characters - but not always correct characters.

PDP LOG

POWER	TIME ON				DATE
	TIME OFF				
USER	TIME ON	TIME OFF	COMMENTS		ELAPSED TIME METER READING AT POWER OFF
Mike/Peter/Tim			Try Music program Apparent Reader Failure		26 498.6
Mike/Peter, et al			Reader Fail from last week so tested rdr w/ Inst. Test Tape. Tape ran O.K. (all settings) note Rob/Mike made copy of "music" tape - Re ran "music" tape - loaded O.K. however however prog turned out to require Drum I/O.		26 498.6
Tim, Cyle			Tim wrote simple typewriter test prog: 0 720004 ty; 1 730003 ty0 2 60000* jmp 1 oper: type a char start 0 should repeat type input char. Results: Bits 13,14 output from PDP-1 (Reg) OK but fails at by typewriter		26 500.0
Eric, Tim, Bob 21-Dec-2024	20:06		Swapped 4601 solenoid drivers in 11C23 and 11C24 in attempt to test for possible fault causing erroneous typewriter output. No change in behavior observed.		26501.0

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PDP LOG

POWER	TIME ON				DATE
	TIME OFF				
USER	TIME ON	TIME OFF	COMMENTS		ELAPSED TIME METER READING AT POWER OFF
Tim, Bob, Eric 21-DEC-2004 (continued)			probed pins L and P of solenoid driver at IC22 IC22 both pulse as expected. Since they get pulled down to -30V, the drivers must work and there must be electrical continuity to solenoid.		26501.3
			Two solenoids were mechanically stuck. Tim carefully jiggled them loose. Now typewriter output is mostly correct. May need some lubrication, possibly at the pivot.		26502.2
		9:40			
Tim, Lyle	8:35		Tim wrote program to exercise typewriter by typing 0-9, abc. Indication was all char typed O.K. and hang on CR. Any char typed would result on continuation of typing. Single stop showed that I-O Sync failed on CR		26502.2
	8:55				26503.0
Tim, Lyle	6:15		Test Typewriter CR CAM - tested O.K. Followed signal from CR Cam, or gate, pulse gen, input of Def. #4301 @ IC1 was unable to detect output @ Def. Analyzed circuit		26503.0
					(Next Page)

12/21/04

12/28/04

1/7/05

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON				DATE
	TIME OFF				
USER	TIME ON	TIME OFF	COMMENTS		ELAPSED TIME METER READING AT POWER OFF
			Ran Paul's Prog that typed WCR - cycled prog with reset/start - able to see CR signal, TRO OK, HBZK AND OF ZS signal OK. UCI PMX did not pulse - suspected failure in #4301 @ UCI. Replacement to #4301 found in archives - Replaced - Brief testing appears to show that CR now working correctly. Will continue testing next week.		26504.7
Mike Cheponis			10PM US - home BRPE Bell		
Tom Lyle	6140		Entered Tom's Typewriter test program on Bank 1 of extended memory. (do not use extend switch) Initial test hung on shift up at random. After bunch of lines typewriter started printing all test characters correctly After about two pages of of almost perfect typing there was a rapid deterioration not with unlike a jam. Found to be the top two		26504.7

1/4/05

1/12/05

(continued)
next page


TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON				DATE
	TIME OFF				
USER	TIME ON	TIME OFF	COMMENTS	ELAPSED TIME METER READING AT POWER OFF	
			(high order) permutation hasn't stopping. Issue appears to be either tube or spring tension problem.	26506.8	1/12/05 (cont.)
Lyle, Eric	7:21		Entered Eric's Display	26506.8	1/18/05
	8:30		Test program (C00→25)	26507.2	
				26507.3	2/5/05
Mike/Bob	4pm	4:10	Visitors / demo		
Ken, Eric, Peter	20:00		testing typewriter after Ken repairs decoder	26507.3	2/19/05
			powered up briefly to test remote power control of Type 30	26507.4	
			powered up with Type 30 DC & Sol supplies on, HV off		
			powered up HV supply, ran Eric's Type 30 test (ran slowly due to bug in program, but Type 30 works)		
		21:41	more typewriter testing	26508.4	
Bob, Lyle, Eric	18:40		Attempting to load CPACWAT 3.1 Binary (five copy) Ran several copies of Spacewar - ran Displayed different starfields - but ships consistently were at X=0, Y=0	26508.4	2/15/05

TABLE 11-8 SAMPLE OPERATION LOG FORMAT
Ver. 4.1 last in copy.
11-27

PDP LOG

POWER	TIME ON				DATE
	TIME OFF				
USER	TIME ON	TIME OFF	COMMENTS		ELAPSED TIME METER READING AT POWER OFF
			Seemed to start where slip "should" have been.		
			Entered Eric's "Model 30 Diagnostic" (Display) 		
			Into "Bank 2" of memory - Starting at Zero. Ran correctly		26510.8
Lyle, Raphael	1830	2100	Ran Main Dec I (Inst. Test) in Bank 0 - Fails with Bank 0 locations 0-227 not "accepting" defect (All Zero). Bank 2 w/ same drag fails consistently at test 17 (see 22, 114 17, 102, 114 ... 140) (Both of the above are repeatable - Tried several times each)		26510.8
			* Fails on 17 Drag. #4		
					2/22/05
Lyle, Eric, Raphael, Tim	1815	2105	Ran Main Dec I 1-17 17 Failed on Rotate Left. Eric wrote Drag to compare all rotates for left and right - Right works correctly; Left I/O shift consistently fails. Eric wrote 2nd Drag which tests shift/Rotate Left/Right of AC and I/O Regs. I/O Reg fails on both Left shift & Rotate - Never shifts at all		26513.3
					26513.3
					2/29/05

2/15/05
(cont.)

#4

2/22/05

2/29/05

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON				DATE
	TIME OFF				
USER	TIME ON	TIME OFF	COMMENTS		ELAPSED TIME METER READING AT POWER OFF
					2/29
			Module 2F3 1607 Pulse Amplifier determined to be bad - Replaced from spares - Tested with MAMDEC F - All Diagnostics Ran Correctly.		
			2125 LOADED SPACEWAR 4.1 RAN CORRECTLY 1661		
					26516.1
Ken & Eric			Tested Spacewar control boxes hyperspace buttons non-op		26516.1 26516.3
Peter, Bob, Lyle			<ol style="list-style-type: none"> 1) Breaker on Bay 1 Center Power Supply flipped causing PTR to Fail. Breaker Reset and flipped on about 15 minutes. Fan. Disconnected Typewriter. 2) Hyperspace & all buttons tested w/short Diag (Ly Eric). Diodes creating hyperspace fail if 2 or 3 buttons of opposite controller are held down. 3) Ran Memory checker board test - Bank 0 Locations 0-227 fail Fail - will not store 16As 4) Ran MAMDEC 30 Display Test Patterns change w/SS 1, 2, 3, 4 		26516.3
					26518.4

3/7/05
3/7/05

3/9/05

3/9/05

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG						
POWER	TIME ON				DATE	
	TIME OFF					
USER	TIME ON	TIME OFF	COMMENTS		ELAPSED TIME METER READING AT POWER OFF	
Tim			Volunteer day demo		26518.7	3/12/05
					26518.8	
Eric, Lyle	1345		DCL Demo Run "Main Dec 30" is correct pattern generator (2nd Component of 4 Part Diag Tape slides) 3rd Diag "Find and Follow", No input pen (seems to be same as "Input Pen Follow" "Microscope" runs but seems to require input pen. → Horizontal Bit 3 bump on ←		26518.8	3/12/05
		1450	Model 30 is not working,		26519.8	
Eric, Ed Thelen	1745		Spacewar		26519.8	3/12/05
		1755			26519.9	
Lyle, Eric, Raphael, Bob			Probs w/PT Reader - Seemed to "go away" after "warm up". Swapped modules on Bank 0 - Memory Bug & Moved". Found bad 1976 - Found open resistor. Replaced Board. Bank 0 appears to work "statically" (defect examine) However Checkerboard fails on all patterns		26519.9	3/15/05
Kim, Eric	2:00	2:45	Reviews of spacewar for MIT Tech Review		26521.7	3/19/05
					26522.2	

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON				DATE
	TIME OFF				
USER	TIME ON	TIME OFF	COMMENTS	ELAPSED TIME METER READING AT POWER OFF	
Ken, Eric	11:07 AM		Arrives at Space War	26522.2	
		12:20 AM		23.5	
Ken, Lyle, Raphael, Eric	6:17 AM		Readjusted TBS switch to prevent short to the ground which caused circuit breaker to trip. -15V was the affected power line. DC current on -15V was 6A under normal condition and exceeded 10A when TBS was shorted to GND.	26523.5	
		21:30		26525.15	
Mike, Raphael Lyle, Raphael, Eric	18:15		Followed Maint. Manual to adjust PT Reader. Feed Hole Amp was set at 0.5ms and adjusted to correct 1ms. All data channel amps were adjusted to 1.7 to 1.8ms. Many were adjusted by 40% to bring within specs. Tested Reader with both grey and yellow Paper Tape - Both Read Correctly 66. A yellow PT of Specimens 4 of was punched and loaded into Bank 0. Both PT and Bank 0 memory worked O.K. Run Memory Checkboard Ran O.K. Both "Hi" and "Lo" and all patterns. Eric & Russell wrote char. generating Prags for the tape 30. Ran Cigital Pen Test - Failed	26525.15	

3/19/05

3/22/05

3/29/05

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

Played Peter's music program. Listened on tiny headphones.

PDP LOG

POWER	TIME ON				DATE
	TIME OFF				
USER	TIME ON	TIME OFF	COMMENTS		ELAPSED TIME METER READING AT POWER OFF
Lyle, Raphael Bob, Peter, Mike, Eric, Ken, Tim	1835		Ready Failure (Morning Sickness Recurred) After warmup reader met specs (Scoped all channels). Swapped bits 1 & 8 of Reader channels - checked w/ scope - specs O.K. Reader O.K. Will see if error "moves" next week.		26530.7
			Put new left on BRPE punch. Tested punch w/ tape feed - worked Eric wrote a "Test Punch" program - Ran correctly. Punched correctly - BRPE appears to be fully functional. Began testing. Sooban - Printing characters appear to work O.K., CR creates bad char following. Space fails, mechanical shift up - fails on normal "push" - requires adjustment.		
			1703 @ 32 Found tolerance bad diodes.		26533.1
Mike & Eric	2142	2234	Test tape reader - Reader is still not working. Partial tape reads		26533.9

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

ON			OFF			
Date	Time	Meter	User	Comments	Date Time Meter	
5-April-2005	6:27	26528.2	Eric, Lyle, Rafael	<p>Tested P.T. Reader - Bad Read, not sure if just "morning sickness". Decided to adjust gap on reader, pull pulley. Read tapes O.K. Will test next week when cold...</p> <p>Ran Eric's new Model 33 test character test. Appeared that lower half of characters were "Flipped".</p> <p>Ran Peter's music program w/ several music tapes - Mostly ran - some missing notes. Peter will investigate offline.</p> <p>Tom, Ken testing Sorokan, Seaped - appeared to be bad ER Adjustment. Lyle adjusted contact w/ special tool - tested O.K. on power up. Space Bar failed.</p> <p>Reran Spawerwar For Raphael to take pictures.</p>		
5-Apr-2005	9:15	20530.7		Lyle		

PDP LOG

POWER	TIME ON				DATE	
	TIME OFF					
USER	TIME ON	TIME OFF	COMMENTS	ELAPSED TIME METER READING AT POWER OFF		
<div style="font-size: 2em; font-weight: bold; margin-bottom: 10px;">4/19/05</div>	1910		Reproduced Card 8 in "slot 8". Swapped Cards 1K7 - Robin rpm coins to, w/both grey and yellow tape. Will test next week when "cold" again - Ran Spaceman as Demo for private party - Gilder signing. Tried Munching Squares Prog - Very cool pattern Good (006010)	26533.9		
<div style="font-size: 2em; font-weight: bold; margin-bottom: 10px;">4/26/05</div>		2110	Patterns (400400?)	26535.1		
	Lyle, Kang Tom, Eric Peter	1915		Check Ready Gold - Read Spaceman Yellow Tape Correctly. Typewriter - Module 4/10 Loc 11C12 Cracked Circuit Board Trace Repaired - Space Works !! Tom found suspect PDP gas Xick GA004 Raytheon High Beta on Tape Ready #1 Amp. Ken + Tim worked on Cardan. Fixed shift. Tom's Spaceman Test Programns except "A" fails to print. Loaded Peter's latest music program!!! Plays well w/o noise!!!	26535.1	

PDP LOG

POWER			TIME ON	TIME OFF	DATE
USER			TIME ON	TIME OFF	COMMENTS
					5/3/05
					ELAPSED TIME METER READING AT POWER OFF
Bob, Peter, Tim, Ken, Lyle, Eric (Mike arrived 8:10 PM)			1800		Ken replaced the 1.5A microfuse in the Type 30's light pen photomultiplier module. Powered up type 30. Fuse OK! Then found blown later. Tim brought in replacement germanium PNP transistor for bad channel amp card in paper tape reader, Motorola 964-3644. Ken replaced transistor. Trimpot adjusted using tape loop. Works in channel 1 (Spawar 4.1 loaded & ran). (Note: card only worked after trimmer was adjusted). Will verify this fix by reading tape next week with reader cold. Light pen module moved for inspection. Photomultiplier tube is RCA 1931A (equiv. to 1P21).

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON			DATE
	TIME OFF			
USER	TIME ON	TIME OFF	COMMENTS	ELAPSED TIME METER READING AT POWER OFF
Mike	-	9:44	jam off after Jordan Test	26537.1
Ken & Eric 5/9/05	26:00		demo spacemar	26537.1
				26537.7
Eric 5/11/05	12:00		demo spacemar for Chuck McManna	26537.7
Leif, Tom Rob	19:30		Ran Mam doc 4 Multitab Divide Test - No Errors Created error by changing Multitab Switch to Typewriter star displayed errors approximately. Ran "Quick Buffer Test" Ran correctly on Typewriter Ran "Electric Typewriter" Executed correctly - But don't have manual. Ran Mam doc 14A Typewriter Test - Spaced Tabs are failing randomly. Put typewriter on float to "stabilize" it - Still had tab problems. Tab appears to be decaying but mechanically fails.	26539.5

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON	TIME OFF	COMMENTS	DATE
				5/17/05
USER	TIME ON	TIME OFF	COMMENTS	ELAPSED TIME METER READING AT POWER OFF
Eric, Bob, Tim, Ken, Lyle, Peter	1845		<p>Further explanation of Type 33 character generator problem in Type 30 display. Eric swapped the 4667 level amp card and the 4215 counter cards with ones from Robert Gardner's collection, but no Δ in symptoms using Eric's test program. Original board replaced & placed back.</p> <p>Replaced 4215's w/spares from archives. Changed pattern but did not resolve problem. Ken did analysis of tabs problem. Alj. Bail Actuator Arm but did not have time to test.</p> <p>Test Test Pattern for Char. Test generated by Lyle to establish which bits were erroneous. verified by Bob</p>	26539.6
		2105		26540.3
Bob, Ken, Peter S. Lyle	1833		<p style="text-align: center;">5/24/05</p> <p>Specimen started from Bank</p> <p>2 - Paged after 5 minutes displayed trash on screen then AT punch started punching with most bits on. Restart @ 4-punches started again. Powered off - Bank on - Loaded SW into</p>	26540.3

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON				DATE
	TIME OFF				
USER	TIME ON	TIME OFF	COMMENTS		ELAPSED TIME METER READING AT POWER OFF
			Bank 0 - Run O.K. Reloaded into Bank 2 - Run O.K. Loaded Typewriter Diag. Ken put 2 color ribbon on typewriter (Red goes on the bottom). Typewriter Test (DRC) Run O.K. Ken jumping for joy. Tried several versions of space var US appear to use <u>step</u> version 4.7 appear to all use mul/divide.		
		2:00			26542.05 26542.05
Sellon I. & MIKE C.	3:09p	3:16p	MAY 25, 2005 MIKE TRAINED SELLOM ON FAWBRING UP PDP-1 FOR DEMO PURPOSES		26542.7
Ken S. Peter S. Tim Mike Bob Joe F			MAY 31, 2005		26542.7
			Type 33 Diag. Lightpen PS diagnostics Tape Duplication DDT experimentation Soraban Testing, Temperature Joe F reclaimed current meter		26545.5

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON				DATE
	TIME OFF				
USER	TIME ON	TIME OFF	COMMENTS	ELAPSED TIME METER READING AT POWER OFF	
P. Samson, Lyle, Bob Rafael, Ken, Tim		time on 26545.5		26545.5	
			HV Light pen working Paper tape Dup's Sound interface measurements Space war! improved tape Space war & A i	26547.2	
4/8	2029		Mike et al	26547.2	
	2037		Show Steve, Peter B, Lee	26547.3	
Mike, Steve, Dave B, Lee			Mike took one tape tray for Dup. Test. purposes		
Ken				26547.3	
Ken			Spacewar Demo who?	26547.3 26547.7	
Sellan	19:46		RUN ERIC'S SOFTWARE, N.G.	26547.7	
Cyle, Ernie, Ken, Tom, Raphael			Ran Mandel 149 (Hypercube test) Ran O.K.; Ran Spacewar - O.K. Ernie wrote prog (New in Bank 2) to display a square □ - the Model 33 displays an "P". Tom determined via scope to be bad bit 4. Replaced 4667 module - problem remains.	26548.8	
Peter	2100		Loading Spacewar	26548.8	
	2102		From Sources, Appears to Run O.K. - Starfield looks good (currently in Bank 4)	26549.0	

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON			DATE
	TIME OFF			
USER	TIME ON	TIME OFF	COMMENTS	ELAPSED TIME METER READING AT POWER OFF
Ken & Peter S	4:17 pm		June 18 2005 SW + Music tests - Tracked down why torpedos don't show in SW built from sources	26549.0
	5:27 pm			26550.1
Ken Eric	21:14 AM		Space wave, Snowflake	26550.1
Joe Brtk			Marching Squares	
Holley Patricia	21:52 PM			26550.7
Ken, Peter, f:in Joe F, Rafael Bob, Lyle, Mike			Type 33 debug Pulled C16, C17 (4215) Checked resistance on Vx, Vy resistors Net-check out O.K. Examined 4215 Board - Enable Int. Bit Jumper check - checked out OK. Replaced counters - Pulled C18 (4667) Turned off OFF HV to test counters w/o load - Results were inconclusive - Suggest use of logic analyzer. Replaced C18 - Indication was same. Peter, Ken made circuit board Filter, plugged in - connected via clip leads to backplane. Tested + works - may need tweaking. Ken loaded new Space war	26550.7

TABLE 11-8 SAMPLE OPERATION LOG FORMAT (continued)

PDP LOG

POWER	TIME ON				DATE
	TIME OFF				
USER	TIME ON	TIME OFF	COMMENTS	ELAPSED TIME METER READING AT POWER OFF	
			Derived from source, compiled by Peter on 6-28-05 with Macro Assm which is part of Simulator (SEMA). StarField is now correct.	26553.1	
Tony, Joe, Kyle Peter, Erve, Raphael	1815		6-28-05 Good Test 33W. Joe/Tan attached Logic Anal. (LA) probes to examine VO-2 & HO2. Looked at amplitude driver - high order bit never flipped to 1. Suspected that it is being reset which would explain why after setting all assoc. wordlines and registers we found 0's on the counters - yet the high order bit is never set. Will test that theory out next week. Turned system over to rest of team to test new SEMA Space war w/ scoring. Works great - score counted by setting bits 7-11 to high score.	26553.1	
				26555.6	

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON	TIME OFF	COMMENTS	DATE
USER	TIME ON	TIME OFF		ELAPSED TIME METER READING AT POWER OFF
			<u>July 5, 2005</u>	
Ken, Peter S.	1815			26555.6
Tim, Lyle, Rafael, Bob, Selam			Music level calibration Lyle, Rafael, Peter - Tried to generate several characters to identify char. gen. issue. 1) Discovered that both halves of the the char are subject to the bit shift problem - the bits 11-17 are folded to the first. ZSDR misfunction causes following gpl instructions to hang even when allowing more than 7.5 usec between the pair. Next week - check intensity circuit & check for early reset of char counter.	
		2100		26558.0
Selam I & AL ALCORN	1700		DEMO FOR AL ALCORN PLAYED SPACEWAR!	26558.0
				26558.2
Selam I & JULIE & ANDREA FROM VULCAN	14:23			26558.2
				26558.4
			<u>JUL 13, 2005</u>	26558.4
Rafael, Bob, Eric	18:15		Worked on Model 33 Display	
Ken, Lyle			Eric wrote SW to help identify character bit displays - Found failing patterns (2), will write in RDP-1 log.	
	20145		on line	26560.6

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG					
POWER	TIME ON				DATE
	TIME OFF				
USER	TIME ON	TIME OFF	COMMENTS	ELAPSED TIME METER READING AT POWER OFF	
Peter S., Bob L., & Al K. Rob, Jim, Lyle	1820		Mod 33 Display - C16, C17 4215 Flip Flop C16 - Must be "standard" and C17 - Must be "Inhibit" Tested Counters - Now get 5x7 characte ^{through} analog circuit. However, we have a timing issue in the in the firing control logic block (Figure 3-9). We are getting 2 μ s on re-intensification and 5 μ s on intensification - we are getting 3 μ s (2 μ s short).	26560.6	
		2100		26563.0	
1814 Ken, Joe, Peter, Rafael, Lyle, Al Koscow	1814		July 26, 2005 Peter debugged new version of music player w/BDT. Coded "Test 33" - Joe/Lyle setup - Lyle, Rafael, Bob studied 33 Display Logic. Scoped 2 μ s pulses, seem to be OK. 3 μ s were 1 μ s.	26563.0	
7/29/05 Lyle Bretley	1435		Demo of Spacewar, etc. Mike Leewen, Docent's, Group	26565.7	
		1515		26566.1	

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG						
POWER	TIME ON			DATE		
	TIME OFF			7/30/05		
USER	TIME ON	TIME OFF	COMMENTS			ELAPSED TIME METER READING AT POWER OFF
Demo Spacewar	1755		Steve Russell, Peter Samson Alan Kotok			26566.1
		1900	Team: Mike, Joe, Ken Lyle, Al Eckert Robert Robert (Friend of Mike)			26567.1
Joe F.	6:06		August 2			26567.1
Ken S.						26569.1
Peter S.	8:09		off			26569.1
SELLAM & Film crew	5:13p		8/3/05 FOR FILMING w/ STEVE RUSSEL ET AL			26569.2
Lyle, Bob, Ken, Joe, Mike, Peter, Raphael, Sellam & Steve Russell			Spacewar! control boxes became operational using an external -3.5VDC bench supply. Steve & Ken then successfully played Spacewar! Ken and Peter replaced the clip leads for audio with permanent wires to slot. Slot contains board w/ filters. Tested w/ spacewar! and system O.K. after mods. loaded Audio SW - 4 Part Harmony - worked O.K. Rescued XY staircase which showed correct pattern			26572.2
		2:10				

Music
Defeat
Tempo
252
↓
120
Testwood

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON	TIME OFF	DATE	
			8/14/05	
USER	TIME ON	TIME OFF	ELAPSED TIME METER READING AT POWER OFF	
Rob, Joe, Lyle (Mike late :-?)	1815		26572.2	
			26573.1	
		2000		
volunteer day				
8/16/05	1830		26573.1	
Joe, Lyle, Tam, Eric, Peter, Mike (At Ent Out)				
<p>Note: Always Remove Panel to replace Lamps 1/1/1</p>			Began testing Spaceman using analog XY display on scope. Attempted to load Eric's revised char gen program with stb w/delay. Reader failed. Binary light did not display. Ptr read 3 char + stopped. Tested "Birdy Lamp" O.K. Replacing lamp peeled up trace. Pulled panel - fixed trace replaced lamp. Peter/Lyle conjectured FF failure in reader circuit - found replacement module + replaced Flip Flop - & upon testing Reader once again works. Note: Binary Light still fails - likely driver. Should work on next week. Peter loaded music prog + data w/o error. Reader O.K. 26574.7	

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON		DATE	
	TIME OFF			
USER	TIME ON	TIME OFF	COMMENTS	ELAPSED TIME METER READING AT POWER OFF
Lyle, Eric, Al, Raphael, Joe, Tim, Ken	1730		Again - Revisited delay timing in e04, C22 was delays - both were OK (2us total) [Matrix Timing] Verified 35us delay in point plotting mode - was 37.5 - Adjusted to 35us [Deflection Setup Delay] checked 310us delay - was 1.02us - Adjusted to 2.98us (Cross adjustment) [Intensification Delay]. Based on findings - we should check remaining delays.	26574.8
8/30/05 Ken, Raphael, Bob, Eric, Lyle, Peter, Jack (Holloway) (Peter's friend) (MET Lab, etc.)	1930	2100	Ken Raphael lubricated motor bearings with 3m1 oil and repacked idler bearings with spray lithium grease. Much quieter. Dead In Space was corrected. Display - Increased delay from 5us to 38us by jumping H-N Slot C1 (1304). Ran Eric's Test 33T and got screen of error correct (but slowly drawn) characters. Removed jumpers and reset back to 5us.	26577.35 26577.35
9/6/05	6:45PM		Tested 33 w/ various capacitors - needed 3000pF to create 35us per dot slow delay to create properly formed characters!	26578.7
Ken, Lyle, Raphael, Peter, Joe, Tim, Eric				26578.7

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

(cont. next page)

PDP LOG

POWER		TIME ON	TIME OFF	DATE
				9/6/05
USER	TIME ON	TIME OFF	COMMENTS	ELAPSED TIME METER READING AT POWER OFF
(Continued)				
			Replaced "O" ring (left) on PT Reader. Reader tested O.K.	
			Eric wrote 33 Display test 33T2 which tests SDB vs. DPY. DPY works per previous 33T test - SSI Down executes SDB followed by 5 NOPs (~25ns) - this creates hang on the next GPC instruction. Test 33T3 SSI as above, SS2 on 320, not delay, off std 25ns (SS2 only effective w/SSI Down - SDB)	
			BOB + B17. Swap deflection Preamps (#1567) - did not do swap - Kyle remarked warning in Chapter 4 of manual recommending caution when working with preamp cards (Page 6-7).	26580.3
				26580.3
Tim, Rafael			Volunteer day and chess exhibit demo.	26580.3
Sep 10, 2005				
Ken			tested Spacewar Switches found 4 bad/flaky prepped 7-pin connector for lightpen PS temp solution.	26584.5

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON			DATE
	TIME OFF			
USER	TIME ON	TIME OFF	COMMENTS	ELAPSED TIME METER READING AT POWER OFF
Joe F, Eric, Lyle, Peter S., Bob, Tim, Mike	1845		Debugging proceeded on Spacelwar control boxes. Capacitor Diode gate (Type 4129) scope'd at pin H of module 2J2 driven by IOT-11 pulse amp. Signal found to show variable pulse amplitudes from approx. -1.5 to -2.0 volts. Suspected 2J2 may be loading pulse amp. Module 2J2 replaced with "new" module from Robert Gasner's collection. Signal showed steady pulse amplitude of 2V. Spacelwar buttons now operating slightly. Both control boxes now operating solidly when running Spacelwar.	26584.5
	2050		(continued)	26586.3

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON	TIME OFF	DATE
USER	TIME ON	TIME OFF	COMMENTS
			ELAPSED TIME METER READING AT POWER OFF
<p>9/14/05 cont</p>			<p>Joe built a replacement power supply for the photomultiplier (over the last couple of days). We tested it out on the lab bench - and it was able to supply the -1,000V per our assumed requirements of the photomultiplier (PM). Based on specs - we have an original diagram. We installed the PS on the PM box - moved the box to the Type 33 Display - inserted the fiberoptic cable, etc. We loaded the "Bright Light Pen" Test on the PDP-7 and ... the light pen failed to work even over varied voltages, etc.</p>
<p>9/20/05</p>			<p>Joe, Kyle, Tim, Pat, Ken Peters</p> <p>2026</p> <p>Pulled PM amp from Model 26586-3 33 Disp & tested on bench. Tested O.K. Put back on 33 and loaded "Bright Light" Diag. Traced signal from P.M. to pulse amp - O.K. - Output of PA w/1. Pulled 4606 PA from B9 and replaced with another module. Still failed - will continue debug next week.</p>
			26586.8

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON					DATE
	TIME OFF					
USER	TIME ON	TIME OFF	COMMENTS			ELAPSED TIME METER READING AT POWER OFF
Peter, Ken, Bob Mike, Eric, Raphael Tim	7:05		Replaced Pulse Amp 4606 in B09 with PA from Archives. Ran "Bright Follow the Pen" - and it worked. Ran Mandec 132 "Light Pen Test", SS1 Test Sensitivity Adjustment. SS2 is test for "Found", SS3 View Speed, SS4 Full screen Scan + Follow the crosshair LPR light also now indicates correctly. Swapped 1567 in slots B8 and B17 - same symptoms with 33 chn. generator			26586.8
Ken took home Paper tape idler wheel to replace bearing						
Eric, Joe, Ken, Tim, Lyke, Al	6:30		Put in new idler arm w/ new bearings. Loaded Light Pen Mandec -			26588.1
Rafael	7:00	29:00	WORKS O.K "cold".			26589.6
Eric	12:13		demo of SPREADSHEET			26589.6
10/12/05	7:31		REASSEMBLED DEPLETION AMPLIFIERS. MEASURED DAMPING NETWORK POTS - UP-105R, DOWN 295R, LEFT 732R, RIGHT 668R SCHEMATIC INDICATES THOSE SHOULD BE 680R. STARTED SYSTEM. FAN LEAD SHORTED TO CHASSIS			26589.6
ERIC, TIM, RAFAEL						
KEN, JOE						
MIKE ARRIVED						
ABOUT 8:00						

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG					
POWER	TIME ON				DATE
	TIME OFF				
USER	TIME ON	TIME OFF	COMMENTS		ELAPSED TIME METER READING AT POWER OFF
10/12/05			AND TRIPPED TYPE 30 circuit breaker. Reconnected FmV load & reset CB. SYSTEM		
CONTINUED			STARTED OK. TRAN ERIC'S CHARACTER DISPLAY PGM AND ADJUSTED FOCUS POT on A3. MOVED IT 1 TURN, BETTER NOW!		
			WHILE GETTING TYPE 30 CRT CRASSLS REAR PANEL OFF OBSERVED REDDISH DIRTING, SOME CORROSION ON METAL STANDOFFS IS PROBABLY CAUSED BY MOUSE PISS. DAMPING RESISTOR POTS ALL SET TO 680 Ω. DISPLAY PRETTY GOOD BUT BOTTOM ROW of character dots is still a problem.		26590.2
10/18/05	6:33		Swap Deflection pre-amps no change, swap back, temp add caps in delay, no diff than before Damping resistors fixed. Test with 120pF cap on Up/down power resistor cap, doesn't help Type 33. Tried swapping Up/down coils on CRT Yoke. NO Display upside down, but Type 33 still has troubles. Set Swap coils back		26590.2
					26591.6

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON		DATE	
	TIME OFF			
USER	TIME ON	TIME OFF	COMMENTS	ELAPSED TIME METER READING AT POWER OFF
Eric Smith, Sol Kaye, Pete Hudson	3:58		demo for row/cols spacewar, munching squares, snowflake	26592.4
				26592.7
Ken	4:45			26592.7
		5:40		26593.7
Ken, Eric	8:00 PM		test before VC VCI Pymos	26593.7
				26593.8
Rafael	14:00		NOV-5-2005	26593.8
				26597.8
	18:40			
Ken	10:45		Nov-6-2005	26593.9
		10:54		26593.9
			Solution check	27
Peter	1:50 PM		Nov. 6, 2005	26597.9
		2:4 PM		Space War would not load m bank 2. Read mbo bank O.K.
Eric			Tried Snowflake m Bank 2 Loaded. Bank O.K.	
		2:53 PM		
Lyle Bickley		6 PM		26602.1
Prof. Eric Peter, Steve			Nov. 8, 2005	26602.1
Ken, Tim, Lyle	6:45		Loaded Main DEC 3 (Addr. Test) Bank 1, 1 No Failure Loaded m Bank 2 - Failure occurred @ 25536; Reloaded - Failure @ 21536; Reload - Failure @ 23536 (continued)	
	6:45			

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG					
POWER	TIME ON				DATE
	TIME OFF				
USER	TIME ON	TIME OFF	COMMENTS		ELAPSED TIME METER READING AT POWER OFF
			Nov 8 (continued)		
			Reboot - Failure @ 25536		
			[Note: Reboots required because		
			diag fails on continue]		
			Loaded Memory checker board		
			in Banks 0 & 1 - No Failure.		
			Loaded memory checker board		
			in Bank 2 - No Failure with		
			all patterns Low Test - Hang		
			on High Test. [Memory		
			door opened + tape pm		
			touched]. Rebooted checkerboard		
			no Failure - High or Low.		
			Loaded Addr. Test - No		
			Failure High or Low.		
			Loaded "Snowflake" in		
			Bank 2 - No problems.		
			Loaded "space word" in		
			Bank 2 - No Problems.		
		2100			26604.4
Ken	7:56	8:40	Demo for 10 writers		26604.4
			Bank 2 worked flawlessly!!		26605.0
			YEAH!!		
Ken, Steve, Peter	8:18		Failure in bank 2, bit 17		26605.0
Bob, Eric, Lyle			consistent with memory		
Tim, Joe, Robert			checkerboard test		26605.8
WAbs Eric	11:58	12:22	demo for Greater training		26605.8
			space word, music, snowflake		26606.2
			couldn't figure out how to get music on speakers		

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON			DATE
	TIME OFF			
USER	TIME ON	TIME OFF	COMMENTS	ELAPSED TIME METER READING AT POWER OFF
11/19	Peter	12:55	demos reattached speakers - music works	26606.2 26606.5
11/21	Eric, Tim	2:24	Demo	26606.5
		2:32		26606.7
11/22	Peter Eric Steve, Bob, Tim, Selham, Ken, Clyde, Barry (Tech. Assn.) Raffael		demos. memory checkerboard (high) in bank 2 fails - no error bits shown, addr 7024. Memory checkerboard runs in 3 hours then fails (low), AC = 777776, IO = 5736 " " 6636 " " 6736 " " 6756 " " 7132 (Swapped sense amps for bits 16, 17, 3D17, 3D18 caused numerous failures - swapped them back - AC = 777776, IO = 3736 4716 4736 5316 5336 (Swap 324, 325 ↔ 3218, 3219 [banks 1, 2] bank 2 still fails (more addresses) bank 1 OK [ex drivers] Swapped back	26606.7
				5534 5672
				5616 5676
				5632
				5636
				5656

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON				DATE
	TIME OFF				
USER	TIME ON	TIME OFF	COMMENTS		ELAPSED TIME METER READING AT POWER OFF
			11/22 continued		
			Now (back to original configuration)		
			doesn't fail - failed after about 10 minutes -		
			no error bits shown many addresses (could be cluttered program)		
			Memory banks taken out to check wiring of		
			thermocouples - found that thermocouples		
			for banks 1, 2, 3 not connected - Only bank		
			0 thermocouples wired to power supplies -		
			Core banks are out - don't try to turn on		
			the PDP-1.		
					26609.1
<hr/>					
Lyle, Peter			Nov, 29, 2005		
Tim, Joe					26609.1
Rafael, Eric			Bank 0 in - works		
Ken, Steve			Banks 1, 2 in - bank 1 works		
			bank 2 worked for a while, then		
			bit 17 & dropped suddenly including		
			at various addresses with examine/		
			deposit.		
			Then after a while bank 2 started		
			working without any failures.		
			Powered machine down for a while.		
					26610.6
<hr/>					
Joe, Peter, Eric			Dec. 6, 2005		26610.6
Tim, Rafael, Ken			at 6:32 pm started checkerboard in bank 2		
			Ran 1 1/2 hours OK (7:45 pm)		
			Running address test - ran ok 1/2 hour		
			All programs (music, checkerboard)		26613.5
			run OK.		

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG						
POWER	TIME ON					DATE
	TIME OFF					
USER	TIME ON	TIME OFF	COMMENTS			ELAPSED TIME METER READING AT POWER OFF
7 DEC 05						
MIKE C. PETER J. JEF,			DEMO FOR BOB SPIDELL, WILLIAM SUTHERLAND, JOHN TOOLE, Dwayne Henricks, Paul Babin			26613.6
			Bank 2 has MUX Program			
						26614.2
DEC. 10, 2005						
Mike Williams, P. Samson			Demo sw. in bank 2			26614.2 26614.4
<hr/>						
Steve B. Peters, Ken S. Eric, Tim Lyle, Bob L., Rafael	1829		Dec. 13, 2005 checkboard in bank 2 run for 0 min - no error Replaced Deflection Power Amp on model SE Display w/ Fixed on Firm Visible Storage no change in charger display. Fixed Changed Regulator modules - Didn't affect the outstanding char. problem.			26614.4
		2100				26616.4

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON				DATE
	TIME OFF				
USER	TIME ON	TIME OFF	COMMENTS	ELAPSED TIME METER READING AT POWER OFF	
Mike, Joe/Peter	18:15	18:45	Ran checker board	266 B 16.4	
Ken, Cyle, Eric, Peter Rafael			Failed w/12 bit - Error loc 554 5616, 26, 32, 36, 72, 76, 5706, 5712, 26 Failed running high checker board in Bank I - Error indication showed program failure, Ran checker board Bank 2 Low - No Failure. Ran checker board High - No Failure Swap 1991 Inhibit 3A23 w/3A25		
	18:50				
			BRACKS 23 01 checker board failed 1836, 1636, 3736... swapped inhibit boards 1992 (pos. A21 ↔ A19) swapped 1991 (3A23 ↔ 3A25) rotation 1994 positions [22, 23, 24] all combinations, same failure. All cards back to original positions. Bank 2 checker board sometimes fails		
	21:01		Small test	266 B 18.2	

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON			DATE
	TIME OFF			
USER	TIME ON	TIME OFF	COMMENTS	ELAPSED TIME METER READING AT POWER OFF
Joe F, Peter S, Lyle KGV, RAFL, Steve Eric	18:00		spacewar runs but display Y axis jittery + goes off screen at top.	26618.2
			Checked board Bit 7 Bank One Fading	
			Bit 17 Bank Two in Many Places	
			Bank Loc Bit	
			1 2313 7	
			1 2211 7	
			1 2215	
			1 2211 7	
			1 2313 7	
			1 - 01 7	
			Adjusted alignment pin on Y deflection master pack display now OK again	
			memory tests run, various drive currents scoped, also read signals (memory working OK right now)	
	20:57			26621.0
			SCOPED READ DRIVE, WRITE X DRIVE, WRITE Y DRIVE WHEN MEMORY WAS WORKING	
Ken, Eric, Tracy, Steve, Lyle Joe for first 1/2 hour			Core of 3B upper 13.20K * Lower 15.54K * 1 upper 13.88K Lower 12.92K 2 upper 13.17K Lower 12.64	Jan 16, 2006 10.96 After 10.65 (Running)
			* unplugged from P/S Plugged in gives seriously erroneous results	
			Taped all cut Thermistor Leads (Red)	

Core stuck not warm to touch

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

11-27
(continued)

PDP LOG

POWER	TIME ON				DATE
	TIME OFF				
USER	TIME ON	TIME OFF	COMMENTS		ELAPSED TIME METER READING AT POWER OFF
	1940		Ran checkerboard while scope, read current, stroke, and sense line (doth refresh 7); Also scope read current, stroke & sense amp out. No Memory Failures		26621.0
	200		1-17-06		26621.8
Pate S, George Michael Steve Russell Warren Harris	1310		Demos - George M. wrote a display board - punched tape "George Michael display pg in memo" Had to use memory bank 1 - → bank 0 not reading in correctly (bank 2 seems OK) [Address test fails in bank 0 (coming from bank 2) at addresses 0 x x 5 x (most of these addresses and no others)		26621.8
	1359		[Also checkerboard now failing sometimes in bank 2 - drops bit 17 at oct. 25736 - intermittent		26622.6

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG

POWER	TIME ON			DATE
	TIME OFF			
USER	TIME ON	TIME OFF	COMMENTS	ELAPSED TIME METER READING AT POWER OFF
			3.25-06	
Lyle, Steve R, Peter S	1347		Location 50 ₂ in bank 0 reads back all 0's - trying swap of 1987 driver in 323 - no change - swapped back. Trying swap of 1976 resistor found in 3A5 - no change - swapped back.	26622.6
	1446		showing SW to Fred Malik (planning to photograph it)	26623.3
Lyle, Steve R, Ken, Joe, Tim			Thermocouple TAPED ON TOP OF BACK CORE OF STACK CASE 20°C 6:49 Temp 22°C 7:05 Temp 23°C 7:44 Temp 24°C WROTE TEST PROGRAM TO RUN IN BANK 1 AND USE EXTEND MODE TO TEST THE LOCATION IN THE TEST WORD FOUND THAT LOCATION 00041 WHICH HAD FAILED BEFORE WAS WORKING LOCATION 00050 THROUGH 00057 FAILED LOCATION 00060 WORKS EXPERIMENTING WITH SWITCHES SHOWS THAT ADDRESSES OF THE FORM 0XX60 ALL READ AS ALL 0'S WHEN WRITTEN AS ALL 1'S	26623.3

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

PDP LOG						
POWER	TIME ON				DATE	
	TIME OFF					
USER	TIME ON	TIME OFF	COMMENTS			ELAPSED TIME METER READING AT POWER OFF
			1-25-06 CONT			
			Only locations 000XX			
			where XX = 5A FAIL			
			7:59 TEMP = 24°C			
			FOUPP 1B 07 in 3A5			
			3Y21 WAS LOOSE SEATED			
			IT. SWAPPED			
			SPARE 1976 RESISTOR			
			MODULE 3A5.			
			NO CHANGE 0X5X			
			0X5X Address still			
			Fail			
			RETURNED ORIGINAL			
			1976 1976 TO 3A5			
			FOUND WIRE FROM			
			3A5 UTO 3B3F			
			WAS BROKEN OFF AT			
			3A3F. RESOLDERED			
			IT. NOW WORKS			
			RAW CHECKERBOARD			
			AND MEMORY ADDRESS			
			TEST IN ALL BANKS			
			NO FAILURES SEEN.			
			CORR 0 TEMP 24°C			26625.4
			LYLE, TIM, PERSIC			
			ERIC, STEVE, RAFAEL			
			1/30/06			26625.4
			Loaded checker board			
			(when system was "cold")			
			into bank 2. Failed			
			as follows!			
			2010 ON			

TABLE 11-8 SAMPLE OPERATION LOG FORMAT

1/30/06 (continued)

Location	Failure	Prog Flags
2 0355 ✓	0-20*	264 out
3755 ✓	"	"
4305 ✓✓	"	"
2705		
4705		
5507		
6355	✓	0
6655		

check marks indicate multiple failures

* Bit 13

Loaded checkerboard into Bank 1, then Bank 0
No Errors

Loaded checkerboard into Bank 2
No Errors

Loaded Address Test - No Errors Any Bank

Reloaded checkerboard into Bank 2 - No Failure

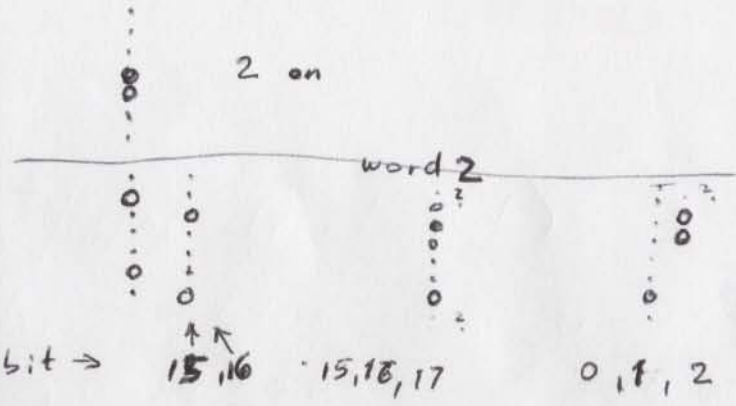
fan screw/flake in Bank 2 - OK

2055 OFF

26626.2

bit

2 on



231
232

bit →

15, 16

15, 18, 17

0, 1, 2

o - normal brightness, * - high intensity, . - blank dot

```
Addr.  Value
===== vertical bar, most left position =====
21      774000      (776060 default)
22      000000      (060377 ← ← )
```

```
Expected  Real
o         o
o         o
o         o
o         o
o         o
o         *
o         .
```

```
===== horizontal bar, bottom line =====
21      402010
22      020100
```

```
Expected  Real
ooooo
```

```
===== L shape =====
21      776010
22      020100
```

```
Expected      Real
o             o
o             o
o             oooo
o             o
o             o
o             *
ooooo        .....
```

```
===== inverted L shape =====
21      004020
22      040201
```

```
Expected      Real
oooooo       *ooo
o             .
o             .
o             .
o             o
o             .
o             .
```

```
===== cross, centered lines =====
21      040211
22      742010
```

```
Expected      Real
o             o
o             o
o             *
ooooo        *ooo
o             .
o             .
o             .
```

```
===== Word 1 all bits on =====
21      777777
22      000000
```

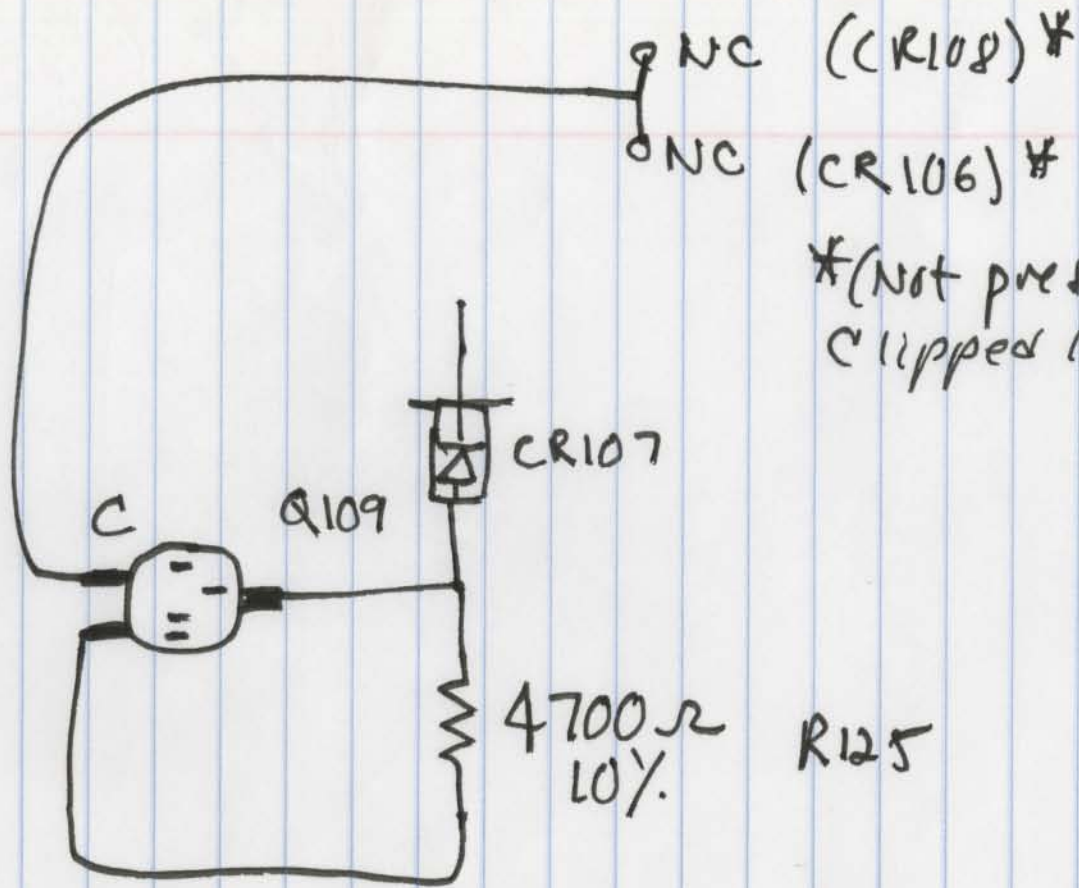
```
Expected      Real
oo            oo
oo            oo
oo            oo
oo            *oo
ooo           oo*
ooo           *
ooo           .
```

```
===== vertical bar, second position from left =====
21      003760
22      000000
```

```
Expected      Real
.o            .o
.o            .o
.o            .o
.o            .o
.o            .o
.o            .o
.o            .o
.o            .
```

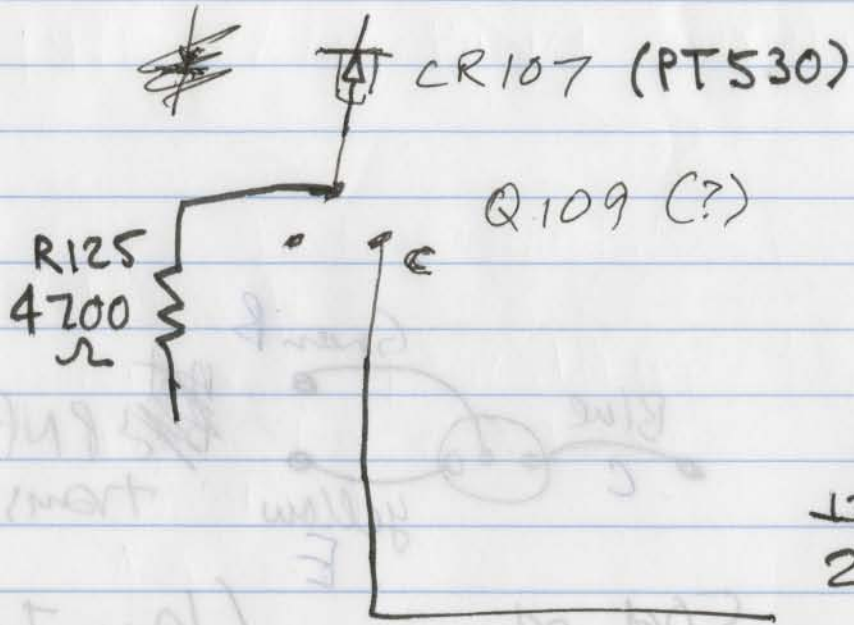
Handwritten notes:
 532
 531
 530
 529
 528
 527
 526
 525
 524
 523
 522
 521
 520
 519
 518
 517
 516
 515
 514
 513
 512
 511
 510
 509
 508
 507
 506
 505
 504
 503
 502
 501
 500

"Missing"
Transistor



* (Not present)
clipped leads

EQR-60-6
0-60 VDC, 0-6A
Deflection Supply, Type 30 CRT
9/29/04



[Germanium
PNP]

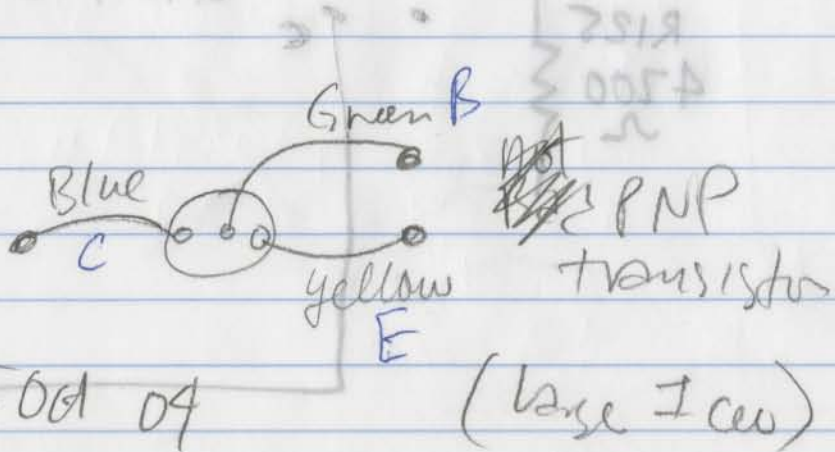
$V_{CE} = 80$ ~~80~~

[$I_C = 3A$
50V]

[NJE EQ R-60-6
0-60 VDC, 0-6A]

(00279) 70190

(5) 0010



2N241A GE208

1010
8551
820545

(Minimum)
9219

~~0.8 = 80 = 80V~~

A2 = 52

V02

0.10 ma Base current, $\beta = 75$

$I_{cbo} = 8 \mu A < 4 \mu A$

$I_{ces} = 22 \mu A < 12 \mu A$

$I_{ceo} > 100 \mu A$ (off scale)

TBP: 4N
1E
EG

≈ 75

0-20 VDC, 0-2A

0-20 VDC, 0-2A

