10003	N3MPL		
01	Namer	;	NOVA3/4 MULTIPROGRAMMING RELIABLITY TEST
02		í	HOTHER HOLTEN BANKHHER REELADETIT TEOL
03			ABSTRACT -
04			THE NOVA3/4 MULTIPROGRAMMING RELIABILITY TEST
.05		2	CONSISTS OF A SERIES OF INDIVIDUAL PROCESSOR
06			AND PERIPHERAL TESTS AND A
07		8	SUPERVISOR PROGRAM. (THE DIAGNOSTIC LINKER)
08		3	
09		1	THE DIAGNOSTIC LINKER IS A PROGRAM
10			DESIGNED TO "LINK" THE VARIETY OF
12			SHEM & STURING IMAL IMAL AND BE Shem y sturing and light they way be
13			THE DIAGNOSTIC LINKER IS A PROGRAM DESIGNED TO "LINK" THE VARIETY OF PROCESSOR AND PERIPHERAL TESTS IN SUCH A FASHION THAT THEY MAY BE RUN CONCURRENTLY. THEREBY, TESTING THE INTERACTIVE CAPABILITIES OF THE PROCESSOR AND ITS PERIPHERAL EQUIPMENT.
14		1	THE INTERACTIVE CAPABILITIES OF
15		1	THE PROCESSOR AND ITS PERIPHERAL
16		1	EQUIPMENT.
17		3	THIS TEST IS PROVIDED IN THREE LENGTHS
18		\$	THE SHORT VERSION ONLY INCLUDES THOSE TESTS THAT APPLY TO THE CPU, MEMORY, FLOATING POINT,
19		3	THE SHORT VERSION ONLY INCLUDES THOSE TESTS
50		3	THAT APPLY TO THE CPU, MEMORY, FLOATING POINT,
21			MULNDIV, TTY, REAL TIME CLOCK, AND THE I/O TESTER.
23		3	THE LONG VERSION INCLUDES THE ABOVE & PRIMARY DEVICE
24		;	CODE TESTS FOR THE NOVA DISK, MOVING HEAD
25		1	THE LONG VERSION INCLUDES THE ABOVE + PRIMARY DEVICE CODE TESTS FOR THE NOVA DISK, MOVING HEAD DISK, 6060 SERIES DISK,6063/64 DISK,MAGNETIC TAPE,CASSETTE, DCU-50/200 ,AND THE LINE PRINTER
65		1	DCU-50/200 , AND THE LINE PRINTER
27			
- 85		1	THE PERIPHERAL VERSION INCLUDES ⁵ , ONLY THE CHECKERBOARD TEST AS A BACKGROUND TEST BUT DOES INCLUDE THE PRIMARY AND SECONDARY (WITH DCU-50/200 AND LPT AS AN EXCEPTION) DEVICE CODE TESTS FOR
29		3	CHECKERBOARD TEST AS A BACKGROUND TEST BUT
30		1	LPT AS AN EXCEPTION) DEVICE CODE TESTS FOR
31 32			THE DEVICES MENTIONED ABOVE.
33		3	140 0011000 MENTIONED MODAC.
34			HARDWARE CONFIGURATIONS
35			MINIMUM MACHINE REQUIREMENTS
36			NOVAS OR NOVA4 PROCESSOR
37			16K OF READ WRITE MEMORY
38		3	(MEMORY MUST BE CONTIGUOUS)
39		12.1.3	TTY/CONSOLE (DEV.10/11)
40		1	
41		15.5	OPTIONAL EQUIPMENT
42		1	UP TO 128K OF READ/WRITE MEMORY
43			(MUST BE CONTIGUOUS)
44 45		1	MAP OPTION(WITH OR WITHOUT PROTECTION)
46			PARITY OPTION
47			FLOATING POINT UNIT
48		12.2.5	DCU-S0/200 FEATURE
49			REAL TIME CLOCK (DEV.N14)
50			FIXED HEAD DISK (NOVA DISK) (DEV.#20,60)
51		15.5.9	MOVING MEAD DISK (ANY/ALL DRIVES)(DEV.#33,73)
52		12.2.9	6060 SERIES DISK (ANY/ALL DRIVES)(DEV.#27,67) 6063/64 DISK (ANY/ALL DRIVES)(DEV.#26,66)
53 54		16.6.10	MAGNETIC TAPE (ANY/ALL DRIVES)(DEV.#28,68)
55		12.2.12	CASSETTE (ANY/ALL DRIVES) (DEV.#34,74)
56		12.2.13	LINE PRINTER (REG AND DCH TYPE) (DEV.#17)
57			I/O TESTER (DEV.#0)

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0004 N3MPL	
01	1
20	12.3 PREREQUISITES
3	12.3.1 SOFTWARE PREREQUISITES
04	THE SYSTEM SHOULD BE CAPABLE
)5	OF RUNNING ALL INDIVIDUAL LOGIC AND
06	RELIABILITY TESTS PERTAINING TO THE
7	PROCESSOR AND ITS PERIPHERAL EQUIPMENT
8	8 BEFORE ATTEMPTING TO RUN THIS TEST
9	INOTE: ALTHOUGH THIS TEST MAY AT TIMES BE USEFUL
10	FIN DETERMING THE GO/NO GO STATUS OF AN
11	SUNKNOWN SYSTEM, IT IS RECOMMENDED THAT:
12	FA. ALL OTHER DIAGNOSTICS BE RUN EVEN IN THE
13	EVENT THAT THIS TEST FINDS NO PROBLEMS.
4	18. AN ATTEMPT BE MADE TO ISOLATE ANY PROBLEMS
15	FOUND BY FIRST UTILIZING THE LOWER
16	I LEVEL TESTS FOR MORE CONSISE ERROR REPORTS.

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NIMPL			10006 N3MPL		
	12.4.2	SYSTEM SETUP	01	14.	OPERATING PROCEDURES
	3	IF THE DCU IS TO BE RUN AT A DEVICE	02	14.1	LOAD THE PROGRAM VIA THE BINARY LOADER
	3	CODE OTHER THAN 64, THEN ONE MEMORY	03	14.2	SET SWITCHES TO:
	1	LOCATION NEEDS TO BE UPDATED TO	04		200 FOR AUTO SIZE AND GO
	1	CONTAIN THE NEW DEVICE CODE.	05		202 FOR MANUAL SELECT/DELETE
·	1	THE LOCATION IS:	06		204 FOR RUNNING WITHOUT MAPPING.
015306		LDC.=DCUDV	07		206 FOR RESTARTING LAST PROGRAM SELECTED
	8	IF THE MOVING HEAD DISKS ARE TO BE	08		210 FOR STARTING ODT BEFORE PROGRAM START
	*	EXERCISED THEY MUST HAVE A PACK INSTALLED	09		EIU FUR STARTING UUT DEFURE FRUGRAM START
	1	AND BE IN THE READY STATE	10	1	****NOTE: TEST MUST BE RUN BEFORE ADDRESS
		IF MAGNETIC TAPES ARE TO BE EXERCISED	11		206 CAN BE UTILIZED.
	;	THEY MUST BE ON LINE WRITE ENABLED	12	7	EVO LAN DE UTILIZEU.
	;	IF CASSETTES ARE TO BE EXERCISED	13	3	PRESS START
	1	THEY MUST BE ON LINE WRITE ENABLED	14	14.3	
		IF THE LINE PRINTER IS TO BE EXERCISED	14	\$4.4	PROCESSOR WILL TYPE: NAME/VERSION
		IT MUST BE ON LINE AND IN THE READY STATE		8	
	;	IF PARITY OPTION EXISTS IT MUST BE	16	1	TOTAL #1K'S=XXX(DECIMAL) MAP OR NO MAP
		JUMPED TO INTERRUPT, AND NOT HALT.		3	PROGRAM RUN LIST
	,	JUNEL IN INTERNOFT, AND NOT HALL.	18	1	PROG# DESCRIPTION
	13.	KEY ENTERED OPTIONS	19	14.5	IF START WAS 200 OR 206 THE LIST OF
	13.	ENTRIES TYPED ON TTY SET BITS IN SWREG	20	3	PROGRAMS TO BE RUN CONCURRENTLY WILL
	1		21	3	THEN BE LISTED AND THE TEST SYSTEM
	3	FOR USE BY THE PROGRAM.	22	8	WILL AUTO START
	3		23	14.6	IF START WAS 202 LINKER WILL
	IKEY	SWREG BIT FUNCTION	24	3	PAUSE AT THE END OF EACH TEST
	1 1	1 =1 DON'T RELEASE AND ALLOW REASSIGNMENT	25	3	DESCRIPTION AND WAIT FOR KEYBOARD
	1	OF MEMORY AFTER ERROR	26	\$	INPUT. TYPING IN A SPACE WILL
	15	2 =1 DELETE TTO OUTPUT	27	3	ENABLE THAT TEST TO BE RUN.
	1 3	3 =1 CAUSES THE DELETION OF THE RANDOM	85	8	TYPING IN ANY OTHER CHARACTER WILL
	1	WAIT STATES IN THE TTY AND LPT	29	3	DELETE THAT TEST FROM BEING RUN
	3	TESTS.	30	8	
	\$ 44 .	4 WILL CAUSE THE ELAPSED RUN	31	\$4.7	IF START WAS 204 LINKER WILL SIZE MEMORY
	1	TIME AND ACCUMULATED ERRORS	32	· •	WITHOUT UTILIZING OR EVEN LOOKING FOR THE
	\$	TO BE TYPED ON THE TTY.	33	3	MAP AND THEN PROCEED AS IN STARTING AT
	7	(NOTE: A RTC MUST EXIST)	34	1	ADDRESS 202 WITH THE MAP NON-EXISTENT.
	15	5 =1 DIRECT ALL ERROR AND RUNTIME TYPEOUTS	35	14.8	IF AN AUTOSTART ADDRESS WASN'T USED
	1	ALSO TO THE LINE PRINTER.	36	3	THE PROGRAM WILL WAIT FOR OPTION SETUP
	1 6	6 =1 THE ERROR ROUTINE WILL PAUSE AFTER	37	3	OF SWREG. SEE PARAGRAPH 3.0. TYPE
	1	EACH PHASE OF AN ERROR TYPEOUT.	38		A CR TO START TESTING.
	\$	TYPE A CR KEY ON DEVICE ITI TO PROCEED.			
	17	7 =1 PRINT THE RUN STATISTICS OF EACH TEST.			
	1				
	-				

EACH KEY ENTRY COMPLEMENTS THE PREVIOUS STATE OF Swreg bit Except control characters Following:

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KEY (C)O	ENTER THE ODT EDITOR (SEE DESCRIPTION AT PARAGRAPH 7.0)
KEY (C)D	DEFAULT MODE RESTART. SWREG BET TO C.
KEY (C)R	RESTART WITHOUT RESETTING SWREG BITS.
KEY M	TYPE THE CURRENT CONTENTS OF SWREG.
WHERE (C)	SIGNIFIES A CONTROL KEY.

10009	N3MPL			10010	NEMPL		
01		*		01		15.2	ERROR ANALYSIS
50		15.	ERROR DESCRIPTION	02			
03			MOST ERRORS DETECTED BY EITHER			1	DUE TO THE INTERACTIVE NATURE OF
04		1	THE INDIVIDUAL TEST PROGRAMS OR	03		1	THE TESTS INVOLVED, A SERIES OF
• •				04		8	ERROR TYPEOUTS WILL PROBABLY BE
05		3	BY THE DIAGNOSTIC LINKER WILL	05		8	REQUIRED FOR ANALYSIS BEFORE A
06		3	RESULT IN AN EXTENSIVE ERROR	06		1	PROBLEM WILL BE ISOLATED.
07		3	TYPEOUT. SOME SMALL NUMBER OF	07		1	A RESTART AT 202 AND DELETION OF ALL
08		1	HIGHLY IMPROBABLE ERRORS MAY RESULT	08			BUT THE TEST THAT ORIGINALLY
09		1	IN A PROGRAM HALT IF THEY ARE	09			FAILED MAY HELP TO ISOLATE
10		3	OF A NATURE THAT THE LINKER CANNOT	10		1	INTERACTIVE PROBLEMS AS FOLLOWS:
11			RECOVER FROM AND LOGICALLY PROCEED,	11			INTERNETIVE PRODUCTS AS FULLWAS
12			(I.E. INTERRUPT STACK OVERFLOWS)	12			
13						12.5.5.1	IF THE TEST RUNS BY ITSELF THE PROBLEM
14				13		1	IS INTERACTIVE-RE-ENABLE ONE OTHER TEST AT
		1		14		2	A TIME TO DETERMINE WHICH ONE IS THE PROBLEM.
15		15.1	ERROR FORMAT	15		3	IF THE TEST DOES NOT RUN BY ITSELF
16		1	ERROR TYPEOUTS INCLUDE	16		1	RESORT TO SIMILAR BUT LOWER LEVEL TESTS
17		15.1.1	PROGRAM # AND NAME AT TIME OF ERROR	17		1	FOR ISOLATION
18		1	(SEE PROGRAM RUN LIST TO CORRELATE)	18		15.3	PERTINENT MEMORY LOC'S TYPED
19		15.1.2	THE CURRENT CONTENTS OF ACO, AC1, AC2.	19		1	
20		15.1.3	LOGICAL SCRATCH AND DATA CHANNEL LIMITS	20		15.8.1	CHECKERBOARD RAN
21		15.1.4	MEMORY ALLOCATION TABLE	21			THE AC'S AT ERROR WILL INDICATE:
22		1	PHYSICAL 1K PAGE# + LOGICAL ADDRESS +RELOCATED ADDRESS	22			
23		15.1.5	CONTINUATION INFORMATION IN GROUPS			1	GOOD DATA- BAD DATA-LOGICAL ADDRESS
			OF 3 MEMORY LOCATIONS PERTINENT TO	53		1	
24		3		24		1	IN ADDITION THE FOLLOWING LOCATIONS ARE TYPED:
25		3	THE INDIVIDUAL TEST THAT FAILED	25		8	CO.TK TEST COUNTER
56		3		56		8	0 GENERATE CHECKERBOARD
27		15.1.6	THE CPU TESTS THAT RELOCATE/REMAP WILL	27		1	1 DISTURB PASS
28		SIN THE	IR ERROR TYPEOUTS:	28		1	2 CHECK PATTERN
29		181.LA	START/ERROR (RES.)	29			3 CHECKSUM THE # OF =1'S IN PATTERN
30		******	X YYYYY ZZZZZ	30			CB.LC STARTING LOGICAL ADDRESS OF "BEGIN"
31				31			RELOCATED TO SCRATCH
32		ST.IA	THE LOGICAL START OF THE RELOCATED TEST LOOP			1	
33				35		7	CB.SE AC3 AT ERROR CALL
		JAAAAA	((I.E. THE LAST LCALL SETUL)	33		1	
34		1		34		3	
35			THIS NUMBER INDICATES WHERE THE RESIDENT COPY	35		12.3.5	SC MEMORY TEST
36		3 4 4 4 4 4	OF THE TEST LOOP MAY BE FOUND IN THE LISTING	36		3	THIS IS AN ISZ/DSZ TEST FOR SC-MEMORIES.
37		3		37		1	
38		ERROR	THIS NUMBER INDICATES WHERE IN THE RESIDENT	38		1	THE AC'S AT ERROR WILL INDICATE:
39		* Z Z Z Z Z Z	COPY OF THE LISTING THE ERROR CALL MAY BE FOUND	39		1	ACTUAL-EXPECTED-LOGICAL ADDRESS
40		1	(FOR SOME VALIDITY TRAP ERRORS THIS NUMBER	40			
91			MAY NOT APPEAR TO BE VALID.)	41			IN ADDITION THE FOLLOWING LOCATIONS ARE TYPED:
42				42			MM.TK ERROR NUMBER:
			THE CPU TESTS THAT RELOCATE WILL UPON				
43				43		¥	0 PATTERN STORING ERROR(SHD BE -1)
44		3	DETECTING AN ERROR CHECK THE RELOCATED	44		3	1 LOCATION NOT -1 BEFORE DOING ISZ
45		3	CODE TO VERIFY THAT IT IS INTACK. IF	45		7	2 ISZ DIDN'T SKIP
46		1	A DIFFERENCE IS FOUND THE FOLLOWING	46		8	3 LOCATION NOT EQUAL TO 0 AFTER ISZ
47		7	TYPEOUT IS INCLUDED IN THE ERROR	47		1	4 DSZ SKIP ERROR
48		1	TYPEOUT:	48		1	5 DSZ TEST-LOCATION NOT -1 AFTER DSZ
49		1		49		1	6 SAME AS 1, EXCEPT TESTING IN REV DIRECTION
50			ATED CODE ERROR	50			7 SAME AS 2, EXCEPT " " "
51			TED ACTUAL ADDR-E ADDR-A	51			10 SAME AS 3, EXCEPT " " "
52		•	YYYYYY ZZZZZ GCGGG	52		*	MM.SE INSTRUCTION ADDRESS FOLLOWING ERROR CALL
53		3	-	53		1	LOCATION ADDRESS OF FAILING LOCATION(LOGICAL)
54		I WHER		54		3	
55		1	XXXXXX IS THE UNRELOCATED CODE WORD	55		3	
56		8	YYYYYY IS THE RELOCATED CODE WORD				
57		8	ZZZZZ IS THE ADDR. OF THE UNRELOC. WORD				
58		1	GOOD IS THE LOGICAL ADDR. OF RELOC. WORD				
59		1					
		• .					

10011	NEMPL			10012	N3MPL			
01		15.3.3	ARITHMETIC TEST	01		15.3.7	NOVA	DISK
02		1	THE AC'S WILL BE TYPED AS THEY WERE AT THE	50		3		
03		3	TIME OF ERROR DETECTION	03		3	AC 0	GOOD DATA
04		3		04		1	AC1	BAD DATA
05		8	IN ADDITION THE FOLLOWING LOCATIONS ARE TYPED:	05		1	AC2	ADRS, OF GOOD DATA (BAD IS AT AC2+4)
06		1	AT.LC STARTING ADDRESS OF ARITH IN SCRATCH	06		1	ND.SA	MAYS ANY OF THE FOLLOWING
07		3	AT.LO LOW LIMIT OF SCRATCH AREA AFTER IT IS	07		1		A. THE ADRS. OF A RANDOM DATA CONTROL WURD
08		8	REMAPPED FOR EXECUTION	08		3		(NDDW1 TO NDDW4) THE ERROR WAS IN ONE OF
09		3	AT.LA AT.LC IN RELATION TO AT.LO	09		1		THE FIRST 4 WORDS IN THE BUFFER
10		3	(LOGICAL START OF ARITH AFTER REMAPPING)	10		3		B. FAC2 ERROR WAS DISK STATUS
11		1	THE LAST THREE RANDOM NUMBERS GENERATED	11		1		C. A -# DATA ERR IS AT AC2+4
12		1	(SEE DISCUSSION OF ST.LA, ETC AT PARA.5.1.6)	12		3	NDDST	LOGICAL ADDR OF DATA START
13		1		13		8	NDCST	LOGICAL CHANNEL ADDR OF DATA START
14		15.3.4	FLT PT TEST	14		1	NDSTA	LAST DISK STATUS
15		3		15		1	NOADR	START SECTOR # OF THESE EXERCISED =1 Operation was a write
16		1	ACO GOOD DATA	16		1	ND.CO	=0 OPERATION WAS A READ
17		1	AC1 BAD DATA AC2 ADDRESS OF GOOD DATA DURING TEST EXECUTION	17		3	ND.CO	AU OPERATION WAS A READ
18		1	ALZ ADDRESS UP GOOD DATA DURING FEST EXECUTION					
19 20			IN ADDITION THE FOLLOWING LOCATIONS ARE TYPED:					
21		,	TH ROTTION THE FOCUMING CONTINUE AND THEOD					
55		,	FP.LC START OF LOCATIONS INCLUDING CURRENT					
23			TEST THAT IS IN SCRATCH (SEE FP.EN)					
24			FP.LO SCRLO AFTER REMAPPING FOR EXECUTION					
25		1	FP.EN END OF TEST OR START OF RANDOM DATA					
26		1	IN SCRATCH AREA					
27		1	PF803 AC3 AT TIME OF ERROR CALL (ADDR OF JSR)					
28		8						
29		8	(FOR THE REMAINDER OF THE OUTPUT SEE DISCUSION OF					
30		3	ST.LA ETC AT PARA. 5.1.6)					
31		1						
32		1						
33 34		12.3.2	MUL/DIV TEST					
34 35		3						
35		1	MULTIPLY DIVIDE FAILURES WILL INDICATE					
37			EITHER MUL FOR MULTIPLY OR DIV FOR DIVIDE					
38		1	IN ADDITION, THREE SETS OF AC'S ARE TYPED					
39			ORIGINAL OPERANDS					
40		1	HARDWARE RESULT (ASSUMED TO BE INCORRECT)					
41		1	SOFTWARE RESULT (ASSUMED TO BE CORRECT)					
42		\$						
43		15.3.6	STACK ERROR TEST.					
44		1	THE STACK ERROR TEST OUTPUT IS AS FOLLOWS:					
45		1						
46		3	PROGRAM # NNN STACK ERROR TEST.					
47		1	SOA 10A 00A					
48		3	NNNNN NNNNN NNNNN					
49		3	SCRLO/HI NNNNN NNNNN USER (A OR B)					
50		1						
51		1	(MEMORY ALLOCATION TABLE APPEARS HERE					
52		1	IF TEST IS RUNNING MAPPED.)					
53		1	LOGICAL ADDRESS OF ERROR IS: NNNNN					
54 55			PAGTANP ARAUPAA AL CHUAN 191 HUMAN					
55 56			THE USER MAY LOOK UP THE ADDRESS GIVEN AS THE LOGICAL					
50 57		1	ADDRESS OF THE ERROR IN THE LISTING. THE TYPE OF ERROR					
58		*	AND THE MEANING OF THE ACS ARE GIVEN IN THE COMMENTS AT THAT					
59		;	POINT.					
		-						

10013	N3MPL		10014 N3MPL	
01		15.3.8 6063/6064 DISK	01	AF T & MOUTHE HEAD DIEN TERT
50		3	02	15.3.9 MOVING HEAD DISK TEST
03		1 PD.SA IS THE KEY TO USING THE ERROR OUTPUT	03	; MM.SA IS THE KEY TO USING THE ERROR PRINT OUT.
04		PD.SA MAYEANY OF THE FOLLOWING:	04	I MH.SA =ADDRESS OF A RANDOM DATA CONTROL WORD
05		3 THE ADDRESS OF A RANDOM DATA CONTROL	05	
0.6		WORD (PDDW1 TO PDDW4), THE ERROR WAS IN		1 (MHDW1 TO MHDW4) THE ERR WAS IN ONE OF
07		ONE OF THE FIRST 4 WORDS IN THE BUFFER.	06	THE FIRST 4 WORDS IN THE BUFFER
0.8		# A NEGATIVE # ,DATA ERROR IS AT AC2+4	07	I ==# ERR IS AT AC2+4
09		# AC2 , ERROR WAS A DISK STATUS ERR	08	#AC2 ERROR WAS DISK STATUS
10		IN WHICH CASE:		IN WHICH CASE:
11		ACO= DRV, TRK, BECTOR	10	ACO=DIB DISK
12		FROM WORD 2 OF CMD QUEUE		F ACI=DIC DISK
13		AC2= DISK DIC STATUS	12	AC2=DISK STATUS(DIA)
14			13	ACSEDIC DISK
15		FOR DATA COMPARE ERRORS, THE AC'S	14	IN THE CASE OF A DATA COMPARE ERROR:
16		AVE THE FOLLOWING INFORMATION:		ACO GOOD DATA (SEE MH.SA)
17		ACO GOOD DATA	16	AC1 BAD DATA
16		AC1 BAD DATA		AC2 ADRS. OF GOOD DATA
19		ACZ ADDRESS OF GOOD DATA(BAD IS AT AC2+4)	18	1 BAD IS AT AC2+4 IF MH.SA IS A -#
20			19	IN ADDITION THE FOLLOWING LOC'S ARE TYPED
21		ALSO THE FOLLOWING INFORMATION IS OUTPUTTED:	20	3 MHDST DATA START IN CORE 8 MHCST DATA START FOR DCH MAP
22		PODST DATA START IN CORE	22	
23		PD.CA LOGICAL ADDR OF CHANNEL IN 1K'S OCTAL	23	
24		2 POSTA DISK STATUS(DIC)	24	
25		PDADR DRIVE+TRACK+SECTOR (FIRST WORD OF QUEUE)	25	MHDOC LAST DOC TO DISK
26		PD.CO 0=READ, 1=WRITE, 2=DATA VERIFY	26	ALSO TE THE ERROR OCCURS IN A READ ODERATION
27			27	; ALSO IF THE ERROR OCCURS IN A READ OPERATION ; THE FOLLOWING DATA IS PRINTED:
28		ALSO IF THE ERROR OCCURS IN A READ OPERATION	28	I THE FOLLOWING DATA IS PRINTED:
29		THE FOLLOWING DATA IS PRINTED:	29	
30			30	
31		#RITE PDCST = XXXXX	31	\$ GGGG MMMM JJJJ KKKK \$WMERE XXXXX = STARTING CHANNEL ADDRESS OF WRITE OPERATION
32		1 MD1 MD2 MD3 MD4	32	SGGG = FIRST PHYS 1K USED IN DISK WRITE
33		1 GGGG HHMM JJJJ KKKK	33	s HNHH = 2ND = " " " " " "
34		3	34	1 JJJJ = 3RD = = = = = = =
35		3 WHERE,	35	3 KKKK 8 4TH " " " " " "
36		XXXXX = STARTING CHANNEL ADDRESS OF WRITE OPERATION	36	NOTE: UPON DETECTION OF AN ERROR THE TEST WILL
37		3 GGGG # FIRST PHYS 1K USED IN DISK WRITE	37	RETRY THE OPERATION FOUR TIMES.
38		2 HHHH III 2ND III III III III III III IIII II	36	s weint the breaktion rook times,
39		y JJJ = 30 + + + + + + + + + + + + + + + + + +	39	,
60		Z KKKK Z 4TH ^R ^N ^N ^N ^N ^N	40	MOVING HEAD DISK STATUS WORDS
41		2	41	
42		\$ NOTE: UPON DETECTION OF AN ERROR THE TEST WILL	42	BITS 4047 4048,57 4231 6030,45 6067
43		RETRY THE OPERATION FOUR TIMES.	43	O R/W DONE SAME SAME DC DNE
44		1	44	1 SEEK O DNE SAME SAME SAME CMD DNE O
45		· · · · · · · · · · · · · · · · · · ·	45	2 SEEK 1 DNE SAME SAME SAME CMD DNE 1
46		\$ 6063/64 DISK STATUS WORD	46	3 SEEK 2 DNE SAME SAME SAME CMD DNE 2
47		*****	47	4 SEEK 3 DNE SAME SAME SAME CMD DNE 3
48		2 BIT(S) MEANING BIT(S) MEANING	48	S SEEK ON DRV O SAME DUAL PRC DKT DISKETTE
49		2 0 ERROR FLG 10 DISK RDY	49	6 SEEK ON DRV 1 SAME SECT ERR V.S. SEL.
50		3 BUS ENABLE 11 UNSAFE	50	7 SEEK ON DRV 2 SAME HEAD ERR N/A BAD SECTOR
51	,	1 4-5 DISK CAPACITY 12 DATA LATE	51	1 8 SEEK ON DRV 3 SAME ADDR ERR UNSAFE UNSAFE
52		16 IDLE DONE 13 ECC	52	9 DRIVE RDY SAME SAME SAME SAME
53		7 WRITE PARITY 14 DATA VERIFY	53	10 SEEK ERR SAME SAME SAME SAME
54		A DCH ERROR 15 PAGE DONE	54	1 11 EOC ERR SAME SAME SAME SAME
55		9 READ/WRITE TIMEOUT	55	1 12 UNSAFE ADDR ERR UNSAFE ADDR ERR ADDR ERROR
			56	1 13 ECC ERR SAME SAME SAME SAME
			57	1 14 DATA LATE SAME SAME SAME SAME
			58	I 15 ERR SAME SAME SAME SAME
			59	***********************

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10015 N3MPL 01	15.3.10 6060/61 DISK TEST	0016 N3MPL	\$5.3.11 MAGNETIC TAPE AND CASSETTE TEST
02		02	S ACO GOOD DATA
03	2 ZB.SA IS THE KEY TO THE ERROR PRINT OUT:	03	AC1 BAD DATA
04	J ZB.SA =ADDRESS OF A RANDOM DATA CONTROL WORD	04	AC2 ADRS OF BAD DATA (GOOD IS AT AC2-4)
05	I (ZBDW1 TO ZBDW4) THE ERR WAS IN ONE OF	05	SIN ADDITION THE FOLLOWING LOC'S ARE TYPED
06	THE FIRST 4 WORDS IN THE BUFFER	06	READ INDICATES # BLOCKS IN BUFFER IF MODE=2
07	\$ ==# ERR IS AT AC2+4 \$ ==AC2 ERROR WAS DISK STATUS	07	# W/DOB LOGICALSTARTING ADRS. WHEN BLOCKS WERE WRITTEN
09	IN WHICH CASE:	80 09	I LAST/DOB LOGICALSTARTING ADRS. CURRENT OPERATION MODE ORREWIND 1=WRITE 2=BACKSPACE OR READ
10	ACOSDIB DISK	10	2 DRIVE # WILL APPEAR IN BITS 4,586
11	AC1=DIC DISK	11	STATUS LAST TAPE STATUS
12	J AC2=DIA DISK(STATUS)	12	3 MT.EK ERROR COUNTER STARTS AT 3 AND COUNTS
13	AC3=DIC DISK	13	DOWN FOR EACH REREAD
14	IN THE CASE OF A DATA COMPARE ERROR:	14	INDIE: IF STATUS INDICATES TAPE ERR (BIT O=1)
15 16	\$ ACO GOOD DATA (SEE ZB.SA) \$ AC1 BAD DATA	15 16	THE CONTENTS OF ACO, 1, AND 2 SHOULD BE IGNORED.
17	AC2 ADRS. OF GOOD DATA	17	15.3.12 LINE PRINTER
16	BAD IS AT AC2+4 IF ZB.SA IS A -#	18	NO ERROR TYPEOUTS.
19	; IN ADDITION THE FOLLOWING LOC'S ARE TYPED	19	PRINTER OUTPUT MUST BE EXAMINED VISUALLY.
50	J ZBDST DATA START IN CORE	20	1
21	ZBCST DATA START FOR DCH MAP	21	15.3.14 DCU-50/200 TEST
23	3 ZBSTA LAST DISK STATUS 3 ZBDOA LAST DOA TO DISK	22	THE AC'S WILL BE TYPED AS THEY WERE AT THE
24	ZBDOC LAST DOC TO DISK	24	TIME OF ERROR DETECTION.
25	3	25	
56	ALSO IF THE ERROR OCCURS IN A READ OPERATION	26	IN ADDITION THE FOLLOWING DATA IS TYPED:
27	I THE FOLLOWING DATA IS PRINTED:	27	RANDOM DATA ACO,1,2
85	NRITE ZBCST = XXXXX	28	3 DCLOR LOGICAL START OF LOOP IN DCU 3 DCLPK LOOP COUNT
29 30	9 MD1 MD2 MD3 MD4 9 GGGG HMHH JJJJ KKKK	29 30	DCLER LOGICAL ERROR ADDRESS
31	WHERE XXXXX # STARTING CHANNEL ADDRESS OF WRITE OPERATION	31	DC.LA LOGICAL START OF TEST
35	1 GGGG = FIRST PHYS 1K USED IN DISK WRITE	32	DC.LP LISTING START OF LOOP
33	1 HHHH # 2ND # # # # #	33	<pre># ERROR LISTING ADDR OF ERROR</pre>
34	's JJJJ = ЗRD + + + + + + + + + + + + + + + + + + +		
35	3 KKKK = 4TH " " " " "		
36	S NOTES UPON DETECTION OF AN ERROR THE TEST WILL		
38	RETRY THE OPERATION FOUR TIMES.		
39	2		
40	**********************		
41	\$ 6060/61 STATUS WORDS		
42 43	panapanapananananananananananananananan		
48	O CNTL FULL INVALID STATUS		
45	1 R/W DONE DRV RESERVED		
46	2 SEEK O DONE TRESPASSED		
47	1 3 SEEK 1 DONE READY		
48	J 4 SEEK 2 DONE BUSY		
49	\$ S SEEK 3 DONE OFFSET \$ 6 PARITY ERROR WRITE DISABLE		
50 51	9 6 PARITY ERROR WRITE DISABLE 9 7 ILLEGAL SECT N/A		
52	B ECC ERROR ILLEGAL ADDR		
53	9 BAD SECTOR ILLEGAL CMD		
54	10 CYL ERROR PWR FAULT		
55	1 11 SURF/SECT ERR PACK UNSAFE		
56 57	1 12 VERIFY ERROR POSITIONER 1 13 R/W TIMEOUT CLK FAULT		
58	14 DATA LATE WRITE FAULT		
59	15 RD/WRT FAULT DRIVE DONE		
60	***************************************		

.

	N3MPL				1001	8 N3MPL			
01		15.4	SPECIAL	CASE ERROR TYPEOUTS	01		15.4.3	I/O OR VALIDITY	TRAP
02		1			20		1	DEFER OR WRITE	CHECK TRAP
03		15.4.1	POWER F	AIL INTERRUPT	03				DEFER OR VALIDITY TRAP
04		1	UPON DE	TECTION OF A POWER FAIL INTERRUPT	04				WAS NOT FORCED BY ANY TEST
05		3	THE LOG	ICAL ADRS. OF THE P.C. AT INTERRUPT	05				
06		3	WILL BE	SAVED.	06			THE AC'S TYPE	ED AFTER THE PROGRAM #
07		3	IF AUTO	-RESTART IS ENABLED OR THE POWER	07				ED WITH THE FOLLOWING:
08		1	FAIL WA	S ONLY MOMENTARY, THE TEST WILL RE-	0.8				S OF INSTR TRAPPED
09		1		S IN A START AT 204 AFTER TYPING	0.9		:		ION DATA REGISTER CONTENTS
10		POWER		XXXX (WHERE XXXXXX IS THE PC AT INTR.)	10				ATUS BITS
11		1			11		,	ALE. MAP 31	×103 0113
12		15.4.2	ILLEGAL	SUPERVISOR CALL	12			STATUS BITS:	
13		1			13			01	PROGRAM MAP ENABLE
14		1	UPON DE	TECTION OF A SUPERVISOR CALL	14			1 2	DCH MAP ENABLE
15				IDN'T MATCH THE LIST OF SUBROUTINES	15		,	21	PROGRAM MAP INHIBIT
16				HE FOLLOWING MESSAGE WIIL BE TYPED:	16			91	SINGLE CYCLE WRITE PROTECT
17					17		1		
18			THEFAL	SUPER CALL AT XXXXXX	17		1	10:	SINGLE CYCLE MAP SELECT A/B
19				ee en enst ni nanaka	19		1	111	AUTOINDEX PROTECT
20			PROG#	NNN			,	12:	DEFER PROTECT
21			FRUGR	181414	50		1	13:	I/O PROTECT
		3	1010	660800 HUNNYN 773777	21		3	143	WRITE PROTECT
55		3	AC'S	COODOO YYYYYY ZZZZZ	55		3	15:	PROGRAM MAP SELECT A/B
23		1			23		1		
24		3	TTTTTT	WWWWWW 999955	24		15.4.4	INTERRUPT WAIT	
25		3			25		8	THE PERIPHERAL	DEVICE ASSOCIATED WITH THE
26		\$		WHERE XXXXXX IS THE LOGICAL ADDRESS OF THE	26		3	PROG. NUMBER TY	YPED HAS NOT RESPONDED WITH
27		3		SUPER CALL, TITITI IS ACS CONTENTS	27		1	A PROGRAM INTER	RRUPT FOR AN EXTENDED
58		1		AND WWWWWW IS THE PHYSICAL PAGE #,333335	26		1	PERIOD OF TIME.	THE 2ND NUMBER TYPED
59		3		IS THE INSTRUCTION CAUSING THE SUPER-	29		,	SHOULD POINT AT	T THE INTERRUPT HANDLER
30		1		CALL.	30		1	FOR THE DEVICE	THAT FAILED
31		1							
35		1	NOTE:	IF THE ADDRESS TYPED IN THE ILLEGAL SUPERCALL					

NOTE: IF THE ADDRESS TYPED IN THE ILLEGAL SUPERCALL WAS 000000 THEN THE PROGRAM WAS EXECUTING LOCATION 0.

100		
	NIMPL	

<pre>10020 M3HPL 10020 M3HPL 1</pre>	10019	NIMPL				10030	MEMOI		
<pre>02 11 N CASE OF A PARTY ERROR THIS TEST WILL 23 14 N CASE OF A PARTY ERROR THIS TEST WILL 24 25 INTE FOLDWING INFORMATION: 25 INTE FOLDWING INFORMATION: 25 INTE STATE FOLLOWING INFORMATION: 25 INTE STATE</pre>			15.4.5	PARITY	ERROR INTERRUPT		NOMPL		
 IN CASE OF A PARTY ERROR TWILL PARTY ERROR PARTY ER	50		1						ATTRACTIC CINCK
98 PRINT THE FOLLOWING INFORMATION: 04 THE DIAMONIC Line (inclusion) 98 PAINT THE FOLLOWING INFORMATION: 04 TAND INSUIDANC TERIST IN THE FOLLOWING 98 PAINT THE FOLLOWING INFORMATION: 04 TAND INSUIDANC TERIST IN THE FOLLOWING 98 INTER MADE 99 10 RETEMINED TO LIST 98 INTER MADE 99 10 RETEMINED TO LIST 98 INTER MADE 99 10 RETEMINED TO LIST 98 INTER MADE 10 10 RETEMINED TO LIST 98 INTER MADE 10 11 11 11 11 98 INTER MADE 11			1	IN CASE	OF A PARITY ERROR THIS TEST WILL				PROCRAM INITIALIZE
05 istity individual fests in the Pollowing 05 istity individual fests in the Pollowing <td>04</td> <td></td> <td>1</td> <td>PRINT T</td> <td>HE FOLLOWING INFORMATION:</td> <td></td> <td></td> <td></td> <td></td>	04		1	PRINT T	HE FOLLOWING INFORMATION:				
06 j PARTY ERROR 06 05 interminance interminance 1 05 interminance 07 interminance 05 interminance			3						
07 / INTE MADE MADE 08 / INTERNAT TALE OF ALL OF A			2	PARITY	ERROR				
00 / XXXXX 00 // DETERNING TO EXIST ON NOT EXIST 00 / XXXXX 00 // DETERNING TO NOT EXIST 00 // XXXXX 010 // XXXXX 00 10 XXXXX 010 // XXXXX 010 11 XXXXX 011 // XXXXX 010 12 YYYYY XXXXX 010 // XXXXXX 13 // XXXXXX 010 // XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX			8	INTR					
00 , MHEBE, 11 00 , AND BWITCHES ARE SET UP ACCORDINGLY 12 11 , XEXAL ADDRESS(LOGICAL) WHERE INTERRUPT OCCUMED 13 10 , ACCORDINGLY ACCORDINGLY 14 12 BITS 1-15 AFE THE MEM ADDRESS DITS 0-2 10 , ACCORDINGLY 14 11 13 JZZZZ EXTRADED MEM ADDRESS DITS 0-2 11 12 , ANTERRUPT VECTOR TABLES ARE SET UP TO 14 14 , METERUPT VECTOR TABLES ARE SET UP TO 15 , METERUPT VECTOR TABLES ARE SET UP TO 14 14 15 , JATECRUPT VECTOR TABLES ARE SET UP TO 15 , METERUPT VECTOR TABLES ARE SET UP TO 15 16 16 , METERUPT VECTOR TABLES ARE SET UP TO 15 , METERUPT VECTOR TABLES ARE SET UP TO 15 16 16 , METERUPT VECTOR TABLES ARE SET UP TO 15 , METERUPT VECTOR TABLES ARE SET UP TO 16 17 17 DATA CHANNEL PROTECTION FLAG IS 17 , METERUPT VECTOR TABLES ARE SET UP TO 16 18 18 JEVER FOUND TO BE SET(EUDY FLAG-DEV. #2) 19 , METERUPT VECTOR TABLES ARE SET UP TO 16 18 19 JEVER FOUND TO TO BE SET(EUDY FLAG-DEV. #2) 10 , METERUPT VECTOR TABLES ARE SET UP TO 17 128 20 THE POLOGING DATA MILE ALLON TO PLACE IS 14 , METERUPT VECTOR TABLES ARE SET UP TO 17			1	XXXXX	YYYYY ZZZZ				
10 / KXXXX ADDRESS(COBICAL) WHERE INTERPUT OCCURED 11 / XXXX ADDRESS(COBICAL) WHERE INTERPUT OCCURED 12 / XX TYTY BIT D IS THE PARTY BIT 11 / 2 / XX OTHER MEESSAR CONSTANTS 13 / XX ADDRESS AT CONSTANTS 14 / ZZZZ EXTREMOS ONE ADDRESS BITS 1-15 / 2 / XX ADDRESSAR CONSTANTS 14 / ZZZZ EXTREMOS ONE ADDRESS BITS 1-2 / 3 / 3 / 3 / 3 / 3 / 3 / 3 / 3 / 3 /			8			0.9		1	
12 9 9 9 9 9 10 12 13 14 15 14 </td <td></td> <td></td> <td>\$</td> <td></td> <td></td> <td>10</td> <td></td> <td>1</td> <td></td>			\$			10		1	
13 1 IZZZZ EXTENDED MEH ADDRESS DITS 0-2 14 15 15 16 15 15 16 15 15 16 15 15 16 15 15 15 16 15 15 15 15 15 15 15 15 15 15 15 15 15			\$	* * * * *		11		1 2.	ANY OTHER NECESSARY CONSTANTS
14 14 14 14 14 14 15 15 15 15 15 15 16 15 16 16 16 16 16 16 16 16 16 17 17 16 17 18 <t< td=""><td></td><td></td><td>2</td><td></td><td></td><td>12</td><td></td><td>3</td><td>ARE INITIALIZED</td></t<>			2			12		3	ARE INITIALIZED
15 1 16 15.4.6 DATA CHANNEL PROTECTION ERROR 17 1 IF THE DATA CHANNEL PROTECTION PLAG IS 18 1F THE DATA CHANNEL PROTECTION PLAG IS 19 1 AFE POLLOWING DATA ANNAL PROTECTION PLAG IS 19 1 AFE POLLOWING DATA WILL BE TYPEDI 20 1 THE POLLOWING DATA WILL BE TYPEDI 21 22 1 AVAILABLE MAP AND EACH BIT 22 1 AVAILABLE MAP AND EACH BIT 23 1 PROGUE ERROR 24 1 DCH VIDLATION ERROR 25 1 DCH VIDLATION ERROR 26 1 VIDLATION ERROR 27 1 XX IS THE PROGRAM NUMBER EXECUTING HMEN 26 1 SCH MERER, 27 1 XX IS THE PROGRAM NUMBER EXECUTING HMEN 26 1 THE ERROR WAS DETECTED. 26 1 THE ERROR WAS DETECTED. 27 1 XX IS THE NUMBER OF DCH ERRS DETECTED SINCE 29 1 THE ERROR WAS DETECTED. 29 1 THE ERROR WAS DETECTED. 20 1 CLAST REPORTED. 20 1 CLAST REPORTED. 30 2 1 INTI. ENTRY POINT. OPTION TESTS DETERMINE 31 1 6. EACH TEST IS ENTERED IN SEQUENCE AT ITS 33 1 1 6. LEACH TEST IS ENTERED IN SEQUENCE AT ITS 34 0 ROT AND PASS INTERRUPT SERVICE PARAM'S 35 1 TO THE LINER, 36 1 OR NOT AND PASS INTERRUPT SERVICE PARAM'S 36 1 OR NOT AND PASS INTERRUPT SERVICE PARAM'S 37 ADDRESS INTERRUPT SERVICE PARAM'S 38 1 NUTRERUPT SERVICE PARAM'S 39 1 THE THERE OF THE ENRORMED OF DCH ERRS DETECTED SINCE 30 1 TO THE LINER, 30 1 THE HARR THE PROGRAM FOR SERVICE PARAM'S 31 1 THE THE PROGRAM FOR SERVICE PARAM'S 33 1 1 F THE OPTION. OPTION SERVICE PARAM'S 34 1 OR NOT AND PASS INTERRUPT SERVICE 35 1 TO THE LINER, 36 1 OR NOT AND PASS INTERRUPT SERVICE PARAM'S 36 1 TO THE LINER, 37 1 DOREST THE SERVICE SERVICE PARAM'S 38 1 THE PROGRAM FOR SERVICE PARAM'S 39 1 THE OPTION FOR THE PROGRAM FOR SERVICE 30 1 THE THE SERVICE SERVICE SERVICE SERVICE 30 1 THE OPTION THE PROGRAM FOR SERVICE 30 1 THE THE OPTION FOR THE PROGRAM FOR SERVICE 30 1 THE OPTION THE PROGRAM FOR SERVICE 30 1 THE OPTION THE PROGRAM FOR SERVICE 30 1 THE OPTION THE P			8	22222	EXTENDED MEM ADDRESS BITS 0~2	13		8	(MEM ALLOCATION TABLES)
<pre>16 JF.4.6 DATA CHANNEL PROTECTION ERROR 16 FROM 17 FROM OT 05 SIZED 17 FROM OT 06 SECTION FLAG IS 18 IF MAP DF EXISTING CONTIGUOUS 19 FEVER FOUND TO 86 SECTION FLAG IS 19 FROM OT 06 SECTION FLAG DEV. #2) 20 FALL SECTION TO BE ASSIGNED FOR THE STATEMENT 20 FALL SECTION FOR SECTION FLAG DEV. #2) 20 FALL SECTION TO BE ASSIGNED TO THE 21 FALL SECTION FLAG DET SECTION FLAG IS 22 FALL SECTION FLAG DEV. #2) 23 FALL SECTION FLAG DEV. #2) 24 FALL SECTION FLAG DEV. #2) 25 FALL SECTION FLAG DEV. #2) 26 FALL SECTION FLAG DEV. #2) 27 FALL SECTION FLAG DEV. #2) 28 FALL SECTION FLAG DEV. #2) 29 FALL SECTION FLAG DEV. #2] 20 FALL SECTION FLAG DEV. *2] 20 FALL SECTION FLAG SUBJECTION FLAG DEV. *2] 20 FALL SECTION FLAG SUBJECTION FLAG SUBJECTION FLAG DEV. *2] 20 FALL SECTION FLAG SUBJECTION FLAG SUBJECTION FOR THE FALL SECTION FLAG SUBJECTION FOR</pre>			\$			14		1 3.	. INTERRUPT VECTOR TABLES ARE SET UP TO
17 17 18 Construction of the labor of the la			1			15		7	PROCESS UNEXPECTED DEVICE INTERRUPTS
<pre>18 7 IF THE DATA ENANNEL PROTECTION FLAG IS 19 5 EVER FOUND TO BE SETIBUST FLAG-DEV. #2) 19 1 KEVER FOUND TO BE SETIBUST FLAG-DEV. #2) 20 1 20 1 21 22 1 THE FOLLOWING DATA WILL BE TYPED: 20 20 21 22 2 1 AVAILABLE MAP AND EACH BIT 22 2 1 AVAILABLE MAP AND EACH BIT 23 1 PROGR ERRORS 24 1 XX YY 25 1 26 27 1 XX YY 26 28 1 ACARTCH AREA TO ANY TEST. 26 30 AVAILABLE MAP AND EACH BIT 26 30 30 AVAILABLE MAP AND EACH BIT 27 1 XX YY 28 29 1 XX YY 29 20 1 XX IS THE PROGRAM NUMBER EXECUTING WHEN 27 1 CLOUDES PROGRAM STORAGE, MEMORY ALLOC. 28 1 THE ERROR MAS DETECTED. 29 1 YY IS THE NUMBER OF DCH ERRS DETECTED SINCE 29 1 YY IS THE NUMBER OF DCH ERRS DETECTED SINCE 30 1 LAST REPORTED. 31 1 FI THE OFICE THEY AREA SOC. MITH KISTS 32 1 INTT, ENTRY POINT, OPTION TESTS DETERMINE 33 1 IF THE OFICE THEY AREA SOC. MITH KISTS 34 1 OR MOT AND PASS INTERRUPT SERVICE PARAM'S 35 1 OR MOT AND PASS INTERRUPT SERVICE 36 1 ADDRESS 37 ADDRESS INTERRUPT SERVICE PARAM'S 38 1 OR MOT AND PASS INTERRUPT SERVICE 39 1 INTT, ENTRY POINT, OPTION TESTS DETERMINE 31 1 FI THE OFICE THEY ARE ASOC. MITH KISTS 35 1 OR MOT AND PASS INTERRUPT SERVICE PARAM'S 36 1 OR MOT AND PASS INTERRUPT SERVICE 37 ADDRESS 38 1 OR MOT AND PASS INTERRUPT SERVICE 39 1 INTROMATION ALONG WITH THE PROGRAM 33 1 IF THRO FOR THE AREA SOC. MITH THE FORGATH 34 1 TO SELECT OR DELETE SPECIFIC TESTS 35 1 OR MOT AND PASS INTERRUPT SERVICE 36 1 ADDRESS 37 ADDRESS INTERRUPT SERVICE 39 1 INTROMATION ALONG WITH THE PROGRAM 31 1 FI THE OFICE THEY AREA SOC. MITH THE PROGRAM 33 1 IF THRO FOR THE AREA SOC. MITH THE PROGRAM 34 1 TO SELECT OR DELETE SPECIFIC TESTS 35 1 TOTAL THE AREA SOC. MITH THE PARAMETERS 36 1 TOTAL THE AREA SOC. MITH THE PARAMETERS 37 ADDRESS INTERROPT SERVICE 39 1 ADDR</pre>			15.4.6	DATA CH	ANNEL PROTECTION ERROR	16		; 4,	. MEMORY IS SIZED
19 J EVER FOUND TO BE SET (BUSY FLAG-DEV. #2) 20 J THE FOLLOWING DATA WILL BE TYPED: 21 J 22 J AVX WEMORY 23 J FROGM ERRORA 24 J AVX AVILABLE WAP AND EACH BIT 24 J XX YY 25 J 26 J AVX TY 26 J AVX TY 27 J XX IS THE PROGRAM NUMBER EXECUTING WHEN 26 J AS ASCRATCH AREA TO ANY TEST. 27 J XX IS THE PROGRAM NUMBER EXECUTING WHEN 28 J AVX IS THE PROGRAM NUMBER EXECUTING WHEN 29 J YY IS THE NUMBER OF DCH ERRS DETECTED. 20 J THE EARON HAS DETECTED. 20 J THE EARON AS DETECTED. 20 J THE EARON AS DETECTED. 20 J THE LAST IX OF MEMORY TO PRESERVE THE 30 J LAST REPORTED. 31 J 6. EACH TEST IS ENTERED IN SEQUENCE AT ITS 33 J IF THE DEVICE THEY ARE ASSOL, WITH EXISTS 34 J OR NOT AND PASS INTERRUPT SERVICE PARAM'S 35 J TO THE LINKER. 36 J OFF AND ASS INTERRUPT SERVICE PARAM'S 37 J ADDRESS 38 J INFORMATION ALONG WITH THE PROGRAM 39 J INFORMATION ALONG WITH THE PROGRAM. 30 J RINART LOADERS 31 J F THE DEVICE THEY ARE ASSOL, WITH EXISTS 34 J OR NOT AND PASS INTERRUPT SERVICE 35 J TO THE LINKER. 36 J OFF AND NILL ALLOW TO PRESERVE THE 37 J ADDRESS 38 J INFORMATION ALONG WITH THE PROGRAM. 39 J INFORMATION ALONG WITH THE PROGRAM. 40 J RUN LIST AND NILL ALLOW THE PROGRAM. 41 J TO SELECT ON DELETE STIP SIZE 42 J F START WAS 202. 43 J 6. AFTER STARTING, THOSE TESTS THAT HAVE 44 T OF START SUBSTSTEM FOR OVAN DIST, OFF AN HAVE 45 J FARAMETERS TYPE AN INDICATION OF THE PARAMETERS 46 J THEY DETEMINED TO EXISTS THAT HAVE 46 J THE DETEMINED TO EXISTS THAT HAVE 46 J THE TO DETEMINE TO PARAMETERS TYPE AN INDICATION OF THE PARAMETERS 46 J THE DETEMINED TO EXISTS OFFICIC			8			17		1	FROM 0 TO 128K AND BUILDS AN 8 WURD
20 J THE FOLLOWING DATA WILL BE TYPED: 21 J CONNECTION ERROR 22 J DCH VIOLATION ERROR 23 J DCH VIOLATION ERROR 24 J MEMORY IS REMOVED TO THE 24 AVAILABLE MAP AND EACH BIT 25 J CORRESPONDING TO IN OF UITILIZED 26 J AVA 27 J XX IS THE PROGRAM NUMBER EXECUTING WHEN 26 J AVA AS ASCRATCH AREA TO ANY TEST. 27 J CINCLUDES PROGRAM SIDNAGE, MEMORY ALLOC. 28 J THE ERROR WAS DETECTED. 29 J YY IS THE NUMBER OF DCH ERRS DETECTED SINCE 30 J YY IS THE NUMBER OF DCH ERRS DETECTED SINCE 30 J SINART LOADER) 31 J 6. EACH TEST IS DETERMINE EXECUTING WHEN 32 J INIT, ENTRY POINT OFILON TEST DETERMINE 33 J IF THE DEVICE THEY ARE ASSOC. WITH EXISTS OFTERMINE 34 J OR NOT AND PASS INTERRUPT HEXISTS DETERMINE 35 J TO THE LAST REPORTED. 36 J CONN MASK AND INTERRUPT SERVICE 37 J ADDRESS 38 J IF THE DEVICE THEY ARE ASSOC. WITH EXISTS 39 J INIT, ENTRY POINT, OFTON TEST DETERMINE 30 J SINART LOADER) 34 J OR NOT AND PASS INTERRUPT SERVICE 35 J TO THE LINKER, 36 J COEVER MASK AND INTERRUPT SERVICE 37 J ADDRESS 38 J IF THE DEVICE THEY ARE ASSOC. WITH EXISTS 39 J INFORMATION ALONG WITH THE PROGRAM 40 OR NOT AND MILL ALOW THE OPERATOR 41 J TO SELECT OR DELETE SPECIFIC TESTS 42 J INFORMATION ALONG WITH THE PROGRAM 43 J OR NOT AND NILL ALOW THE OPERATOR 44 J OR NOT AND INTERRUPT SERVICE 45 J PROMATION ALONG WITH THE PROGRAM 40 J RAW LIST AND NILL ALOW THE OPERATOR 41 J TO SELECT OR DELETE SPECIFIC TESTS 42 J INFORMATION ALONG WITH THE PROGRAM 43 J OR NOT AND NOT LALLOW THE OPERATOR 44 MONICLAILALOW THE OPERATOR 45 J PROMATION ALONG WITH THE PROGRAM 46 J PROVE DELETE SPECIFIC TESTS 47 ADDRESS 48 J AND WILL ALOW THE OPERATOR 49 J AND WILL ALOW THE OPERATOR 40 J RAW LIST AND WILL ALOW THE OPERATOR 40 J RAW LIST AND WILL ALOW THE OPERATOR 41 J TO SELECT OR DELETE SPECIFIC TESTS 43 J ALOWA DIST.SECT THE NOTAR SOCOLINE OF THE PRANETERS 44 J OR VERTIONE TO EXIST.SECT THE NOVA DISK.SOCO/SI DISK.			3			18		3	BIT MAP OF EXISTING CONTIGUOUS
21 J 22 J DCH VIOLATION ERROR 23 J DCH VIOLATION ERROR 24 J AVAILABLE MAP IS MOVED TO THE 25 J CORRESPONDING TO INK OF UITILIZED 26 J AVAILABLE MAP AND EACH BIT 26 J AVAILABLE MAP AND EACH BIT 27 J XX YY 28 J 26 J BO THAT IT MILL NOT BE ASSIGNED 26 J AS A SCRATCH AREA TO ANY TEST. 27 J XX IS THE PROGRAM NUMBER EXECUTING WHEN 27 J (INCLUDES PROGRAM STORAGE, MEMORY ALLOC. 28 J THE EARON WAS DETECTED. 29 J TY IS THE NUMBER DETECTED SINCE 29 J THE LAST REPORTED. 30 J LAST REPORTED. 31 J 6. EACH TEST IS ENTERRUPT MASKS AND STACK AREA AND 32 J INTI, ENTERP DOINT, OPTION TESTS DETERMINE 33 J IF THE DEVICE THEY ARE ASSO . WITH EXISTS 34 J OR NOT AND PASS INTERRUPT SERVICE 35 J TO THE LINKER. 36 J (DEVW, MASK AND INTERRUPT SERVICE 37 ADDRESS) 38 J NOT AND TASK AND INTERRUPT SERVICE 39 J INFORMATION ALONG WITH THE PROGRAM 40 J RUM LIST AND MILL ALLOW THE OPERATOR 41 J DELECT ON DELETED THE ANAMETERS 42 J INFIRM MASK AND INTERRUPT SERVICE 43 J 6. AFTER START MAS 202. 44 J 6. AFTER START MASK CO. 45 J NORGASISTER FOR THE ANGENER FOR THE ANAMETERS 45 J MERGRAM MASK AND INTERRUPT SERVICE 46 J THEY DETERMINED TO CENTER THE ANAMETERS 46 J MART MASK CO.			1					1	MEMORY
22 DCM VIOLATION ERROR 23 I PROGE ERRORS 24 J XX YY 25 J 26 J MMERE, 26 J MMERE, 27 J XX IS THE PROGRAM NUMBER EXECUTING WHEN 26 J MMERE, 27 J XX IS THE PROGRAM NUMBER EXECUTING WHEN 26 J AS CAATCH AREA TO ANY TEST. 28 J THE ERROR WAS DETECTED. 28 J THE ERROR MAS DETECTED. 29 J YY IS THE NUMBER OF DCM ERRS DETECTED SINCE. 29 J YY IS THE NUMBER OF DCM ERRS DETECTED SINCE. 30 J CLAST REPORTED. 31 J 6. EACH TEST IS ENTERED IN SEQUENCE AT ITS 32 J INTI. ENTRY FOUNT. SERVICE AT EASTS 33 J IF THE DEVICE AT AND SINTERMUME 34 J OR NOT AND PASS INTERRUPT SERVICE AT ITS 35 J O THE LAST IS ENTERED IN SEQUENCE AT ITS 36 J CLAST REPORTED. 37 J ADDRESS INTERRUPT SERVICE AND SINTERMUME 35 J O THE LAST AND INTERRUPT SERVICE ANAM'S 35 J O THE LIST AND INTERRUPT SERVICE 36 J CLAST REPORTED. 36 J CLAST REPORTED. 37 J ADDRESS INTERRUPT SERVICE 39 J INFORMATION ALONG WITH THE PROGRAM 35 J O THE LIST AND INTERRUPT SERVICE 36 J CLAST REPORTED. 36 J THE LAST AND INTERRUPT SERVICE 37 J ADDRESS 38 J THE THE PROFILE SERVICE 39 J INFORMATION ALONG WITH THE PROGRAM 40 J RUN LL ALLOW THE OPERATOR 41 J TO SELECT OR DELETE SPECIFIC TESTS 42 J THE THEN TYPES THE STATEM SIZE 43 J FRAT WAS 20 Z. 43 J FRAT WAS 20 Z. 44 J THE START INNO, THOSE FECTS THE ANAMETERS 44 J TO SELECT OR DELETE SPECIFIC TESTS DETERTOR 45 J PARAMETERS TYPE AN INDICATION ON AD INSERSORA IN A PARAMETERS 46 J THEY DETING THE PARAMETERS 46 J THEY DETING THE PARAMETERS 46 J THEY DETING THE PARAMETERS 46 J THEY ON DEXIST. CASE THE NOW AD DISK, 6050/50 DISK. 46 J THEY AND ADDIST.			8	THE FOL	LOWING DATA WILL BE TYPED:	20		1	
23 j PROGW ERRORS 24 j XX YY 25 j 26 j MHERE, 27 j XX IS THE PROGRAM NUMBER EXECUTING WHEN 26 j AS A SCRATCH AREA TO ANY TEST. 26 j AS A SCRATCH AREA TO ANY TEST. 26 j AS A SCRATCH AREA TO ANY TEST. 27 j ICULUOES PROGRAM SOURCE ALLOC. 28 j THE ERROR WAS DETECTED. 29 j YY IS THE HUMBER OF DEH ERRS DETECTED SINCE 29 j YY IS THE HUMBER OF DEH ERRS DETECTED SINCE 30 j LAST REPORTED. 31 j 6. EACH TEST IS ENTERRUPT O PRESERVE THE 32 j INIT, ENRRY POINT, OPTION TERRUPT SERVICE 33 j IF THE DEVICE THEY ARE ASSOC, WITH EXISTS 34 j OR NOT AND PASS INTERRUPT SERVICE PARAM'S 35 j TO THE LINKER. 36 j (DEVEN, MASK AND INTERRUPT SERVICE 36 j OR NOT AND PASS INTERRUPT SERVICE 36 j OR NOT AND INTERRUPT SERVICE 36 j OR NOT AND NAUGH WITH EXISTS 36 j OR NOT AND PASS INTERRUPT SERVICE 36 j ODERSS. 37 j ADDRESS 38 j A ATTER STRERUPT SERVICE 39 j INFORMATION ALONG WITH THE PROGRAM 41 j TO SELECT OR DELETE SPECIFIC TESTS 42 j INSTANT WILL ALLOW THE OPERATOR 41 j TO SELECT ON DELETE SPECIFIC TESTS 43 j 8. AFTER STREATING, INDOSE TESTS INTA THAYE 44 j TO SELECT ON DELETE START AND SOC. 45 j PARAMETERS TYPE AN INDICATION OF THE PARAMETERS 46 j THE DEVICE THE ARA POR SOC SET THAT HAVE 47 JTR STREATING THE RAMETERS TYPE AN INDUCATION OF THE PARAMETERS 46 J THE STREAT THE AN OF AND DISK, ADDED TO EXIST. (SEE THE NOVA DISK, ADDED TO EXIST.)			3			21		1 5,	. THE EXIST MAP IS MOVED TO THE
24 J XX YY 25 J 25 J 30 THAT IT WILL NOT BE ASSIGNED 25 J 30 THAT IT WILL NOT BE ASSIGNED 25 J 30 THAT IT WILL NOT BE ASSIGNED 26 J AS A SCRATCH AREA TO ANY TEST. 27 J XX IS THE PROGRAM NUMBER EXECUTING WHEN 27 J (INCLUDES PROGRAM STORAGE, MENORY ALLOC. 26 J AS A SCRATCH AREA TO ANY TEST. 27 J XX IS THE RUMBER OF DCH ERRS DETECTED. 26 J TABLES, INTERRUPT MASKS AND STACK AREA AND 29 J YY IS THE NUMBER OF DCH ERRS DETECTED SINCE 29 J THE LAST IK OF MENORY TO PRESERVE THE 30 J BHARY LOADER) 31 J 6. EACH TEST IS ENTERED IN SEQUENCE AT ITS 32 J INT, ENTRY POINT, OPTION TESTS OFTERMINE 33 J IF THE DEVICE THEY ARE ASSOC. WITH EXISTS 35 J TO THE LINKER, UPT MARKS AND INTERRUPT SERVICE PARAM'S 35 J TO THE LINKER, (DEVW, MASK AND INTERRUPT SERVICE PARAM'S 35 J TO THE LINKER, (DEVW, MASK AND INTERRUPT SERVICE 37 J ADDRESS) 36 J 7. LINKER THEN TYPES THE STREM SIZE 37 J ADDRESS AND INTERRUPT SERVICE 40 J RUM LIST AND WILL ALLOW THE DEPEATOR 40 J RUM LIST AND WILL ALLOW THE DEPEATOR 40 J RUM LIST AND WILL ALLOW THE DEPEATOR 40 J RUM LIST AND NILL ALLOW THE DEPEATOR 40 J RUM LIST AND NILL ALLOW THE DEPEATOR 40 J RUM LIST AND NILL ALLOW THE DEPEATOR 40 J RUM LIST AND NILL ALLOW THE DEPEATOR 40 J RUM LIST AND NILL ALLOW THE DEPEATOR 41 J TO SELECT OR DELETE SPECIFIC TESTS THAT HAVE 42 J SI J FART WAS 202. 43 J PARAMETERS TYPE AN INDICATION OF THE PARAMETERS 45 J PARAMETERS TYPE AN INDICATION OF THE PARAMETERS 45 J PARAMETERS TYPE AN INDICATION OF THE PARAMETERS 45 J PARAMETERS TYPE AN INDICATION OF THE PARAMETERS 45 J PARAMETERS TYPE AN INDICATION OF THE PARAMETERS 45 J PARAMETERS TYPE AN INDICATION OF THE PARAMETERS 45 J PARAMETERS 45 J PARAMETERS TYPE AN INDICATION OF THE PARAMETERS 45 J PARAMETERS TYPE AN INDICATION OF THE PARAMETERS 46 J THEY DETERTINED TO EXIST. (SEE THE NOVA DISK, 660/61 DISK			3			55		3	AVAILABLE MAP AND EACH BIT
25 J 26 J WHERE, 27 J XX IS THE PROGRAM NUMBER EXECUTING WHEN 27 J XX IS THE PROGRAM NUMBER EXECUTING WHEN 27 J (INCLUDES PROGRAM STORAGE, MEMORY ALLOC. 28 J THE ERROR WAS DETECTED. 29 J THE LAST IK OF MACKS TO P DCM ERRS DETECTED SINCE 29 J THE LAST IK OF MACKS TO P DCM ERRS DETECTED SINCE 30 J LAST REPORTED. 31 J 6. EACH TEST IS ENTERED IN SEQUENCE AT ITS 32 J INIT. ENTRY POINT. OPTION TESTS DETERMINE 33 J IF THE DEVICE THEY ARE ASSOC. WITH EXISTS 34 J OR NOT AND PASS INTERRUPT SERVICE PARAM'S 35 J TO THE LINKER. 36 J (DEVW. MASK AND INTERRUPT SERVICE 37 J ADDRESS) 38 J 7. LINKER THEN TYPES THE SYSTEM SIZE 39 J INFORMATION ALONG WITH THE PROGRAM 40 J RUN LIST AND MILL ALON WHE STETS THAT HAVE 41 J TO SELECT OR DELETE SPECIFIC TESTS 42 J IFFIR SUBSYSTEM FOR SPECIFIC 43 J 6. AFTER STARTING, THOSE TESTS THAT HAVE 44 SIZED" THEIR SUBSYSTEM FOR SPECIFIC 45 J PARAMETERS TYPE AN INDICATION OF THE PARAMETERS 46 J THEY DENTIFY AN INDICATION OF THE PARAMETERS 46 J THEY DENTIFY AND INSTRUCT THE AND DISK, 6060/61 DISK,			1					8	CORRESPONDING TO 1K OF UITILIZED
263WHERE,263A SCRATCH AREA TO ANY TEST.273XX15THE PROGRAM NUMBER EXECUTING WHEN271INCLUDES PROGRAM STARGE, MENRY ALLOC.283THE ERROR WAS DETECTED.261TABLES, INTERNUT MASKS AND STACK AREA AND29301YIS THE NUMBER OF DCH ERRS DETECTED SINCE291THE LAST IX OF MEMORY TO PRESERVE THE3030116. EACH TEST IS ENTERED IN SEQUENCE AT ITS303116. EACH TEST IS ENTERED IN SEQUENCE AT ITS30321INT. ENTRY FOIRT. OPTION TESTS DETERMINE33321IF THE DEVICE THEY ARE ASSOC. WITH EXISTS343510ROT AND PASS INTERNUT SERVICE PARAM'S353410OR NOT AND PASS INTERNUT SERVICE3610INFORMUT AND AND SERVICE PARAM'S373811INTERNUT SERVICE391INFORMATION ALONG WITH THE PROGRAM40110RUM LIST AND WILL ALLO THE PROGRAM41110BLECT OR PROFILET SPECIFIC TESTS421115START WAS 202 .431110SATENT START THAS 202 .44110SUBSTSEM FOR SPECIFIC TESTS451PARAMETERS THE AN INDUSTSTEM FOR SPECIFIC THE PARAMETERS461THEY DERMINED THE AN INDUSTATION AD THE PARAMETERS461THEY DERMINED THE AN IDISTICATION OF THE PARAMETERS46			,	XX	YY .	24		8	MEMORY IS REMOVED FROM THE MAP
27 J XX IS THE PROGRAM NUMBER EXECUTING WHEN 27 J (INCLUDES PROGRAM STORAGE, MEMORY ALLOC. 28 J THE GRADA WAS DETECTED. 28 J TABLES, INTERRUPT MASKS AND STACK AREA AND 29 J YY IS THE NUMBER OF DCH ERRS DETECTED SINCE. 29 J THE LAST IS OF MEMORY TO PRESERVE THE 30 J LAST REPORTED. 30 J GINARY LOADER) 31 J LAST REPORTED. 30 J GINARY LOADER) 32 J INIT, ENTRY POINT. OPTION TESTS DETERMINE 33 J IF THE DEVICE THEY ARE ASSOC. WITH EXISTS 34 J OR NOT AND PASS INTERRUPT SERVICE PARAM'S 35 J TO THE LINKER. 36 J (DEVW, MASK AND INTERRUPT SERVICE 37 J ADDRESS) 38 J IF THEN TYPES THE SYSTEM SIZE 39 J INFORMATION ALONG WITH THE PROGRAM 40 J RUW LIST AND WILL ALLOW THE OPERATOR 41 J DECENT OR DELET AND START WAS PECIFIC 42 J IF START WAS 202. 43 J FATTER SUBSYSTEM FOR SPECIFIC 44 SIZED' THEIR SUBSYSTEM FOR SPECIFIC 45 J PARAMETERS TYPE AN INDICATION OF THE PARAMETERS 46 J THEY DETERMINED TO EXIST. GEE THE NOVA DISK, 6060/61 DISK,			8			25		8	SO THAT IT WILL NOT BE ASSIGNED
28 1 THE EROR WAS DETECTED. 28 1 TABLES, INTERRUPT MASKS AND STACK AREA AND 29 1 Y IS THE NUMBER OF DCM ERRS DETECTED SINCE. 29 1 THE LAST IK OF MEMORY TO PRESERVE THE 30 1 LAST REPORTED. 31 6. EACH TEST IS ENTERED IN SEQUENCE AT ITS 32 1 INIT. ENTRY POINT. OPTION TESTS DETERMINE 33 1 F 6. EACH TEST IS ENTERED IN SEQUENCE AT ITS 34 1 INT. ENTRY POINT. OPTION TESTS DETERMINE 35 1 IF THE DEVICE THEY ARE ASSOC. WITH EXISTS 34 0 NOT AND PASS INTERRUPT SERVICE 35 1 TO THE LINKER. 36 1 OEVW, MASK AND INTERRUPT SERVICE 36 1 NOT AND PASS INTERRUPT SERVICE 36 1 TO THE LINKER. 37 ADDRESS 1 38 1 TLINKER THEN TYPES THE SYSTEM SIZE 39 1 INFORMATION ALDING THE PROFATOR 41 1 TO SELECT OR DELETE SPECIFIC TESTS 42 1 FER STARTING, THOSE TESTS THAT HAVE 42 1 <			7					8	AS A SCRATCH AREA TO ANY TEST.
29 J VY IS THE NUMBER OF DCH ERRS DETECTED SINCE. 30 J LAST REPORTED. 30 J BINARY LOADER) 31 J 6. EACH TEST IS ENTERED IN SEQUENCE AT ITS 32 J INIT, ENTRY POINT. OPTION TESTS DETERMINE 33 J IF THE DEVICE THEY ARE ASSOC. WITH EXISTS 34 J OR NOT AND PASS INTERRUPT SERVICE PARAM'S 35 J TO THE LINKER. 36 J (DEVW, MASK AND INTERRUPT SERVICE 37 J ADDRESS) 38 J 7. LINKER THEN TYPES THE SYSTEM SIZE 39 J INFORMATION ALONG WITH THE PROGRAM 40 J RUW LIST AND WILL ALLOW THE OPERATOR 41 J TO SELECT OR DELETE SPECIFIC TESTS 42 J IF START WAS 202. 43 J 8. AFTERT STARTING, THOSE TESTS THAT HAVE 44 "SIZED" THEIR SUBSYSTEM FOR SPECIFIC 45 J PARAMETERS J PARAMETERS 46 J THE VERTIMENDAL			8	XX				8	
30 ; LAST REPORTED. 30 ; LAST REPORTED. 31 ; 6. EACH TEST 13 ENTERED IN SEQUENCE AT ITS 32 ; INIT, ENTRY POINT. OPTION TESTS DETERMINE 33 ; IF THE DEVICE THEY ARE ASSOC. WITH EXISTS 34 ; OR NOT AND PASS INTERRUPT SERVICE PARAM'S 35 ; TO THE LINKER. 36 ; (DEVE, MASK AND INTERRUPT SERVICE 37 ; ADDRESS) 38 ; 7. LINKER THEN TYPES THE SYSTEM SIZE 39 ; INFORMATION ALONG WITH THE PROGRAM 40 ; RUNQUIST AND WILL ALLOW THE OPERATOR 41 ; TO SELECT OR DELETE SPECIFIC TESTS 42 ; IF START WAS 20 . 43 ; 6. AFTER STARTING, THOSE TESTS THAT HAVE 44 ; "SIZED" THEIR SUBSYSTEM FOR SPECIFIC 45 ; PARAMETERS TYPE AN INDICATION OF THE PARAMETERS 46 ; THEY DETERMINED TO EXIST.(SEE THE NOVA DISK,6060/61 DISK,			8					1	TABLES, INTERRUPT MASKS AND STACK AREA AND
315EACH TEST IS ENTERED IN SEQUENCE AT ITS32INIT. ENTRY POINT. OPTION TESTS DETERMINE33IF THE DEVICE THEY ARE ASSOC. WITH EXISTS34I OR NOT AND PASS INTERRUPT SERVICE PARAM'S35I OR NOT AND PASS INTERRUPT SERVICE36I OEWW, MASK AND INTERRUPT SERVICE37ADDRESS)38I NINGRMATION ALONG WITH THE PROGRAM39I INFORMATION ALONG WITH THE PROGRAM40I RUN LLST AND WILL ALLOW THE OPERATOR41I TO SELECT OR DELETE SPECIFIC TESTS42I START WAS 202.43I SIZEO" THEIR SUBSYSTEM FOR SPECIFIC44SIZEO" THEIR SUBSYSTEM FOR SPECIFIC44I SIZEO" THEIR SUBSYSTEM FOR SPECIFIC45J PARAMETERS TYPE AN INOICATION OF THE PARAMETERS46J THEY DETERMINED TO EXIST. (SEE THE NOVA DISK, 6060/61 DISK,			8	¥ ¥				1	THE LAST 1K OF MEMORY TO PRESERVE THE
321INIT, ENTRY POINT, OPTION TESTS DETERMINE331IF THE DEVICE THEY ARE ASSOC. WITH EXISTS341OR NOT AND PASS INTERRUPT SERVICE3510THE LINKER,3610CDEVW, MASK AND INTERRUPT SERVICE371ADDRESS)3817. LINKER THEN TYPES THE SYSTEM SIZE391INFORMATION ALONG WITH THE PROGRAM401UIST AND WILL ALLOW THE OPERATOR411TO SELECT OR DELETE SPECIFIC TESTS421F START WAS 202433A AFTER STARTING, THASE THE ARAMETERS441"SIZED" THEIR SUBSYSTEM FOR SPECIFIC453PARMETERS TYPE AN INDICATION OF THE PARAMETERS464THEY DETERMINED TO EXIST. (SEE THE NOVA DISK, 6060/61 DISK,	30		1		LAST REPORTED.			8	
33IF THE DEVICE THEY ARE ASSOC. WITH EXISTS34JOR NOT AND PASS INTERRUPT SERVICE PARAM'S35JOT THE LINKER.36JOEVW, MASK AND INTERRUPT SERVICE37JADRESS)38JINKER THEN TYPES THE SYSTEM SIZE39JINGRMATION ALONG WITH THE PROGRAM40RUN LIST AND WILL ALLOW THE OPERATOR41JO SELECT OR DELETE SPECIFIC TESTS42JF START WAS 202.43J & AFTER STARTING, THOSE TESTS THAT HAVE44JOEST START THE SUBSYSTEM FOR SPECIFIC44JOEST THEIR SUBSYSTEM FOR SPECIFIC45J PARAMETERS TYPE AN INDICATION OF THE PARAMETERS46J THEY DETERMINED TO EXIST.(SEE THE NOVA DISK,6060/61 DISK,								1 6.	
303330R NOT AND PASS INTERRUPT SERVICE PARAM'S353510 THE LINKER.36350 DRWS, MASK AND INTERRUPT SERVICE3730 ADDRESS)3837INFORMATION ALONG WITH THE PROGRAM40391 NFORMATION ALONG WITH THE PROGRAM40301 RUN LIST AND WILL ALLOW THE OPERATOR4130 SELECT OR DELETE SPECIFIC TESTS4231 SAFT WAS 202.4343443443453463464								8	
35353510 THE LINKER.363610 CVW, MASK AND INTERUPT SERVICE3730 ADRESS)3837LINKER THEN TYPES THE SYSTEM SIZE3939INFORMATION ALONG WITH THE PROGRAM4039RUN LIST AND WILL ALLOW THE OPERATOR4131TO SELECT OR DELETE SPECIFIC TESTS423454335AFTER STARTING, THOSE TESTS THAT HAVE4435374536ATTERS TYPE AN INDICATION OF THE PARAMETERS4637THEY DETERMINED TO EXIST. (SEE THE NOVA DISK, 6060/61 DISK,								1	
361(DEV#, MASK AND INTERRUPT SERVICE3737ADDRESS)3837LINKER THEN TYPES THE SYSTEM SIZE39JINFORMATION ALONG WITH THE PROGRAM401RUN LIST AND WILL ALLOW THE OPERATOR411TO SELECT OR DELETE SPECIFIC TESTS421IF START WAS 202.4318. AFTER STARTING, THOSE TESTS THAT HAVE441"SIZED" THEIR SUBSYSTEM FOR SPECIFIC441"SARMETERS TYPE AN INDICATION OF SPECIFIC451PARAMETERS461THEY DETERMINED TO EXIST.(SEE THE NOVA DISK,6060/61 DISK,								8	
37373038371. KINKER THEN TYPES THE SYSTEM SIZE39391. KINKER THEN TYPES THE SYSTEM SIZE39307. KINKER THEN TYPES THE DEFRATOR403RUN LIST AND WILL ALLOW THE DEFRATOR4130. SELECT OR DELETE SPECIFIC TESTS4231. SATRT WAS 202.4338. AFTER STARTING, THOSE TESTS THAT HAVE443"SIZED" THEIR SUBSYSTEM FOR SPECIFIC443"SIZED" THEIR SUBSYSTEM FOR SPECIFIC453PARMETERS TYPE AN INDICATION OF THE PARAMETERS46465								1	
3637. LINKER THEN TYPES THE SYSTEM SIZE393939394030413742374330. AFTER START WAS 202.43434431. START WAS 202.4431. START WAS 202.4531. PARAMETERS TYPE AN INDICATION OF THE PARAMETERS4631. THEY DETERMINED TO EXIST. (SEE THE NOVA DISK, 6060/61 DISK,								3	
391INFORMATION ALONG WITH THE PROGRAM403RUN LIST AND WILL ALLOW THE OPERATOR413TO SELECT OR DELETE SPECIFIC TESTS423FF START WAS 202.4338. AFTER STARTING, THOSE TESTS THAT HAVE443"SIZED" THEIR SUBSYSTEM FOR SPECIFIC443PARAMETERS TYPE AN INDICATION FTHE PARAMETERS453PARAMETERS TYPE AN INDICATION FTHE PARAMETERS4646FTHEY DETERMINED TO EXIST.(SEE THE NOVA DISK,6060/61 DISK,								8	
403RUN LIST AND WILL ALLOW THE OPERATOR41308 ELECT OR DELETE SPECIFIC TESTS423318. AFTER START WAS 202.43338. AFTER STARTING, THOSE TESTS THAT HAVE443*SIZED* THEIR SUBSYSTEM FOR SPECIFIC443*SIZED* THEIR SUBSYSTEM FOR SPECIFIC453PARAMETERS TYPE AN INDICATION OF THE PARAMETERS463THEY DETERMINED TO EXIST. (SEE THE NOVA DISK,6060/61 DISK,								1 7.	
411TO SELECT OR DELETE SPECIFIC TESTS42316START WAS 202.4333AFTER STARTING, THOSE TESTS THAT HAVE443*SIZED* THEIR SUBSYSTEM FOR SPECIFIC443*SIZED* THEIR SUBSYSTEM FOR SPECIFIC453PARAMETERS TYPE AN INDICATION OF THE PARAMETERS463THEY DETERMINED TO EXIST.(SEE THE NOVA DISK,6060/61 DISK,								3	
42 J IF START WAS 202. 43 J 6. AFTER STARTING, THOSE TESTS THAT HAVE 44 S "SIZED" THEIR SUBBYSTEM FOR SPECIFIC 45 J PARAMETERS TYPE AN INDICATION OF THE PARAMETERS 46 J THEY DETERMINED TO EXIST.(SEE THE NOVA DISK,6060/61 DISK,								8	
43 ; 8. AFTER STARTING, THOSE TESTS THAT HAVE 44 ; "Sized" their subsystem for specific 45 ; parameters type an indication of the parameters 46 ; they determined to exist.(see the nova disk,6060/61 disk,								8	
44 \$ "SIZED" THEIR SUBSYSTEM FOR SPECIFIC 45 \$ PARAMETERS TYPE AN INDICATION OF THE PARAMETERS 46 \$ THEY DETERMINED TO EXIST.(SEE THE NOVA DISK,6060/61 DISK;								3	
45 3 PARAMETERS TYPE AN INDICATION OF THE PARAMETERS 46 3 THEY DETERMINED TO EXIST.(SEE THE NOVA DISK,6060/61 DISK,									
46 F THEY DETERMINED TO EXIST. (SEE THE NOVA DISK, 6060/61 DISK,									
						_			
47 \$ 6063/64 DISK, AND MOVING HEAD DISK TEST DESCRIPTIONS.)									
						47		1 60	053/64 DISK, AND MOVING MEAD DISK TEST DESCRIPTIONS.)

10021	N3MPL					
01	-	16.2	PROGRAM RUN	10022 NJMPL		
50				01	16.4	INDIVIDUAL TEST DESCRIPTIONS
03		3	ONCE THE LINKER HAS COMPLETED ALL	50	,	
		1	INITIALIZATION THE FOLLOWING SERIES	03	16.4.1	CHÉCKERBOARD RAN
04		1	OF OPERATIONS IS LOOPED THROUGH	04		
05		*		05		EMORY CHECKER BOARD TEST IS A SUBSET OF OTHER MEMORY
06 -	· · · ·		1. LINKER RANDOMLY SELECTS ONE OF	06		
07			THE INDIVIDUAL TESTS UNTIL IT			RBOARDS. A COMPLETE TEST OF AN AVAILABLE SCRATCH
08				07	JAREA I	S COMPRISED OF THE FOLLOWING SEQUENCE:
09		1	FINDS ONE THAT IS NOT WAITING	08	8	
		3	FOR INTERRUPT (WAIT IS BIT O OF	09	1C8.TK=	0 SREQUEST 1 TO 20K OF SCRATCH, RANDOMLY RE-
10		1	THE THIRD WORD IN TEST=1) AND THAT	10		ILOCATE THE EXECUTE PORTION OF CHECKERBOARD
11		\$	THE NEXT RANDOM NUMBER FALLS WITHIN	11		INTO SCRATCH AND GENERATE THE CHECKERBOARD
12		8	ITS ENTER LIMITS	12		PATTERN
13		1			1	JPATTERN
14			2. IF THE MAP OPTION EXISTS, ALL LOGICAL PAGES	13	1	
15		1		14	ICB.TK=	
		1	EXCEPT PAGE 0 ARE ACCESS PROTECTED WITH	. 15	3	10F THE FIRST 16 WORDS OF SCRATCH, SHUFFLE THESE
16		3	THE PHYSICAL AREA OF THE SELECTED TEST	16	1	INORDS 16 TIMES SUCH THAT THEY END UP IN THEIR
17		3	MAPPED TO ITSELF AND ANY ASSIGNED	17		ORIGINAL POSITION, RE-COMPLIMENT THE SINGLE
18		3	SCRATCH AREA MAPPED TO START AT 1K	16		BIT IN EACH WORD-PROCEED WITH EACH GROUP OF
19		1	ABOVE THE TEST, MEMORY LOCATIONS SCRLD	19		
20			AND SCRHI (SCRATCH LOW AND HIGH) ARE		8	116 WORDS UNTIL ALL MEMORY HAS BEEN EXERCISED.
21			SET TO INDICATE THE LIMITS OF	20	3	
)		21	ICB.TK=	
55		8	THE SCRATCH AREA AVAILABLE TO THE TEST.	22	1	THE PATTERN EXPECTED
53		1		23	1	
24		3	3. DATA CHANNEL LIMITS (DCHLO AND DCHHI)	24	ICB.TK=	3 FAST CHECKSUM MEMORY TO ENSURE THAT ALL DATA
25		3	ARE CALCULATED AND ENTERED	25		IS INTACT (RETURNS TO CHECK PASS IF CHECK-
26		1		26		SUM DOES NOT AGREE.)
27			4. THE SELECTED TEST IS ENTERED AT	27		FOUN DUES NOT AGREE.
28			ITS SPECIFIED EXECUTE ENTRY POINT		3	
60			ITS SPECIFIED EAECULE ENTRY FUINT	85	\$	
				29	16.4.2	DCU - 50 TEST
				30	1	
				31	1	THE MULTI-PROGRAMMING RELIABILITY DOU TEST RUNS
				32	1	AN ARITHMETIC TEST VIA THE DCH .
				33		THE DCU INTERRUPTS THE CPU
				34		WHEN EITHER IT HAS COMPLETED THE TEST OR
				35		FINDS AN ERROR.
					J.	
				36	1	THIS TEST WILL AUTOSIZE FOR DCU-50/200 AT DEVICE 64.
a - 2				37	3	IF DCU-50 IS SETUP FOR OTHER DEVICE CODE, PATCH
				38	3	THE DEVICE CODE INTO LOCATION DOUDV. IF DOU-50/200
				39	3	DOESN'T RESPOND TO DEVICE CODE THEN TEST IS DELETED
				40	1	AUTOMATICALLY.
				41 0153	06	LOC.=DCUDV

10023	N3MPL	16.4.3 SC MEMORY TES	Ţ	10024 N3MPL 01	10.4.4 ARITHMETIC TEST
02		1	•	02	8 8 8 8 8 8 1 1 M C 1 L 1 C 1 C 3 1
03 04 05		THIS MEMORY TEST DOES	S & READ/MODIFY/WRITE TO THE AVAILABLE N "ISZ" INSTRUCTION.TEST IS BROKEN INTO THE	03 04 05	THE MULTIPROGRAMMING RELIABILITY ARITHMETIC TEST WAS DERIVED FROM THE STAND ALONE ARITHMETIC TEST. THIS TEST PREQUIRES 2% OF SCRATCH FOR EXECUTION. THE EXECUTE POP-
06 07 08 09		s MM.,TK≃0 7 8	WRITE INTO EACH MEMORY LOCATION A MINUS ONE STARTING AT SCRLO AND ENDING AT SCRHI VERIFYING EACH GOT THERE.	06 07 08 09	;TION OF THE TEST IS RANDOMLY RELOCATED WITHIN AVAILABLE ;SCRATCH. IF THE SYSTEM IS MAPPED, (HAS AN MMU) THE ;SCRATCH AREA IS RANDOMLY REMAPPED TO SOME OTHER LOGICAL AD- ;DRESS FOR EXECUTION. AT THE END OF EACH EXECUTION PASS SCRATCH
10 11 12 13		s MM₀TK≖1 s	READ A LOCATION BEFORE DOING THE ISZ TO VERIFY IT HASN'T BEEN DISTURBED.	10 11 12	JAREA IS RANDOMLY RELEASED OR HELD. IF HELD, THE NEXT TIME JTHE TEST IS ENTERED, THE EXECUTABLE PORTION OF THE TEST WILL JAGAIN BE RANDOMLY RELOCATED WITHIN SCRATCH FOH EXECUTION.
13 14 15		MM.TK= 2	ISZ DION'T SKIP	13	; ;6.4.5 FLOATING POINT TEST
16		\$ MM.TK= 3	LOCATION NOT 0 AFTER ISZ	15)) THE NOVA MULTIPROGRAMMING RELIABILITY TEST
18		5 MM.TK= 4	DSZ SKIPPED-ERROR	17	PERFORMS A LOAD AND STORE SINGLE PRECISION WITH COMPARE TEST AND A LOAD AND STORE DOUBLE PRECISION
20		S MM.TKE S	DSZ TST- LOCATION NOT -1 AFTER DSZ	19 20	;WITH COMPARE TEST. ; THIS TEST IS ENTERED IF A DEVICE CODE OF 76 WAS
22 23 24		; ММ.,ТК.# 6 ;	SAME AS 1, EXCEPT TESTING IN THE REVERSE DIRECTION	21 22 23	<pre>#FOUND DURING THE INITIALIZATION PORTION. # A RANDOM SCRATCH AREA OF 1 = 32 K IS ASSIGNED FOR #FOR EXECUTION. THE EXECUTE PORTION OF THE TEST IS #FOR EXECUTION. THE PORTION. THE</pre>
25 26 27		; MM_TK= 7	SAME AS 2, EXCEPT TESTING IN THE REVERSE DIRECTION.	24 25 26	JRANDOMLY RELOCATED WITHIN THE AVAILABLE SCRATCH AREA. J IF THE SYSTEM IS MAPPED, (HAS A MMPU) THE SCRATCH JAREA IS RANDOMLY REMAPPED TO SOME OTHER LOGICAL
28		; MM.TK= 10 ;	SAME AS 3, EXCEPT TESTING IN THE REVERSE Direction.	27 26 29 30	ADDRESS FOR EXECUTION, AT THE END OF EACH EXECUTION PASS SCRATCH AREA IS RANDOMLY RELEASED FOR OR HELD. PIF HELD, THE NEXT TIME THE TEST IS ENTERED, THE PEXECUTABLE PORTION OF THE TEST WILL AGAIN BE RANDOMLY
				31 32	FRELOCATED WITHIN SCRATCH FOR EXECUTION.
				33 34 35	16.4.6 MUL/DIV TEST 3 THE NOVA MULTIPROGRAMMING MULTIPLY/DIVIDE TEST 1PERFORMS A TRIAL INSTRUCTION TO DETERMINE
				36 37	IF THE MULTIPLY/DIVIDE OPTION IS INSTALLED.) THIS TEST WAS DERIVED FROM THE STAND ALONE
				38 39 40	9 MUL/DIV TEST. 9 NO MEMORY REALLOCATING IS DONE IN THIS TEST.
				41	16.4.7 STACK ERROR TEST 1 THE STACK ERROR TEST IS DESIGNED TO EXERCISE THE
				43	ISTACK OVERFLOW FUNCTION OF THE NOVA. IT SHOULD IBE NOTED THAT THIS TEST DOES NOT SET UP THE STACK.
				45	;THE TEST EXPECTS THE LINKER TO HAVE ESTABLISHED THE ;STACK BY THE TIME THE TEST IS CALLED.
				47	; ;when executed the stack test forces a stack overflow ;and then checks the following paramaters;
				49 50 51	Y VERIFY THE TALL PUSHED ON THE STACK TO TRIGGER FAULT.
				52	Y VERIFY CORRECT RETURN ADDRESS PLACED IN LOC. 0. VERIFY STACK POINTER CORRECT AFTER PUSH.
				54 55	FIF ANY OF THESE PARAMATERS DOES NOT CHECK OUT AN ERROR FIS ANNOUNCED.

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10025 N3M	Ρι	10026 N3MPL	
01	16.4.8 6063/64 DISK		
50		01	16.4.7 6063/64 DISK (CONTINUED)
03	DURING INITIALIZATION THE TEST CHECKS FOR THE	50	AFTER SELECTION OF THE OPERATION TO BE PERFORMED,
04	JEXISTANCE OF A DISK CONTROLLER AND THEN CHECKS	03	IA COMMAND QUEUE IS GENERATED IN THE FIRST 256 WORDS
05	FOR THE EXISTANCE OF ANY/ALL DRIVES. A WRITE	04	JOF SCRATCH(FIVE WORDS PER SECTOR). THE FIRST WORD
06	BUFFERS COMMAND IS USED TO SIZE FOR AVAILABLE	05	CONTAINS THE DRIVE, TRACK AND SECTOR TO BE EXERCISED.
07	DRIVES.	06	ITHE SECOND WORD CONTAINS THE COMMAND AND EXTENDED
08		07	JADDRESS BITS OF THE DATA ADDRESS. WORD # 3 CONTAINS
09	THE TEATING OF FACH ANALLARIE OPTIG TO CONTROLED	08	ITHE THE LOWER 16 BITS OF THE LOGICAL ADDRESS OF THE
10	THE TESTING OF EACH AVAILABLE DRIVE IS CONTROLLED	09	JDATA . WORD # 4 IS USED BY THE DISK TO STORE THE
	184 SELECTION OF ONE OF THREE OPERATION TABLES	10	ISTATUS WORD. WORD # 5 IS NOT CURRENTLY USED.
11	PER DRIVE. EACH CONTROL TABLE IS 13 WORDS IN	11	3
12	ILENGTH. THE FIRST WORD CONTAINS THE TRACK NUMBER	12	THE LAST QUEUE BLOCK CONTAINS A HALT BIT IN WORD
13	(RANDOMLY SELECTED), THE SECOND WORD CONTAINS THE	13	;# 2 WHICH TERMINATES THE OPERATION AFTER
	ISTARTING SECTOR AND NUMBER OF SECTORS USED. THE	14	COMPLETION OF THE SECTOR AND CAUSES THE DISK
15	ISTARTING SECTOR IS RANDOMLY SELECTED AND THE NUMBER	15	ITO INTERRUPT THE CPU.
16	10F SECTORS IS DETERMINED BY THE AMOUNT OF SCRATCH	16	;THE DISK STATUS IS CHECKED AT THE TIME OF THE INTERRUPT
17	J AREA ASSIGNED TO THE DISK TEST WHEN THE DISK	17	FAND IF OK THE SCRATCH AREA IS VERIFIED. A STATUS ERROR OF
18	IS WRITTEN.	18	(DATA LATE WILL CAUSE THE TEST TO RETRY THE OPERATION
19	THE THIRD WORD IS A RETRY COUNTER	19	JUP TO FOUR TIMES. AS THE
20	THE FOURTH WORD CONTAINS THE FIRST WORD OF THE	20	JDATA COMPARES ARE PERFORMED A NEGITIVE COUNT IS
21	JCOMMAND QUEUE, I.E., DRIVE+TRACK+SECTOR.	21	ISTORED IN THE CHECKED LOCATION TO CLEAR THE BUFFER.
2.5	THE FIFTH THRU EIGHTH WORDS ARE THE RANDOM DATA	55	3
23	;WORDS USED TO CREATE THE TEST PATTERN.(THEY REPEAT	53	16.4.9 NOVA DISK TEST
24	(EVERY FOUR WORDS)	24	3
25	;THE NINTH WORD IS THE CHANNEL ADDR. USED IN	25	IWHEN ENTERED FOR ITS INITIALIZATION PASS THE
56	SWRITING TO THE DISK, WORDS TEN THRU THIRTEEN	26	INOVA DISK TEST SIZES THE DISK SYSTEM. IT DOES THIS BY
27	;ARE THE PHYSICAL MEMORY 1K'S USED TO WRITE	27	FINITIATING A READ AT THE HIGHEST ADDRESS OF
28	;TO THE DISK.	28	SEACH AVAILABLE DISK UNTIL IT NO LONGER RECEIVES A
59	1	29	INDNEXISTENT DISK BIT IN THE STATUS.
30	JUPON ENTERING FOR INITIAL EXECUTION, THE TEST ATTEMPS TO	30	THIS "HIGH DISK ADRS." IS TYPED THE FIRST
31	JACQUIRE 1-4K OF SCRATCH AREA. THE TEST THEN RANDOMLY	31	TIME THE NOVA DISK TEST IS ENTERED.
32	SELECTS A DATA STARTING ADDRESS AFTER THE FIRST	32	DURING RUNNING THE DISK TEST KEEPS 3 RANDOM
33	1256 WORDS IN SCRATCH. THE FIRST 256 WORDS ARE RESERVED	33	CONTROL TABLES THAT CONTAIN THE FOLLOWING INFO:
34	FOR THE COMMAND GUEUE.	34	A. THE START SECTOR # OF 16 RANDOMLY SELECTED
35	THE TEST THEN SELECTS ONE OF THE AVAILABLE	35	SECTORS. (THIS N IS RIGHT JUSTIFIED 4 BITS)
36	DRIVES AND ONE OF THE THREE OP TABLES FOR THAT DRIVE.	36	B. A START SECTOR RANDOMLY SELECTED WITHIN 16
37	IF THE FIRST WORD OF THE TABLE IS NON-ZERO(INDICATING	37	C. THE NUMBER OF SECTORS TO BE WRITTEN/READ
38	THE THE TRACK # IN WORD #1, STARTING AT THE SECTOR IN	38	D. 4 RANDOM DATA WORDS THAT KEY THE PATTERN
39	SBITS 11-15 OF THE SECOND WORD, FOR THE # OF SECTORS	39	(THESE 4 WORDS REPEAT EVERY 4 WORDS)
40	SPECIFIED BY THE BITS 3-7 IN THE SECOND WORD, RANDOM DATA	40	THE TEST OPERATES OFF THESE RANDOM CONTROL TABLES
41	HAS BEEN WRITTEN THAT IS EQUAL TO THE CONTENTS OF WORDS	41	IN A MANNER SIMILAR TO THAT DESCRIBED FOR THE INDIVIDUAL
42	14 THRU 7 F THE OP TABLE) THEN THE NEXT OPERATION OF	42	IDISKS IN THE MOVING HEAD DISK TEST.
43	FREAD OR DATA VERIFY IS RANDOMLY SELECTED.	42	IDIARS IN THE MUTING NEW DIGN (FOI.
64	JIF THE FIRST WORD OF THE TABLE IS ZERO, A TRACK IS		
45	SELECTED WHICH IS NOT CURRENTLY IN AN OP TABLE,		
46	JAND A STARTING SECTOR # IS RANDOMLY SELECTED SUCH THAT		
47	THE # OF SECTORS WRITTEN WILL NOT MAKE THE SECTOR #		
47	SFIELD OVERFLOW INTO THE TRACK FIELD. (I.E., THE STARTING		
40	SECTOR FALLS BETWEEN O AND 32-4 OF SECTORS TO BE WRITTEN)		
50	THE DATA PATTERN IS GENERATED IN SCRATCH AREA AND		
	TA WRITE OPERATION IS SELECTED.		
51			
52	3		

10029 N3MPL 16.4.12 LINE PRINTER TEST ITHE NON-OCH LINE PRINTER TEST RANDOMLY PRINTS 10 TO 60 LINES 3 PER PAGE WITH RANDOM STALLS EVERY 1 TO 9 LINES. JEACH LINE OF PRINT CONSISTS OF THE CHARACTERS SPACE 1(40) TO Z (132). THE TEST FILLS THE PRINT BUFFER UNTIL THE FIRST PRINT CYCLE STARTS, CONTINUATION OF PRINTING UNTIL FRANDON STALL IS THEN RUN OFF INTERRUPTS FROM THE PRINTER. I THE DCH-LINE PRINTER TEST ASSIGNS 1 TO 2K OF ISCRATCH AND ASSIGNS IT TO THE DCH A MAP. IT THEN RANDOMLY ICHOSES A STARTING ADDRESS 0 TO 63 WORDS INTO THE SCRATCH AREA I NEXT THE TEST CHOSES 10 TO A MAXIMUM OF 60 LINES TO PRINT. ITHE PATTERN PRINTED CONSISTS OF THE CHARACTERS SPACE(40) TO

16.4.13 REAL TIME CLOCK

ITHE REAL TIME CLOCK IS RUN AT 1K HERTZ. RUNTIME ALONG WITH ACCUMULATED ERROR COUNT ARE PRINTED AT 5 MINUTES 115 MINUTES, 30 MINUTES AND EVERY 30 MINUTES OF RUNTIME ITHEREAFTER. THIS TYPEOUT ALSO OCCURS AFTER EVERY ERROR STYPEOUT OR IF TTY KEY & IS TYPED.

1 J (135). A TAB RUNAWAY ERROR WILL RESULT IN A PROGRAMED HALT.

16.4.14 TELETYPE TEST

2

THE TELETYPE TEST PRINTS A SINGLE LINE CONSISTING OF THE CHARACTERS SPACE TO Z. THE TEST WILL ALSO ECHO CHARACTERS IAS TYPED.

10030 N3MPL 17.0 ODT EDITOR REQUESTING THE ODT EDITOR 17.1 TO ENTER THE ODT TYPE A CONTROL O ON THE TTL. THIS CAN BE DONE AT ANY POINT IN THE PROGRAM. 17.2 RESPONSE ON ENTERING THE ODT A CARRIGE RETURN, LINE FEED AND AN @ IS TYPED ON THE TTO. 17.3 CONVENTIONS AND SYMBOLS IN COMMAND LINES CR PRESSING THE RETURN KEY IS REPRESENTED BY CR . 8 1 LF PRESSING THE LINE FEED KEY IS REPRESENTED BY LF . 12 PRESSING AN ILLEGAL KEY CAUSES THE ODT TO RESPONSE WITH 1 A 7. 10 ODT IS READY AND AT YOUR SERVICE. **17.4 COMMAND STRUCTURE** -----AN ODT COMMAND HAS THE GENERAL FORMAT: [ARGUMENT] [COMMAND] ARGUMENT MAY BE ONE OF THE FOLLOWING: ADR AN OCTAL ADDRESS OR AN EXPRESSION OF THE FORM: X+X+X.... WHERE EACH X IS AN OCTAL INTEGER, SEPARATED FROM THE FOLLOWING X BY EITHER + (PLUS) OR - (MINUS). LEADING ZEROS NEED NOT BE TYPED. N AN OCTAL INTEGER. A COMMAND IS A SINGLE TELETYPE CHARACTER CHARACTERS USED TO OPEN/CLOSE LOCATIONS INCLUDE: #/# "CR" "LF" #** CHARACTERS USED TO ENTER/EXIT ODT INCLUDE: **O*(CTRL 0) *R* *P* CHARACTERS USED TO MODIFY CURRENT ARGUMENTS ARE: "RUBDUT" "+" "-" AND THE INTEGERS O TO 7 THE CHARACTER "=" ALLOWS THE CURRENT ARGUMENT TO BE EXAMINED WITHOUT OPENING OR CLOSING THE CURRENT LCC. CHARACTERS USED TO MANIPULATE THE NOVA 3 MAP INCLUDE: sWe ave alle alle alle alle

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43 44 45

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49 50 51

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			10005	SUGMA	
0001	SUGWV.	AUS ASSEMPLER NEV 02.02 14146146 12/28/78	01	000000	.00 0
01			50		
50			03		CONTENTS
03			04		28222822
U 4			05		
05			06		
0.6			07		I. GOAL
07		***************************************	08		
00		3	09		II. DESINED ATTRIBUTES
6) 9		S JAMES NAMDUZ.TX PANT NUMHERS 097-001135	10		
10		3	11		III. WHAT THE PROGRAM WILL DO AND WHY
11		\$	12		
12		1 NESCRIPTION: NOVA 4 MEMORY DIAGNOSTIC / UNMAPPED / PART 2	1 5		IV. DESIGN HIGHLIGHTS
13		3	14		
14		1	15		V. KNOWN ANOMALIES
15		: REVISION MISTORY:	16		
16		3	17		
17		s heve date	18		TABLE 1- TEST NAMES' BIT POSITIONS
1.00		1	14		
14		1 00 12/27/78	50		TABLE 2- CONTROL FLAGS' DEFAULT SETTINGS
05		1	21		
15			55		TABLE 3- PROGRAM MONITOR COMMANDS
25		1 CUPYRIGHT 🕜 DATA GENERAL CORPORATION, 1978	5 2 5		
25		; ALL RIGHTS RESERVED.	24		· · · · · · · · · · · · · · · · · · ·
24		;	25		FIGURE 1- FAULT TYPES VS. MEMORY TEST PATTERNS
			50		
			27		FIGURE 2- ERROR LOG OUTPUT
			85		
			29		FIGURE 3- MEMORY TOPOLOGY, 4K RAMS
			50		
			51		
			35		LAST MODIFICATION: 12/27/78

NYMOU

12/27/78 15:06

I. GOAL

PRUVIDE A MEANS OF TESTING THE FIRST & WORDS OF MEMORY (MOS DYNAMIC 4K HAMS) ON AN UNMAPPED NOVA 4.

II. DESINED ATTRIBUTES

A) SPEED- ENTIRE PROGRAM SHOULD RUN NO LONGER THAN 10-15 MINUTES IN AUTO MODE.

8) THOROUGNESS- ALL MEMORY FAULT TYPES SHOULD BE TESTED.

C) STRENGTH- EACH MEMORY FAULT TYPE SHOULD BE CHECK HY A MEHONY TEST PATTERN OF AT LEAST MEDIUM STRENGTH. THE STRONGER A TEST, THE MORE LIKELV IT IS TO FIND A BUG. IN A SIMILAR VEIN, "MEAK" TESTS FIND MAND ERNORS, "STRONG" TESTS FIND SOFT (I.E., INTER-MITTENT, INTERACTIVE) ERRORS.

D) UTOS COMPATIBLE.

E) HE USED UNDER ANY OF THE FOLLOWING POSSIBLE CONFIGURATIONS:

CONF	IG=0	(1)	16K	BUARD
CONF	IG=1	(1)	32K	BOARD
CONF	IG=2	(2)	168	BOARDS

F) OPTIONS- UNDER MANUAL CONTROL, THE USER MAY OPT FOR TESTS AMICH COVER LESS IMPONTANT FAULT TYPES AND/OR TAKE A LONG TIME TU RUN. ME CAN ALSO ENABLE SPECIAL FEATURES WHICH AID IN THE LUCATION OF DIFFICULT ERRORS.

G) IF AN ERHOR IS FOUND, PRINT OUT THE EXACT LOCATION OF THE BAD CHIP.

M) PROGRAM LENGTH WILL BE 8K, AND RESIDE IN LOCATIONS 20000 TO 37777.

 AN EKROR LOG BE KEPT, WHICH CONTAINS A HISTORY OF ALL ERRORS ENCOUNTERED.

III. MMAT THE PROGRAM WILL OD AND WHY

A) IN AUTO MODE

DEFINITION: IN AUTO MODE, ALL CONTROL FLAGS (CF'S) AHE SET TO DEFAULT. SEE TABLE 2 FOR DEFAULT SETTINGS. 'AUTO MODE' IS RUN BY ISSUING ANY AUTO MODE COMMAND IN DTOS (E.G., LOAD.NN MEMO, AUTO). ALSO, AUTO MODE CAN BE SIMULATED BY HUMNING UNDER DTOS MANUAL MODE BUT USING THE DEFAULT SETTINGS FOR ALL CF'S.

:0005	Cited Vil 2		10006	SUGMA	
01	1,4002	PAGE 2	01		
02			02		
03		1. SIZE MEMONY+ RUN & TOP DOWN MEMORY SIZING ROUTINE TO	03		
0.5		DETENDINE THE CONFIGURATION OF THE MACHINE, THE THREE POSSIBLE	0.4		
05		SUAND CONFIGURATIONS ARE LISTED IN II. E). THIS IS NECESSARY	05		ы
		FOR CONTROL OF VARIOUS PARAMETERS WITHIN THE PROGRAM, ESPECIALLY	0.6		
05		IN DETERMINING THE EXACT LOCATION OF ANY ERNORS (MODULE, BANK,	07		
07			0.8		0
0.8		AND SIT).	09		1
09			10		
10		2. RUN THE SPECIFIED TESTS			
11			11		
12		FIVE TESTS HAVE BEEN CHOSEN THAT MOST OPTIMALLY MEET	12		C
13			13		1
14		ADDRESS HIT: 3) MARCHING 1/0: 4) GALLOPING COLUMN: AND 5) GALLOPING	14		C
15		ROAS.	15		
16			16		
17		THE TESTS WILL HE RUN IN THAT ORDER. THIS WAY, IF THE	17		P.
19		FAULT IS A HARD ERROR, THEN ONE OF THE FIRST THREE QUICK TESTS	18		
19		AILL FIND IT. IF NOT, THE GALLOPING TESTS WILL THEN BE RUN.	19		1
50		SEE TABLE 1 FUR APPROXIMATE TEST TIMES FOR EACH PATTERN.	20		
21			21		
55		THE MUDIFIED DATA=ADDRESS TEST WILL BE RUN IN TWO	22		1
23		PHASES. IN THE FIRST PHASE OF THE MODIFIED DATA=ADDRESS TEST.	23		
24		PHASES. IN THE FIRST PHASE OF THE MODIFIED DATAEADDRESS TEST, The data wurd aritten to and subsequently read from the memony Location will be the Lower 14 bits of tis 20-bit address. On the	24		
25		LOCATION ATLE RE THE LOAFP 14 ATTS OF ITS 20-BIT ADDRESS, ON THE	25		1
		LOCATION WILL BE THE LOWER 14 BITS OF ITS 20-BIT ADDRESS. ON THE SECO-10 PHASE, THE COMPLEMENT OF THE LOWER 14 BITS OF THE 20-BIT	26		
25		ADDRESS WILL WE WHITTEN TO/HEAD FROM THE LOCATIONS.	27		c
27			28		
92		THE GALLOPING TEST PATTERNS WILL BE RUN IN BK CHUNKS.	29		
29		EXTENSIVE USE OF THE MMPUL FEATURE AND MICROCODE SUPPORT IS MADE.	30		
30		EXIENSIVE USE OF THE MMPOL PERIORE AND MICHOCODE SUPPORT IS MADE.	31		
31		THESE FIVE TESTS COVER THE FOLLOWING SIX FAULT TYPES:	32		
32		1) FAULTY ADDRESS DECODERST 2) INTERACTIVE COUPLING BETWEEN	33		
नु व		1) FAULT AUDRESS DECODERST ES INTERACTIVE COUPLING DENEEN	34		
34		CELLS; 3) MERESM SENSITIVITY; 4) SLOW ACCESS TIME; 5) SENSE AMPLIFIEN RECOVERY; 6) CELL FUNCTIONALITY (CAN THE CELL HOLD AMAT IT'S TOLD TO); AND 7) STUCK ADDRESS BITS AT THE CHIP LEVEL.	35		
35		AMPLIFIEN NECUVENT 6) CELL FUNCTIONALITT (LAN THE CELL HOLD			
36		AHAT IT'S TOLD TO); AND 7; STUCK ADDRESS 5113 AT THE CHIP LEVEL.	36		
57			57		T
38		FIGURE 1 DETAILS WHICH TESTS COVER WHAT FAULT TYPES.	38		
39			39		5
40		EACH TEST WILL BE RUN SEQUENTIALLY DEPENDENT ON ERROR	40		
41		EACH TEST WILL BE RUN SEQUENTIALLY DEPENDENT ON EARON Conditions, specifically, test 1 is run, if an error occurs, a primtout frolaining the nature and location (Board, Module,	41		
42			42		
43		MANK, AND MIT) OF THE ERROR IS GENERATED AND CONTROL IS RETURNED To dtos. If no error occups, test 2 is run. Each test is run	43		
44		TO DTOS. IF NO ERROR OCCURS, TEST 2 IS RUN. EACH TEST IS RUN	44		
45		IN A SIMILAR MANNER UNTIL AN ERROR OCCURS OF ALL THE TESTS	45		
45		ARE COMPLETED. A COMPLETION MESSAGE IS THEN PRINTED OUT (SEE	4.6		
47		SECTION III. C) 2.).	47		
			48		
			49		
			50		
			51		
			52		
					N
			53		PC.
			54		
			55		
			56		-
			57		P
			58		
			59		

B) IN MANUAL MODE ************

DEFINITIONS IN MANUAL MODE, THE OPERATOR CAN TAILOR THE PROGRAM TO EXAMINE MORE SPECIFIC PROBLEMS. THE OPERATOR MUST ENTER THE SETTINGS FOR ALL THE CF'S BEFORE THE TESTS CAN BE RUN (I.E., AT THE START OF THE FIRST PASS). A «LF» RESPONSE WILL SET THE CF TO ITS DEFAULT. SEE TABLE 2 FOR DEFAULT SETTINGS. MANUAL MODE IS RUN BY USING ANY DIOS MANUAL MODE COMMAND (E.G., LOAD HEMD, DEBUG MEMD).

.

ALL NUMERIC QUESTIONS SHOULD BE ANSWERED IN OCTAL NUMBERS. ALL YES/NO QUESTIONS MUST BE ANSWERED WITH "Y" <CR>, "N" «CR», OR «LF». THE «LF» SETS THE CF TO THE DEFAULT, WHICH IS 'NO'.

. MODULES TO BE TESTED

ENTER A HIT PATTERN TO DETERMINE WHAT MODULES ARE TO BE TESTED. A "O" RESPONSE TESTS ALL MODULES. THIS CF APPLIES TO ALL TESTS EXCEPT THE MODIFIED DATA=ADDRESS AND ATA=ADDRESS UPPER.

MUT	MODULE TESTED	(MUT=MODULES UNDER TEST)

15	A	
14	8	
13	с	
12	D	

AS USUAL, A BIT SET MEANS THAT THAT MODULE WILL BE TESTED.

. ERRON CONTHOL MODE (ECM)

"ECM (0-4)? " . THE NUMBER ENTERED WILL AFFECT THE CTION TAKEN UPON HITTING AN ERRORS

ECM	ACTION TAKEN
0	PRINT AN ERROR REPORT AND RETURN TO DTOS.
1	PRINT AN ERROR REPORT AND CONTINUE.
	PRINT AN ERROR REPORT AND HALT.
2	
3	PRINT AN ERROR REPORT AND GO TO PROGRAM MONITOR.
4	ENTER ERROR IN ERROR LOG AND CONTINUE.
50M#2 1	S ILLEGAL WHEN USING POWER SUPPLY VOLTAGE
MARGINING. (SEE	4) 5.)
THE DEF	AULT ECH IS 3.
15	IS ENTERED, THE USER MUST THEN SET THE LOG
PRINT (LP) CONT	
"PRINT	ERROR LOG AT CONCLUSION (Y/N)? "
FOR FUR	THER INFORMATION III.8)7., III.C)1., III.D) .
10111011	

PAGE 3

NMDU2				PAGE 4	01	SUQMA		PAGE 5
	3. SUPPLEMENTA	L ERROR INFORM	ATION		02 03			
			INFORMATION (Y/N)	? "	04		5. ERCC ENAM	NAMME ERCC IS NOT IMPLEMENTED ON NOVA 4 MACHINES ************************************
					06			
	ACTUAL DATA AR		LURE ADDRESS, EXP DDITION TO THE (D		07 08 09 10		TO (THE ENCC LOG	WHLE ERCC (Y/N)? " CHECK THE ENCC RITS, ANSWER "Y". WITH ERCC ENABLED, NGIC WILL COPY THE ENCC RITS (MEMIN 16-20) INTO
	4. POWER SUPPL	Y VOLTAGES (PSV)		11 12		DATA BITS 11	ERCC IS ENAMLED AND AN ERROR IS REPORTED IN BITS
	CONDITIONS OR	UNDER MARGINAL		UNDER NOMINAL UN UNDER MARGINAL RE IN THE CORRECT	13 14 15 16 17 14		11-15, THEN BITS (I.E., MESSAGE WILL	N THE USER SHOULD THANSLATE THAT TO MEAN THE ERCC , dits 16-20). To remind mim of this, a warning , lue printed along with the enror printout, and errors, bit o of the test names' bit pattern will
	THE US	ER ENTERS AN O	CTAL BIT PATTERN	AS FOLLOWS:	19			
	RIT SET	V88 (-5V)	(VDD (+12V)	VCC (+5V)	0 5 2 1 2 2		OTHER ERNOR	ITE THAT AN ERCC ENROR IS TREATED JUST LIKE ANY R which would be detected by a test pattern.
					23		*ER(RCC ENABLE" IS ONLY IMPLEMENTED AT THE HEGINNING GRAM (I.Ç., CHANGING THE CF'S VALUE IN THE PROGRAM
	15	-5.25 -4.5V	10.8 12.6	4,5 5,25	25		MONITOR WIL	. HAVE NO AFFECT UNTIL THE NEXT PASS OF THE PROGRAM).
	VOLTAGES (WHIC	H IS THE DEFAU	THE TESTS WILL RU LT CONDITION). OT Marginal conditi	HERWISE, THE TESTS	26 27 28 29 30		6. ERROR LUC The	DG : ENROR LOG CONSISTS OF A LIST OF 3-WOHD BLOCKS THAT
		RUN WITH HI/L	ERS): 1= HI/LO/LO D/LO, SECOND RUN	ONLY; 2= LO/HI/HI WITH LO/HI/HI;	31 32 33			FOLLOWING INFORMATION: CONTENTS
					34		******	******
	THIS IS TO ASS Levels before	ANY OTHER PROG	DLTAGES ARE RETUR RAM IS RUN. FOR		35 36 37 38		1 2 3	AMARD, RANK, MODULE, BIT NUMBER TEST NAMES" BIT PATTERN Failure count
	PROGRAM USING Reset Switcm D IF IT IS VITAL	SWITCH PACK), URING ANY RUN TO STOP THE P	'BREAK', OR HIT T	ME FRONT PANEL E BEING MARGINED.	39 40 41 62		ERRUN HAS DO LOCATION IS	: FAILURE COUNT IS THE TOTAL NUMBER OF TIMES AN ICCURRED UNDER ALL TESTS RUN FOR THE CHIP NHUSE IS SPECIFIED IN WORD 1.
	FOLLOWING SEGU	ENCEI			4 3 4 4			GGING AN ERRON ENTAILS THE FOLLOWING ACTIONS:
		"I ABORTS THE	YOU IN THE PROGRA Program, returns	VOLTAGES TO	45 46			ERROR'S CHIP LOCATION IN LOG?
	3) 'Ex		ELS, AND RETURNS Mmand which halts		67 48 49			IF IT IS IN THE LOG, UPDATE THE TEST NAMES' BIT ID INCHEMENT THE FAILURE COUNT.
	PSV RUN, THE P "H" COMMAND. H NOT RESET THE RULE, WHEN USI	ROGRAM WILL SU OWEVER, THIS I VOLTAGES TO TH	U WANT TO STOP TH	YOU TO USE THE ECAUSE THIS WILL GES. AS A GENERAL	50 51 52 53 54 55		ALL PERTINE Log.End Poi	IF IT IS NOT IN THE LOG, CREATE A NEW NODE WITH NT INFORMATION ENTERED FOR THAT EHRON. UPDATE INTER. AN ATTEMPT TO CREATE ANOTHER NODE WOULD OVERFLOW AEN A MARNING MESSAGE IS ISSUED, AND THE PROGRAM
	AS USU	AL, IF AT ANY	TIME AN ERROR IS	ENCOUNTERED, THE Ent error control	56 57 58 59			ENTERED. SURE 2 IS AN EXAMPLE OF AN ERROR LOG PRINTOUT. LES UNDER FIGURE 2 FOM MORE INFORMATION.

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10009	NHUU2		10010 NMDU2	
01		PAGE 6	0 1	PAGE 7
50			50	
03		7. FEST PATTERUS	03	3. END PROGRAM FORMAT
04			04	
05		ENTER A HIT PATTERN TO DETERMINE WHAT TESTS ARE TO BE	05	
06 07		RUN, SEE TABLE 1 FUN TEST NAMES' BIT POSITIONS, A BIT SET Wobld mean that that test will be run.	07	
08		NUCLO MERN THAT THAT IEST ALL AL ADA.	0.8	(MAKES SENSE, HUM?)
09		A WOTE ON THE OPTIONALLY AVAILABLE PATTERNS-	0.9	
10			10	
11		GALLOPING PATTENN IS A VERY SLOW BUT COMPREHENSIVE TEST	11	4. SUPPLEMENTAL ERROR INFORMATION
12		PATTERN WHICH OFFERS STRONG TESTS FOR FAULTY ADDRESS DECODERS,	12	
13		ALL TYPES OF CELL INTERACTIVE COUPLING, SLOW ACCESS TIME, AND	1.5	40.95555
14		CELL FUNCTIONALITY.	14	ADDRESS=
15			15	ACTUAL DATAS
17			17	
18			10	THE SUPPLEMENTAL ERROW INFORMATION IS PRINTED BETWEEN
19		C) ERROR REPORTING	19	REPORT FORMAT.
20			20	
21			21	
55		UPON MITTING AN ERROR, THE PROGRAM PHINTS OUT 1.	55	
53		2. IS PRINTED OUT AT THE END OF EACH HOARD. 3. IS PRINTED Out at the END OF THE PROGRAM.	23	0) PROGRAM MONITOR
24		UUI AT THE ENU UP THE PHOGRAM.	25	
26		IF THE SEI CF IS SET, 4. IS PRINTED ALONG WITH 1.	26	IN BOTH MANUAL AND AUTO MODES, AT THE END OF EACH TEST,
27			27	AT THE OCCURRENCE OF AN ERROR, AND AT THE END OF EACH PASS, THE
28		1. ERROR REPORT FORMAT	85	TTY IS TESTED FOR INPUT. IF A VALID SWITCH PACK COMMAND WAS
29			29	ENTERED, IT IS THEN EXECUTED. IF NOT, A CHECK FOR 'CNTRL-C' IS
30			30	PERFORMED. IF 'CNTRL-C' WAS TYPED, A SMALL "PROGRAM MONITOR" IS
31			31	EXECUTED. A "**?" PROMPT SIGNALS THE USER TO ENTER ONE OF THE
32		TEST NAME:	32	VALID COMMANDS LISTED IN TABLE 3. ILLEGAL COMMANDS HAVE NO ILL
33		BUARD VUMBER	35	EFFECTS.
34 55		MODULE:	35	ONCE IN THE PROGRAM MONITOR, SWITCH PACK COMMANDS ARE NOT
36		HIT NUMHER(S)=	36	ACCEPTED, FUR THIS REASON, IN ORDER TO GET A MARD COPY OF THE
37			37	ERROR LOG PRINTOUT, IT IS NECESSARY TO ENABLE SWREG'S BIT 5 BEFORE
38		BE APPENDED TO THE ERROR REPORT FORMAT.	38	ENTERING THE PROGRAM MONITOR (I.E., TYPE '5' BEFORE 'CNTRL-C' AND
39			39	'P' OR 'D').
40			40	
41		2. NORMAL TERMINATION FORMAT	41	ANY CHANGES MADE IN THE PATS, PSV, OR ECCE CF'S WILL
42		a wa a a a a a a a a a a a a a a a a a	42	NOT TAKE EFFECT UNTIL THE NEXT BOARD (FOR BOARDS 2 THRU LAST)
43		TOTTLO AGUALETER	43 44	ON THE NEXT BANK (FOR BOARD 1).
44		TESTING COMPLETED	45	
45 46		BOARD NUMBERS	45	
40		ADDRESS STARTE	47	IV. DESIGN HIGHLIGHTS
48		ADONESS ENDE	48	
49		HAM TYPES K	49	
50			50	A) ALL GALLOPING TEST PATTERNS WILL BE RUN USING A MICROCODE
51		THE "ADDRESS START" REFERRED TO IN THE NORMAL TERMINATION	51	ROUTINE TO ACHIEVE THE GREATEST SPEED AND TO TEST THE MEMORY
52		REPURT IS THE BOARD STARTING ADDRESS. THE 'ADDRESS END' IS THE	52	TO ITS FULLEST.
53		BOARD ENDING ADDRESS.		

10011 NMDU2 10012 NMDU2 01 PAGE 8 01 TAHLE 1: TEST NAMES' HIT POSITIONS 02 02 02 111111111111111111111111111111111111	
PAGE 8 01 TAHLE 1: TEST NAMES' HIT POSITIONS 02 02 02 02 03 04 04 04 04 04 04 05 C) INTERRUPTS WILL BE ENABLED ONLY FOR DETERMINING BOARD 05 01 POSITION 06 CONFIGURATIONS AND DURING PORCE SUPPLY VOLTAGE MARGINING WITHIN 06 11 POSITION 07 THE PROGRAM & KEC. THEY WILL BE DISABLED THE REST OF THE PROGRAM. 07 08 14 MUDIFIED DATARADDRESS A 09 0) IF THE MMPUI EXISTS, THEN NAMDU2 WILL IMMEDIATELY RETURN 09 14 10 TO DITOS. IN THIS CASE, IT IS NECESSARY TO RUN NAMOM. 10 15	
03 B) EXISTING DLIB ROUTINES THAT ARE APPLICABLE ARE TO RE USED. 03 04 04 04 05 C) INTERRUPTS WILL BE ENABLED ONLY FOR DETERMINING BOARD 05 BIT POSITION IEST NAME PODE RUN 06 CONFIGURATIONS AND DURING PORER SUPPLY VOLTAGE MARGINING WITHIN 06 SETENSES A 07 THE PROGRAM & KEC. THEY WILL BE DISABLED THE REST OF THE PROGRAM. 06 14 MUDIFIED DATAFADDRESS A 08 09 D) IF THE MMPUL EXISTS, THEN NAMDU2 WILL IMMEDIATELY RETURN 09 14 STUCK ADDRESS BIT A 09 D) IF THE MAPULE STATS, THEN NAMDU2 WILL IMMEDIATELY RETURN 09 14 STUCK ADDRESS BIT A 10 TO DTOS. IN THIS CASE, IT IS NECESSARY TO RUN NAMOM. 10 15 MARCHING 1/0 A	
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10 TO OTOS. IN THIS CASE, IT IS NECESSARY TO RUN NAMOM. 10 15 MARCHING 1/0 A	
11 12 GALLOPING COLUMNS A	
12 11 GALLOPING ROWS A	
13 10 GALLOPING PATTERN M	
14 V. KNOWN ANOMALIES 14	
15 888888888888888888888888888888888888	
16 NOTEST 1/ ATAUTOR MEMANUAL	
17 A) ROW AND BIT COLUMN RIPPLING 17	
18 1/2 SHOULD TAKE LESS THAN 2 MINUTES TO RUN ALL	LL
19 THE TESTS, THIS ASSUMES NO MEMORY ENROPS ARE	15.000
20 1/ A BAD CHIP MAY LOAD DOWN A SIGNAL (E.G., RAS DR CAS) 20 DETECTED (I.E., IF THERE ARE ERRONA, AND ECH-4	
21 SUFFICIENTLY TO CAUSE SOME OR ALL OF THE OTHER CHIPS IN THE SAME 21 REING LOGGED, NOT PRINTED), THEN THE TESTS WILL	L TARE
22 BANK+MODULE (1,E.,ROH) OR HIT COLUMN TO GENERATE ERRORS. IN THE ERROR 22 LONGER TO COMPLETE).	
23 LOG, THE GENUINE BAD CHIP CAN BE SPOTTED AS THE ONE WITH THE MOST	
28 ERRORS (A FAILURE COUNT IN THE THOUSANDS), WHILE THE GOOD CHIPS	
25 WELLD HAVE A FAILURE COUNT ONLY THE HUMDREDS. IF THIS OCCURS, REPLACE	
26 THE CHIP WITH THE HIGHEST NUMBER OF REPORTED ERRORS AND RERUN THE	
27 PROGRAM, IF ALL THE OTHER CHIPS WERE REALLY GOOD, THEN ALL THE	
28 RELATED ERRORS SHOULD DISAPPEAR.	
30 2/ YOU RUN THE PROGRAM WITH EKROR REPORTING (AS WOULD BE THE CASE	
31 IN AUTO MODE). AN ERNOR IS REPORTED, AND YOU REPLACE THE REPORTED	
32 CHIP, IF, AFTER REPUNNING THE PROGRAM, YOU STILL GET AN ERROR IN THE	

EVICE WORLD'S AN ERROR IS REPORTED, AND YOU REPLACE THE REPORTED CHIP, IF, AFTER RERUNNING THE PROGRAM, YOU STILL GET AN ERROR IN THE SAME ROW AND/OR THE SAME BIT COLUMN, THIS MAY RE THE DREADED 'RIPPLING' EFFECT. INSTEAD OF COMMITING SUICIDE, RETURN THE OFFENDED CHIP (WITH APPROPRIATE APOLOGIES) TO THE BOARD AND RERUN THE OFFENDED CHIP (WITH ERROR LOGGING, FOLLOWING THE PROCEDURE OUTLINED IN '1/'.

3/ IF THE LOADING FROM THE GENUINE BAD CHIP IS SEVERE ENOUGH, IT CAN PULL A CRITICAL SIGNAL DOWN OR UP AND CAUSE ALL THE "GOOD" CHIPS IN THE SAME ROW AND/OR BIT COLUMN TO GENERATE AS MANY ERRORS AS THE BAD CHIP ITSELF. IN THIS CASE, YOU'RE OUT OF LUCK, AND MUST RESORT TO EMULATING A BIRD (IN OTHER WORDS, THE 'OL "MUNT AND PECK" METHOD).

B) IF YOU TYPE 'CNTRL-C' DURING AN ERROR REPORT WHEN ECM-3 (ENTER PROGRAM MONITOR UPON ERROR), WHEN IT COMES TIME TO 'EXIT PROGRAM MONITOR', YOU WILL MAVE TO ENTER THE 'E' COMMAND TWICE-ONCE FOR YOUR 'CNTRL-C' AND ANOTHER BECAUSE ECM-3.

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TABLES AND FIGURES FOLLOW

01 02	N4005	TABLE 2		DL FLAGS' DEFAUL	T SETTINGS	10014 NMDU2 01 02		TARLE 3: PROGRAM P	NONITOR COMMANDS
03						04	COMMAND	(STANDS FOR)	ACTION TAKEN
04						04	2222223		***********
05				PROGRAM OCTAL		05			
66			CF	VALUE	DEFAULT	00		ABORT	RETURN TO DTOS
07		22 25 25 25 25 25 25 25 25 25 25 25 25 2	88		*****	07		CLEAR	CLEAR ERROR LOG
0.6						06	6	DUMP	PRINT & CLEAR ERROR LOG
09		MUDULES UNDER TEST	MUT	0	ALL	09	0	EXIT	RETURN TO MAIN PROGRAM
10		ENROR CONTROL MODE	ECM	0	PRINT ERROR, RETURN TO DTO	10	5		PRINT CONTROL FLAGS
11		SUPPL, ERROR INFO.	SEI	0	NONE .	11	- F	FLAGS	PROGRAM HALTED
12		POWER SUPPLY VOLTAGES	PSV	0	NOMINAL ONLY	12	н	HALT	
13		ECC ENABLE	ECCE	0	NOT AVAIL./NOT ENABLED	13	ρ	PRINT	PRINT ERROR LOG
14		ENNOR LOG PRINT	LP	0	NO LOG PRINT & CONCL.	14	R	RESET	PRINT CF'S; INPUT NEW VALUES
15		PATTERNS TO HE RUN	PATS	37	ALL EXCEPT GALPAT	15	T	TERMINATE	TERMINATE THE CURRENT TEST,
16						16			AND RETURN TO THE
17						17			PROGRAM EXEC.
18		NOTES: 1/ CF=CONTHOL P	LAG			16			
10						19			
20		21 THE DEFAULT	PATTERNS	ANE THE FIRST S	PATTERNS LISTED	20			
24		LISTED IN TA				21	NOTES: 1/ A	N ILLEGAL COMMAND WILL (CAUSE A MESSAGE TO BE
61		610100 110 11				22	***** P	RINTED, LISTING THE VAL	ID COMMANDS THAT MAY
50		TA PROCESS IS	AL VALUE	REFERS TO THE	VALUE THE "CF"	23		E ENTERED.	
23				LEMENT THE DESCR					
64		NOULD CONTRI	the LPL Touted	PROFESSION NEEDER	TAPA APLEAPLE				

10015 NM 01 02 03 04	MDU2 FIGURE 1: FAULT TYPES VS. MEMORY TEST PATTERNS SESSER	10016 NMDU2 01 02 03 04	FIGURE 2: ERROR LOG DUTPUT
05	TEST NAME I MAJOR FAULT TYPES TESTED	05	
06		06	
07	MODIFIED DAA 1,2,6	07	
0.6	0	08	CHIP LOCATION TEST FAILURE
09	STUCK ADR, GIT 1 1,2	10	19942 9828 282 282 288 22288 19947 9436 1997 1991 1947 2001
10	MARCHING 1/0 1 2,8	11	
11	maqaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa	12	1 1 C 9 000140 360
18	GALLOPING COL. 1 4.5	13	1 1 C 12 000140 360
14		14	1 1 0 0 000140 32157
15	GALLOPING ROWS 1 3.5.7	15	1 0 A 6 000203
16		16	2 0 P 9 000040 64
17	GALLOP'G PATTERNI 1,2,3,4,6,7,8	17	2 0 19 10 000040 64
18		18	2 0 8 15 000040 64
19		19	
20		20	
15	风雨 ¥ \$	21	NATES ITES NAME/STI IS A DIT SITTEN. A SIT SET MEANS
55	8 8 8	23	NOTES: 1/ 'TEST NAME(S)' IS A BIT PATTERN. A RIT SET MEANS That an error was occurred under the corresponding
53	1: FAULTY ADDRESS DECODING- WRONG CELL OR CHIP ACCESSED	E 3	TEST LISTED IN TABLE 1 FOR THE SPECIFIED CHIP
24		25	LOCATION. (E.G., 41= BITS 10,15 => GALLOPING ROWS
25	2: FAULTY ADDRESS DECODING- CELL INACCESSIBLE 3: INTERACTIVE COUPLING WITHIN ROWS	26	AND MODIFIED DATABADDRESS, IF RUNNING THE MAPPED VERSION).
26 27	AI INTERACTIVE COUPLING WITHIN COLUMNS	27	BIT O SET MEANS THAT ERCC WAS ENABLED DURING TESTING.
28	SI REFRESH SENSITIVITY	28	
29	6: SLOW ACCESS TIME	29	2/ THE TEST NAMES LISTED INDICATE UNDER WHAT
30	7 SENSE AMPLIFIER RECOVERY	30	TESTS AN ERRUR HAS OCCURRED IN THE WORD.
31	83 CELL FUNCTIONALITY	31	
		32	3/ 'FAILURE COUNT' IS THE NUMBER OF TIMES AN ERROR HAS
		33	OCCURRED AT THE SPECIFIED CHIP LOCATION.
		34	IF THE FAILURE COUNT=177777, THEN THERE WAS AN OVERFLOW
		35	IN THE FAILURE COUNT DATA WORD (I.E., THE NUMBER OF ERRORS
		36	FOR THAT CHIP WAS >=177777).
		37	
		38	4/ ALL NUMBERS ARE IN OCTAL.
		39	PA TO PET A MARY OF THE CODOR I OF RETATOUT. IT TO

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47 48 49 5/ TO GET A MARD COPY OF THE FRROR LOG PRINTOUT, IT IS NECESSARY TO SET SWREG'S BIT 5 BEFORE ENTERING THE PROGRAM MONITOR (UNLESS, OF COURSE, THE CONSOLE DEVICE IS A PRINTER OR TELETYPE). IF THE LOG IS TO BE PRINTED OUT ONLY AT THE CONCLUSION OF THE PROGRAM, SET BIT 5 ANYTIME DURING THE EXECUTION OF THE PROGRAM.

6/ A 'GALLOPING PATTERN' FAILURE COUNT OF 1 SHOULD BE INTERPRETED AS A HARD ERROR, ("1" 1S THE MAXIMUM FAILURE COUNT THAT GALPAT WILL GENERATE).

10017				
Занина АТТ 0 10 400 574001 1 1 1 14 1 1 1 1 1 10 400 574001 1 1 1 14 1 1 1 1 1 11 1 1 1 1 1 1 11 1 1 1 1 1 1 1 11 <		FIGUS	RE SI MEMORY TOPOLOGY, AK RAMS	
ВІТ 15 АІТ 0 10 400 374001 1 14 1 15 1 1374 377741 14 1 15 1 140004 1 14 1 14004 1 14004 1 14005 1 140004 1 14005 1 15 1 16006 1 15 1 16007 1 17 14007 180006 1 19 14001 19 10006 10 1 11 1 11 1 12 1375 1375 377751 11 1 140005 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
ВІТ 15 АІТ 0 10 400 374001 НАМК 0 1 14 1 НАМК 0 15 140000 778001 1 16 140004 1 17 1. 1 18 140004 1 19 140004 1 11 1. 1 11 1. 1 14 140004 1 14 140004 1 14 140004 1 14 1400370 777001 1 15 140005 1 15 140005 1 14 14005 1 15 140005 1 16 140075 1 17 1 1 16 1 1 17 1 1 18 140005 1 19 1 1 10 1 1 11 1 1 12 140005 1 19 1 1 10 1 1 11 1 1 12 10002 1				
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14 1 НАМК 0 1 1 10 1 1 1 1 11 1374 577741 1 1 12 1374 577741 1 1 14	0.8	10 400 374001		1 I I
1 1	69		BANK O	1 1
1374 377741 1 1 1 14	10	1. 1		1 1
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1 1 0.000, 774001 1 1 16 1 1 1 1 1 1 17 1	15	***********		
1 1	14			*******
17 1 1 1 1 1 14 140374 777741 1 1 1 20 1 1 1 1 1 20 1 1 1 1 1 20 1 401 574011 1 1 24 11 401 574011 1 1 25 15 1 8ANK 0 1 1 26 1. 1 1 1 1 26 1.5 377751 1 1 1 26 1375 377751 1 1 1 27 1 1 1 1 1 26 1375 377751 1 1 1 27 1 1 1 1 1 28 140005 1 1 1 1 39 1 1 1 1 1 31 1403575 777751 1 1 1 36 1 1 1 1 1 36 1 1 1 1 1				
1 1 0 1 1 1 1 1 0 1 1 1 1 20 1 1 1 1 1 1 1 21 1 0 1				
1			BANK 1	
20 22 23 11 401 574011 24 11 401 574011 25 15 26 1. 27 1 26 1.5 1 1 26 1.5 1 1 27 1 1 1 26 1.375 37 1 30 1 30 1 31 140001 774011 32 140005 33 1. 34 140375 777751 35 1 36 1 37 1 38 1 39 1 39 1 39 1 39 1 39 1 39 1 30 1 31 1 32 1 33 1 34 1 35 1				1 1
22 23 24 11 401 374011 1 25 15 1 26 1. 1 27 1. 1 26 1. 1 27 1. 1 26 1.375 377751 27 1. 1 28 1375 377751 29		*******		
27 11 401 574011 1 1 24 11 401 574011 1 1 25 15 1 8ANK 0 1 26 1. 1 1 27 1. 1 1 26 1.75 377751 1 1 26 1375 377751 1 1 26 140001 774011 1 1 27 1 1 1 28 140005 1 1 30 1 1 1 31 140005 1 1 34 140375 777751 1 1 35 1. 1 1 36 1 1 1 37 1 1 1 36 1 1 1 37 1 1 1 36 1 1 1 37 1 1 1 37 1 1 1 38 1 1 1 39 1 1 1 40 1 1 1 41 1 1 42				
23 11 401 374011 1 1 24 11 401 374011 1 1 25 15 1 1 26 1. 1 1 27 1. 1 1 26 1375 377751 1 29		83853588358306086A854	***************************************	
24 11 401 374011 1 25 15 1 26 1. 1 27 1. 1 28 1375 377751 29				
25 15 1 BANK 0 1 1 26 1. 1 1 1 27 1. 1 1 1 28 1375 377751 1 1 29		11 401 474011		1 1
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27 1 1 1 28 1375 377751 1 1 29				i i
26 1375 377751 1 29				i i
29				1 1
1 140001 774011 1 32 140005 1 1 35 1. 1 1 34 140375 777751 1 36				*******
32 1 40005 1 1 1 33 1 1 1 1 34 140375 777751 1 1 35		********		
33 1. 1 HANK 1 1 1 34 140375 777751 1 1 1 35	31	140001 774011		1 1
34 140375 777751 1 35	32			1 1
35	5 5		HANK 1	1 1
5A 57 54 59 40 12 402 574021 41 16 1 16 1 16 1 1 42 1 1 1 44 1376 577761 47 140002 174021 48 1 1 1 1 1 1 1 1.				1 1
37 34 34 34 35 12 402 574021 40 12 402 574021 41 16 42 1 43 1 44 1376 45 1 46 1 47 140002 774021 48 140006 49 1 40 1 50 140376 777761 52 1		****************		*******
3A 39 12 402 374021 1 1 40 12 402 374021 1 1 1 41 16 1 1 1 42 1 1 1 1 43 1. 1 1 1 44 1376 377761 1 1 45				
5q			***************************************	
an 12 402 57402! 1 a1 16 1 bANK 0 1 i 1				
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47 140002 774021 1 1 48 140006 1 1 1 49 1. 1 1 1 50 140376 777761 1 1 51	45	*****		
4A 140006 1 1 1 4a 1 1 1 1 50 140376 777761 1 1 51 52 52 53		******		********
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50 i40376 77776i i i i 51	48			1 1
51 •••••••••• 52	40	1. 1	BANK 1	1 1
52	50	140376 77776!		1 1
	51			****** *
	53	***************************************		

-----13 403 ... 374031 BANK 0 17 1. 1. 1377 377771 *************** 140005 ... 774031 140007 RANK 1 1. 140577... 777771 --------------

EACH BLOCK REPRESENTS A CHIP. THE NUMBERS WITHIN THE BLOCK DENOTE PHYSICAL ADDNESSES.

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THIS IS THE VIEW IF THE FRONT END (I.E., THE ONE WITH THE PINS) IS TOWARDS YOU, THE BANKS ALTERNATE: THE MODULES RUN HACK TO FRONT (A-D); THE BIT NUMBERS RIN HIGHT TO LEFT. IF THERE ARE ANY ERCC CHIPS, THEY WOULD HE APPENDED TO THE LEFT.

A 16K BOARD WOULD HAVE ONLY BANK 0. A 32K BOARD WOULD HAVE BOTH SANK O AND BANK 1.

> .ENDC .EJEC

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0001 NMDU1	AOS ASSEMBLEM REV 02.02 14:42:50 12/28/78	02			v	
01		03				CONTENTS
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0 5		05				
04						
05		06		I. GOAL		
0 h	1	08		1. GOAL		
97				II. DESIRED AT	TOTO:: 75 8	
0 8	8	09		II. DESIRED AT	INTODIES	
09	TRAMES NAMDUL.TX PART NUMBERS 097-001134	10				
10	3	11		III. WHAT THE	PROGRAM WI	LL DU AND
11	3	12				
12	: DESCRIPTION: NOVA 4 MEMORY DIAGNOSTIC / UNMAPPED / PART 1	13		IV. DESIGN HIG	ML10413	
13	3	14				
14	3	15		V. KNOWN ANOMA	6153	
15	1 NEVISION HISTORYS	16				
16	8	17				
17	r REV. DATE	18		TABLE 1- TEST	NAMES. BIL	PUSITIONS
18	8	19				
19	12/27/78	20		TABLE 2- CONTR	OL FLAGS"	DEFAULT SE
20	8	21				
21	1	55		TABLE 3- PROGR	AM MONITUR	COMMANDS
22	I COPYNIGHT (C) DATA GENERAL CORPORATION, 1978	53				
25	7 ALL RIGHTS RESERVED.	24				
24	2 *************************************	25		FIGURE 1- FAUL	T TYPES VS	. MEMORY T
		26				
		27		FIGURE 2- ERRO	R LOG OUTP	UT
		85				
		29		FIGURE 3- MEMO	RY TOPOLOG	Y, 4K RAMS
		30				

DO AND WHY POSITIONS FAULT SETTINGS OMMANDS MEMORY TEST PATTERNS FIGURE 3- MEMORY TOPOLOGY, 4K RAMS

12/27/78 14:42

LAST MODIFICATION:

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N4MDU

I. GOAL

PROVIDE & MEANS OF TESTING UP TO 32K WORDS OF MOS DYNARIC RAMS ON AN UNMAPPED NOVA 4.

II. DESIRED ATTRIBUTES

A) SPEED- ENTIRE PROGRAM SMOULD RUN NO LONGER THAN 10-15 MINUTES IN AUTO MODE.

8) THOROUGNESS- ALL MEMORY FAULT TYPES SHOULD BE TESTED.

C) STRENGTH- EACH MEMORY FAULT TYPE SMOULD BE CHECK BY A MEMORY TEST PATTERN OF AT LEAST MEDIUM STRENGTH. THE STRONGER A TEST, THE MORE LIKELY IT IS TO FIND A BUG. IN A SIMILAR VEIN, "WEAK" TESTS FIND MARD ERRORS, "STRONG" TESTS FIND SOFT (I.E., INTER-MITTENT, INTERACTIVE) ERRORS.

D) DTOS COMPATIBLE.

E) BE USED UNDER ANY OF THE FOLLOWING POSSIBLE CONFIGURATIONS:

CONFIG=0	(1)	16K	GRADS
CONFIG=1	(1)	35K	BOARD
CONFIG=2	(2)	16K	BOARDS

F) OPTIONS- UNDER MANUAL CONTROL, THE USER MAY OPT FOR TESTS WHICH COVER LESS IMPORTANT FAULT TYPES AND/OR TAKE A LONG TIME TO RUN. HE CAN ALSO ENABLE SPECIAL FEATURES WHICH AID IN THE LOCATION OF DIFFICULT ERRORS.

G) IF AN ERROR IS FOUND, PRINT OUT THE EXACT LOCATION OF THE GAD CHIP.

M) PROGRAM LENGTH WILL BE 8K OR LESS. THIS ALLOWS THE TESTING OF 4K RAMS/16K BOARD SYSTEMS.

1) AN ERROR LOG BE KEPT, WHICH CONTAINS & HISTORY OF ALL ERRORS ENCOUNTERED.

III. WHAT THE PROGRAM WILL DO AND WHY

A) IN AUTO MODE

DEFINITIONS IN AUTO MODE, ALL CONTROL FLAGS (CF'S) ARE SET TO DEFAULT. SEE TABLE 2 FOR DEFAULT SETTINGS. 'AUTO MODE' IS RUN BY ISSUING ANY AUTO MODE COMMAND IN DTOS (E.G., LOAD.NN MEMO, AUTO). ALSO. AUTO MODE CAN BE SIMULATED BY RUNNING UNDER DTOS MANUAL MODE RUT USING THE DEFAULT SETTINGS FOR ALL CF'S.

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1. SIZE MEMORY- RUN A TOP DOWN MEMORY SIZING ROUTINE TO DETERMINE THE TOP OF MEMORY.

DETERMINE THE CONFIGURATION OF THE MACHINE. THE THREE POSSIBLE BOARD CONFIGURATIONS ARE LISTED IN II. E). THIS IS NECESSARY FOR CONTROL OF VARIOUS PARAMETERS WITHIN THE PROGRAM, ESPECIALLY IN CETERMINING THE EXACT LOCATION OF ANY ERRORS (GOARD, MODULE, BANK, BIT).

2. RUN THE SPECIFIED TESTS

SIX TESTS MAVE BEEN CHOSEN THAT MOST OPTIMALLY MEET THE DESIRED ATTRIBUTES: 1) MODIFIED DATA=ADDRESS; 2) STUCK ADDRESS BIT; 3) MARCHING 1/0; 4) GALLOPING COLUMN; 5) GALLOPING ROMS; AND 6) GALLOPING DIAGOMAL.

THE TESTS WILL BE RUN IN THAT ORDER. THIS WAY, IF THE FAULT IS A MARD ERROR, THEN ONE THE FIRST THREE QUICK TESTS WILL FIND IT. IF NOT, THE GALLOPING TESTS WILL THEN BE RUN. SEE TABLE 1 FOR APPROXIMATE TEST TIMES FOR EACH PATTERN.

THE MODIFIED DATA=ADDRESS TEST WILL BE RUN IN TWO PHASES. IN THE FIRST PHASE OF THE MODIFIED DATA=ADDRESS TEST, THE DATA MORD WRITTEN TO AND SUBSEQUENTLY READ PROM THE MEMORY LOCATION WILL BE THE LOWER 14 BITS OF ITS 20-BIT ADDRESS. ON THE SECOND PHASE, THE COMPLEMENT OF THE LOWER 14 BITS OF THE 20-BIT ADDRESS WILL BE WRITTEN TO/READ FROM THE LOCATIONS.

THE GALLOPING TEST PATTERNS WILL BE RUN IN 16K CHUNKS. Extensive use of the MMPU1 Feature and Microcode Support IS Made.

THESE SIX TESTS COVER THE FOLLOWING SIX FAULT TYPES: 1) FAULTY ADDRESS DECODERS; 2) INTERACTIVE COUPLING BETWEEN CELLS; 3) REFRESM SENSITIVITY; 4) SLOW ACCESS TIME; 5) SENSE AMPLIFIER RECOVERY; 6) CELL FUNCTIONALITY (CAN THE CELL MOLD WHAT IT'S TOLD TO1; AND 7) STUCK ADDRESS BITS AT THE CHIP LEVEL.

FIGURE 1 DETAILS WHICH TESTS COVER WHAT FAULT TYPES.

EACH TEST WILL BE RUN SEGUENTIALLY DEPENDENT ON ERROR CONDITIONS. SPECIFICALLY, TEST 1 IS RUN. IF AN ERROR OCCURS, A PRINTOUT EXPLAINING THE NATURE AND LOCATION (BOARD, MODULE, BANK, AND BIT) OF THE ERROR IS GENERATED AND CONTROL IS RETURNED TO DTOS. IF NO ERROR OCCURS, TEST 2 IS RUN. EACH TEST IS RUN IN A SIMILAR MANNER UNTIL AN ERROR OCCURS OF ALL THE TESTS ARE COMPLETED. A COMPLETION MESSAGE IS THEN PRINTED OUT (SEE SECTION III. C) 2.).

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B) IN MANUAL MODE

DEFINITION: IN MANUAL MODE, THE OPERATOR CAN TAILOR THE PROGRAM TO EXAMINE MORE SPECIFIC PROBLEMS. THE OPERATOR MUST ENTER THE SETTINGS FOR ALL THE CF'S BEFORE THE TESTS CAN BE RUN (I.E., AT THE START OF THE FIRST PASS). A «LF» RESPONSE WILL SET THE CF TO ITS DEFAULT. SEE TABLE 2 FOR DEFAULT SETTINGS. MANUAL MODE IS RUN BY USING ANY DTOS MANUAL MODE COMMAND (E.G., LOAD MEMD, DEBUG MEMD).

ALL NUMERIC QUESTIONS SHOULD BE ANSWERED IN OCTAL NUMBERS. ALL YES/NO QUESTIONS MUST BE ANSWERED WITH "Y" <CR>, OR <LF>. THE <LF> SETS THE CF TO THE DEFAULT, WHICH IS 'NO'.

1. MODULES TO BE TESTED

ENTER A BIT PATTERN TO DETERMINE WHAT MODULES ARE TO BE TESTED. A "O" RESPONSE TESTS ALL MODULES. THIS CF APPLIES TO ALL TESTS EXCEPT THE MODIFIED DATA=ADDRESS ANO DATA=ADDRESS UPPER.

MUT	MODULE TESTED	(MUT=MODULES	UNDER	TEST)
15	A			
14	8			
13	с			
12	D			

AS USUAL, A BIT SET MEANS THAT THAT MODULE WILL BE TESTED.

2. ERROR CONTROL MODE (ECM)

"ECM (0-4)? " -THE NUMBER ENTERED WILL AFFECT THE ACTION TAKEN UPON HITTING AN ERROR:

ECM	ACTION TAKEN
0	PRINT AN ERROR REPORT AND RETURN TO DTOS.
1	PRINT AN ERROR REPORT AND CONTINUE.
5	PRINT AN ERROR REPORT AND HALT.
3	PRINT AN ERROR REPORT AND GO TO PROGRAM MONITOR.
4	ENTER ERROR IN ERROR LOG AND CONTINUE.

ECM=2 IS ILLEGAL WHEN USING POWER SUPPLY VOLTAGE MARGINING. (SEE 8) 5.)

THE DEFAULT ECM IS 3. IF "4" IS ENTERED, THE USER MUST THEN SET THE LOG PRINT (LP) CONTROL FLAG: "PRINT ERROR LOG AT CONCLUSION (Y/N)? "

FOR FURTHER INFORMATION -- III.8)7., III.C)1., III.D) .

PAGE 4

3. SUPPLEMENTAL ERROR INFORMATION

"SUPPLEMENTAL ERROR INFORMATION (Y/N)? "

IF VES, THEN THE FAILURE ADDRESS, EXPECTED DATA, AND ACTUAL DATA ARE PRINTED IN ADDITION TO THE (DEFAULT) ERROR REPORT FORMAT. SEE III.C).

4. POWER SUPPLY VOLTAGES (PSV)

THE PROGRAM CAN EITHER RUN THE TESTS UNDER NOMINAL CONDITIONS OF UNDER MARGINAL CONDITIONS, TO RUN UNDER MARGINAL VOLTAGES, THE BACKPANEL PROGRAMMING PLUG MUST BE IN THE CORRECT POSITION.

THE USER ENTERS AN OCTAL BIT PATTERN AS FOLLOWS:

BIT SET	V38 (-5V)	VDD (+12V)	VCC (+5V)
15	-5.25	10.8	4.5

IF NO BITS ARE SET, THE TESTS WILL RUN UNDER NOMINAL VOLTAGES (WHICH IS THE DEFAULT CONDITION). OTHERWISE, THE TESTS WIL BE RUN UNDER EACH CHOSEN MARGINAL CONDITION.

EXAMPLES (OCTAL NUMBERS): 1= HI/LO/LO ONLY; 2= LO/MI/HI ONLY; 3= FIRST RUN WITH HI/LO/LO, SECOND RUN WITH LO/HI/HI; 0= Nominal voltages only.

PSV MAY NOT BE USED WHEN ECM=2 (MALT ON ERROR REPORT). THIS IS TO ASSURE THAT THE VOLTAGES ARE RETURNED TO NOMINAL LEVELS BEFORE ANY OTHER PROGRAM IS RUN. FOR THIS REASON, THE PROGRAM MONITOR'S "M" (HALT) COMMAND WILL BE REJECTED IF PSV>0.

PROGRAM USING SWITCH PACK), 'BREAK', OR HIT THE FRONT PANEL RESET SWITCH DURING ANY RUN WHERE VOLTAGES ARE BEING MARGINED. IF IT IS VITAL TO STOP THE PROGRAM DURING A PSV RUN, USE THE FOLLOWING SEQUENCE:

1)	CNTRL-C'S	PUTS YOU	IN THE PI	ROGRAM MONITOR.
2)	"A'I ABORT	S THE PROG	RAM, RET	URNS VOLTAGES TO
	NOMIN	AL LEVELS,	AND RET	URNS TO DTOS.
3)	"EXIT'S A D	TOS COMMAN	D WHICH I	HALTS THE MACHINE.

IF YOU RESET PSV=0 USING THE PROGRAM MONITOR DURING A PSV RUN, THE PROGRAM WILL SUBSEQUENTLY ALLOW YOU TO USE THE "" COMMAND. HOWEVER, THIS IS NOT ADVISABLE BECAUSE THIS WILL NOT RESET THE VOLTAGES TO THEIR NOMIMAL VOLTAGES. AS A GENERAL RULE, WHEN USING PSV, AND YOU WANT TO STOP THE PROGRAM, USE THE PROCEDURE OUTLINED ABOVE.

AS USUAL, IF AT ANY TIME AN ERROR IS ENCOUNTERED, THE Program will process it according to the present error control Mode.

10008 NMDU1

19 20

5. ERCC ENABLE

"ENABLE ERCC (Y/N)? "

TO CHECK THE ERCC BITS, ANSHER "Y", WITH ERCC ENABLED, THE ERCC LOGIC WILL COPY THE ERCC BITS (MEMIN 16-20) INTO DATA BITS 11-15.

IF ERCC IS ENABLED AND AN ERROR IS REPORTED IN BITS 11-15, THEN THE USER SHOULD TRANSLATE THAT TO MEAN THE ERCC BITS (1.E., BITS 16-20). TO RENIND MIM OF THIS, A WARNING MESSAGE WILL BE PRINTED ALONG WITH THE ERROR PRINTOUT, AND IF LOGGING ERRORS, BIT O OF THE TEST NAMES' BIT PATTERN WILL BE SET.

NOTE THAT AN ERCC ERROR IS TREATED JUST LIKE ANY OTHER ERROR WHICH WOULD RE DETECTED BY A TEST PATTERN.

"ECCC ENABLE" IS ONLY IMPLEMENTED AT THE BEGINNING OF THE PROGRAM (I.E., CHANGING THE CF'S VALUE IN THE PROGRAM Monitor wil have no Affect until the Next pass of the Program).

6. ERROR LOG

THE ERROR LOG CONSISTS OF A LIST OF 3-WORD BLOCKS THAT CONTAIN THE FOLLOWING INFORMATION:

WORD #	CONTENTS
1	BOARD, BANK, MODULE, BIT NUMBER
2	TEST NAMES' BIT PATTERN
3	FAILURE COUNT

THE FAILURE COUNT IS THE TOTAL NUMBER OF TIMES AN ERROR HAS OCCURRED UNDER ALL TESTS RUN FOR THE CHIP HHOSE LOCATION IS SPECIFIED IN WORD 1.

LOGGING AN ERROR ENTAILS THE FOLLOWING ACTIONS:

A/ ERROR'S CHIP LOCATION IN LOG?

R/ IF IT IS IN THE LOG, UPDATE THE TEST NAMES' BIT PATTERN, AND INCREMENT THE FAILURE COUNT.

C/ IF IT IS NOT IN THE LOG, CREATE A NEW NODE WITH ALL PERTIMENT INFORMATION ENTERED FOR THAT ERROR. UPDATE LOG.END POINTER. 4

IP AN ATTEMPT TO CREATE ANOTHER NODE WOULD OVERFLOW The LOG, then a warning message is issued, and the program monitor is entered.

FIGURE 2 IS AN EXAMPLE OF AN ERROR LOG PRINTOUT. SEE THE NOTES UNDER FIGURE 2 FOR MORE INFORMATION.

0009 NHOU1	PAGE 6	10010 NMDU1 01	
21	FAUL D	02	
5		03	3. END PROGRAM FORMAT
3	7. TEST PATTERNS	04	
) 4			
5	ENTER A BIT PATTERN TO DETERMINE WHAT TESTS ARE TO BE	. 05	
6	RUN. SEE TABLE 1 FOR TEST NAMES' BIT POSITIONS. A BIT SET	06	
7	MOULD MEAN THAT THAT TEST WILL BE RUN.	07	(MAKES SEN
e5		0.6	(MARES SEN
4	A NOTE ON THE OPTIONALLY AVAILABLE PATTERNS-	09	
0		10	4. SUPPLEMENTAL ERROR INFORMATION
1 .	GALLOPING PATTERN IS A VERY SLOW BUT COMPREMENSIVE TEST	11	4. SUPPLEMENTAL ERROR INFORMATION
5	PATTERN WHICH OFFERS STHONG TESTS FOR FAULTY ADDRESS DECODERS,	12	
3	ALL TYPES OF CELL INTERACTIVE COUPLING, SLOW ACCESS TIME, AND	13	1000500-11
4	CELL FUNCTIONALITY.	14	ADDNESS=
5		15	EXPECTED DATA=
6		16	ACTUAL DATAS
7		17	
4		18	THE SUPPLEMENTAL ERROR INFORMATION
9	C) ERRON REPORTING	19	REPORT FORMAT.
0	0	20	
1		21	
2	UPON MITTING AN ERROR, THE PROGRAM PRINTS OUT 1.	22	
3	2. IS PRINTED OUT AT THE END OF EACH BOARD. 3. IS PRINTED	23	D) PHOGRAM MONITOR
4	OUT AT THE END OF THE PROGRAM.	24	************
5		25	
6	IF THE SEI CF IS SET, 4. IS PRINTED ALONG WITH 1.	26	IN BOTH MANUAL AND AUTO MODES, AT
7		27	AT THE OCCURRENCE OF AN ERROR, AND AT THE
8	1. ERROR REPORT FORMAT	85	TTY IS TESTED FOR INPUT. IF A VALID SWITCH
9		29	ENTERED, IT IS THEN EXECUTED. IF NOT, A CH
)		30	PERFORMED. IF 'CNTRL-C' WAS TYPED, A SMALL
1		31	EXECUTED. A "++?" PROMPT SIGNALS THE USER
2	TEST NAME:	32	VALID COMMANDS LISTED IN TABLE 3. ILLEGAL
3	BOARD NUMBERS	33	EFFECTS.
4	MODULE	34	
5	6 ANK =	35	ONCE IN THE PROGRAM MONITOR, SWITC
6	017 NUMBER(S)=	36	ACCEPTED. FOR THIS REASON, IN ORDER TO GET
7		37	ERHOR LOG PRINTOUT, IT IS NECESSARY TO ENA
8	BE APPENDED TO THE ERROR REPORT FORMAT.	58	ENTERING THE PROGRAM MUNITOR (I.E., TYPE '
9		39	'P' OR 'D').
0		40	
1	2. NORMAL TERMINATION FORMAT	41	ANY CHANGES MADE IN THE PATS, PSV,
2		42	NOT TAKE EFFECT UNTIL THE NEXT BOARD (FOR
3		43	OR THE NEXT BANK (FOR BOARD 1).
4	TESTING COMPLETED	44.44	
5		45	
6	BOARD NUMBER=	46	
7	ADDRESS START=	47	IV. DESIGN HIGHLIGHTS
8	ADDRESS ENDS	48	325335555555555555555555555555555555555
9	RAM TYPES K	49	
0		50	A) ALL GALLOPING TEST PATTERNS WILL BE RUN
1	THE "ADDRESS START" REFERRED TO IN THE NORMAL TERMINATION	51	ROUTINE TO ACHIEVE THE GREATEST SPEED AND
5	REPORT IS THE BOARD STARTING ADDRESS. THE 'ADDRESS END' IS THE	52	TO ITS FULLEST.
3	BOARD ENDING ADDRESS.	53	
,		54	B) MEMORY SIZING WILL TAKE ADVANTAGE OF A
		55	ACCESSES TWO MEMORY LOCATIONS FAST ENOUGH
		56	INTERFERENCE. USE OF THE REAL TIME CLOCK W
		57	MEMORY SIZING ALGORITHM.

PAGE 7

NSE, HUH?)

IS PRINTED BETWEEN

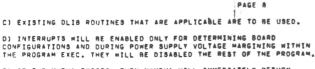
THE END OF EACH TEST, END OF EACH PASS, THE H PACK COMMAND WAS HECK FOR 'CNTRL=C' IS L "PROGRAM MONITOR" IS TO ENTER ONE OF THE L COMMANDS HAVE NO ILL

CH PACK COMMANDS ARE NOT T A HARD COPY OF THE ABLE SWREG'S BIT 5 BEFORE '5' BEFORE 'CNTRL-C' AND

OR ECCE CF'S WILL BOARDS 2 THRU LAST)

N USING A MICROCODE TO TEST THE MEMORY

MICROCODE ROUTINE THAT TO CAUSE MEMORY WILL COMPLETE THE MEMORY SIZING ALGORITHM.



E) IF THE MMPU1 EXISTS, THEN NAMDU1 WILL IMMEDIATELY RETURN TO DTOS. IN THIS CASE, IT IS NECESSARY TO RUN NAMDM.

V. KNOWN ANOMALIES

A) ROW AND BIT COLUMN RIPPLING

1/ A BAD CHIP MAY LOAD DOWN A SIGNAL (E.G., RAS OR CAS) SUFFICIENTLY TO CAUSE SOME OR ALL OF THE OTHER CHIPS IN THE SAME BANK-MODULE (I.E., NOW) OR BIT COLUMN TO GENERATE ERRORS. IN THE ERROR LOG, THE GENUINE BAD CHIP CAN BE SPOTTED AS THE ONE WITH THE MOBT ERRORS (A FAILURE COUNT IN THE THOUSANDS), WHILE THE GOOD CHIPS WOULD MAYE A FAILURE COUNT ONLY THE HUNDREDS. IF THIS OCCURS, REPLACI THE CHIP WITH THE MIGHEST NUMBER OF REPORTED ERRORS AND RERUN THE PROGRAM. IF ALL THE OTHER CHIPS WERE REALLY GOOD, THEN ALL THE RELATED ERRORS SHOULD DISAPPEAR.

2/ YOU RUN THE PROGRAM WITH ERROR REPORTING (AS WOULD BE THE CASE IN AUTO MODE). AN ERROR IS REPORTED, AND YOU REPLACE THE REPORTED CHIP. IF, AFTER REFUNNING THE PROGRAM, YOU STILL GET AN ERROR IN THE SAME ROW AND/OR THE SAME BIT COLUMN, THIS MAY BE THE DREADED "RIPPLIN(EFFECT. INSTEAD OF COMMITING SUICIDE, RETURN THE OFFENDED CHIP (WITH APPROPRIATE APOLOGIES) TO THE BOARD AND REFUN THE PROGRAM USING ERROR LOGGING, FOLLOWING THE PROCEDURE OUTLINED IN "1/".

3/ IF THE LOADING FROM THE GENUINE BAD CHIP IS SEVERE ENOUGH, IT CAN PULL A CRITICAL SIGNAL DOWN OR UP AND CAUSE ALL THE "GOOD" CHIPS IN THE SAME ROW AND/OR BIT COLUMN TO GENERATE AS MANY ERRORS AS THE BAD CHIP ITSELF. IN THIS CASE, YOU'RE DUT OF LUCCH, AND MUST RESORT TO EMULATING A BIRD (IN OTHER WORDS, THE "OL "MUNT AND PECK" METHOD).

B) IF YOU TYPE 'CNTRL-C' DURING AN ERROR REPORT WHEN ECM=3 (ENTER PROGRAM MONITOR UPON ERROR), WHEN IT COMES TIME TO 'EXIT PRÓGRAM MONITOR', YOU WILL HAVE TO ENTER THE 'E' COMMAND TWICE-ONCE FOR YOUR 'CNTRL-C' AND ANOTHER BECAUSE ECM=3.

TABLES AND FIGURES FOLLOW

10012 NHDU1

TABLE 11 TEST NAMES" HIT POSITIONS

			ESTIMATED
BIT POSITION	TEST NAME	MODE RUN	TEST TIME
	*******	********	********
15	MODIFIED DATA=ADDRESS	4	5 8EC
14	STUCK ADDRESS BIT	A	1 880
13	MARCHING 1/0	A	5 SEC
12	GALLOPING COLUMNS	A	15 SEC
11	GALLOPING ROWS	A	15 SEC
10	GALLOPING DIAGONAL	A	15 SEC
9	GALLOPING PATTERN	M	1 MIN

NOTES: 1/ ATAUTO: MEMANUAL

.....

2/ ALL ESTIMATED TEST TIMES ARE FOR 32K WORDS DF MEMORY.

3/ TEST TIMES LISTED ASSUME NO MEMORY ERRORS ARE DETECTED (1.e., IF THERE ARE ERRORS, AND ECM=A (ERRORS AEING LOGGED, NOT PRINTED), THEN THE TESTS WILL TAKE LONGER TO COMPLETE).

10011 NMOU1

10013 NMOU1		10014 NMDU1		
01	TABLE 2: CONTROL FLAGS' DEFAULT SETTINGS	01	TABLE 3: PROGRAM MONITO	R COMMANDS
02	8882853	50	******	
03		03		
04		04 COMM	AND (STANDS FOR) A	CTION TAKEN
05	PROGRAM OCTAL	05 ====		
06	DESCRIPTION OF CF CF VALUE DEFAULT	06		
07	***************************************	07 A	ABORT	ETURN TO DTOS
0.8		08 C	CLEAR	LEAR ERROR LOG
0.9	MODULES UNDER TEST HUT O ALL	09 D		PRINT & CLEAR ERROR LOG
10	ERROR CONTHOL MODE ECM O PHINT ERROR, RE	TURN TO DTO 10 E		RETURN TO MAIN PROGRAM
11	SUPPL, ERROR INFO. SEI O NONE.	11 F		PRINT CONTROL FLAGS
12	POWER SUPPLY VOLTAGES PSV 0 NOMINAL ONLY	12 н		PROGRAM HALTED
13	ECC ENABLE ECCE O NOT AVAIL./NOT			PRINT ERROR LOG
14	ERROR LOG PRINT LP 0 NO LOG PRINT 0			PRINT CF'S: INPUT NEW VALUES
15	PATTERNS TO BE RUN PATS 77 ALL EXCEPT GALP	AT 15 T	TERMINATE	TERMINATE THE CURRENT TEST,
16		16		AND RETURN TO THE
17		17		PROGRAM EXEC.
18	NOTES: 1/ CF=CONTROL FLAG	18		
19	• 5 # # #	19		
20	2/ THE DEFAULT PATTERNS ARE THE FIRST 6 PATTERNS LISTED			
21	LISTED IN TABLE 1.		S: 1/ AN ILLEGAL COMMAND WILL CAUSE	
22		55		MANDS THAT MAY
23	3/ "PROGRAM OCTAL VALUE" REFERS TO THE VALUE THE "CF"	23	BE ENTERED.	
24	WOULD CONTAIN TO IMPLEMENT THE DESCRIBED DEFAULT.			

10015 01 02 03 04	NMDU1	FIGURE 11 FAULT TYPES VS. MEMORY TEST PATTERNS	10016 NMDU1 01 02 03 06	FIGURE 2: ERROR LOG ONTPUT
05		TEST NAME I MAJOR FAULT TYPES TESTED	05	
06		IEGI KAME I MAJUK FAULI ITPEG IEGIEU Rurrengengengengen in Bergenkengen konstruktion and and and and and and and and and an	05	
07		MODIFIED D=A 1 1.2.8	07	
0.8			0.8	CHIP LOCATION TEST FAILURE
09		STUCK ADR, BIT 1 1.2	09	BOARD BANK MOD BIT NAMES COUNT
10			10	
11		MARCHING 1/0 1 2.8	11	
12			12	1 1 C 9 000140 360
13		GALLOPING COL. 1 4.5	13	1 I C 12 000140 360
14		***************************************	14	1 1 0 0 000140 32157
15		GALLOPING ROWS 1 3,5,7	15	1 0 A 6 20200 1 A 0 1
16			16	2 0 3 9 000040 64
17		GALLOPING DIAG. 1 3,4,6,7	17	2 0 8 10 000040 64
18			18	2 0 8 15 000040 64
19		GALLOP'G PATTERNI 1,2,3,4,6,7,8	19	
50		***************************************	50	
21			15	NATES AN APPAR NUMPERIE TO A DID RATERAL A STA OF MEANS
22		NEA 3	22	NOTES: 1/ 'TEST NAME(S)' IS A BIT PATTERN. A BIT SET MEANS That an error was occurred under the corresponding
23		R & Y 3 #8##	24	TEST LISTED IN TABLE 1 FOR THE SPECIFIED CHIP
25		5 8 A	25	LOCATION. (E.G., 418 BITS 10,15 => GALLOPING ROWS
56		1: FAULTY ADDRESS DECODING- WRONG CELL OR CHIP ACCESSED	26	AND MODIFIED DATA=ADDRESS, IF RUNNING THE MAPPED VERSION).
27		23 FAULTY ADDRESS DECODING- CELL INACCESSIBLE	27	BIT O SET MEANS THAT ERCC WAS ENABLED DURING TESTING.
28		3: INTERACTIVE COUPLING WITHIN ROWS	28	
29		A: INTERACTIVE COUPLING WITHIN COLUMNS	29	2/ THE TEST NAMES LISTED INDICATE UNDER WHAT
30		S: REFRESH SENSITIVITY	30	TESTS AN ERROR HAS OCCURRED IN THE WORD.
31		6: SLOW ACCESS TIME	31	
32		78 SENSE AMPLIFIER RECOVERY	35	3/ 'FAILURE COUNT' IS THE NUMBER OF TIMES AN ERROR HAS
33		8: CELL FUNCTIONALITY	33	OCCURRED AT THE SPECIFIED CHIP LOCATION.
			34 35	IF THE FAILURE COUNT=177777, THEN THERE WAS AN OVERFLOW In the failure count data word (I_E_, the number of errors
			36	FOR THAT CHIP WAS >=177777).
			37	ran inal chir and relitivity.
			38	4/ ALL NUMBERS ARE IN OCTAL.
			39	
			40	5/ TO GET A HARD COPY OF THE ENROR LOG PRINTOUT, IT IS
			41	NECESSARY TO SET SWREG'S BIT 5 BEFORE ENTERING THE
			42	PROGRAM MONITOR (UNLESS, OF COURSE, THE CONSOLE DEVICE IS
			43	A PRINTER OR TELETYPE); IF THE LOG IS TO BE PRINTED OUT
			44	ONLY AT THE CONCLUSION OF THE PROGRAM, SET BIT 5 ANYTIME
			45	DURING THE EXECUTION OF THE PROGRAM.
			46	
			47	6/ A 'GALLOPING PATTERN' FAILURE COUNT OF 1 SHOULD RE
			48	INTERPRETED AS A MARD ERROR. ("1" IS THE MAXIMUM FAILURE
			49	COUNT THAT GALPAT WILL GENERATE).

10017 V4DU1 01 02 05 04	FIGURE 3: MEMORY TOPOL 86888888	OGY, 4K NAMS
05	olf 15	BIT 0
0.6		********
37		1 1
9.8	10 400 376001 16 1 BANK 0	
99		
0	4. 4	
1	1. i 1374 377741	i i
3	****************	
4		
5	140000 774001	1 1
6	140004	
7	B BANK 1	8 8
A	140374 777741	8 8
9	*************	********
0		
1		
2		
3	*************	
4	11 401 374011	
5	15 I BANK O	
6		
7	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	
6 9	1375 377751	*********
9		*******
1	140001 774011	1 1
2	140005	1 1
3	I. I BANK I	1 1
4	140375 777751	1 1
9	***************	*********
6		
7	***************************************	
8		
9	***************	
0	12 402 374021	
1	16 1 BANK O	
5	1. 1	
3		
6	1376 377761	
5	**************	
5		1 1
7	140002 774021 140006 i	
8		
19	1. 1 GANK 1 140376 777761	
51		
2		

10018 NMDU1 ----...... 13 403 ... 374031 BANK 0 1. 1. ----------...... 140003... 774031 BANK 1 1. 140377... 777771 . 1 -1 -----********

> EACH BLOCK REPRESENTS & CHIP. THE NUMBERS WITHIN THE BLOCK DENOTE PHYSICAL ADORESSES.

THIS IS THE VIEW IF THE FRONT END (I.E., THE ONE WITH THE PINS) IS TOWARDS TOU. THE BANKS ALTERNATE; THE MODULES RUN BACK TO PRONT (A-D); THE BIT NUMBERS RUN RIGHT TO LEFT. IF THERE ARE ANY ERCC CHIPS, THEY WOULD BE APPENDED TO THE LEFT.

A 16K BOARD WOULD HAVE ONLY BANK 0. A 32K BOARD WOULD HAVE BOTH BANK G AND BANK 1.

> .ENDC .EJEC

		10002 06088		
0001 DGCFP	AUS ASSEMBLER REV 02.02 13:39:03 12/28/78	01	:1.9	PROGRAM
1		0 2	1	
		03	1	DGCFP.Tx 097-001130
		04	1	UGCFP.SR 094-001533
		05	1	DGCFP.SV 095-001130
		06	:	DGCFP.LS 096-001130
		07	1	
	; * * * * * * * * * * * * * * * * * * *	08	15.0	REVISION HISTORY
	\$	09	\$	
	I NAME: DGCFP,TX PART NUMBER: 097-001130	10	7	DATE REVISION
	3	11	:	
	T	12	1	12/27/78 00
	: DESCRIPTION: DGC NOVA FLOATING POINT TEST PROGRAM	13	3	
	2	14	13.0	MACHINE REGUINEMENTS
	8	15	2	
	1 REVISION HISTORY:	16	7	1. DGC NOVA IV CENTRAL PROCESSOR
	3	17	3	S. FIXED POINT MULTIPLY/DIVIDE OPTION
	I REV. DATE	18	1	5. AK WORDS READINRITE MEMORY
	:	19	1	4. DGC NOVA FLOATING POINT PROCESSOR
	12/27/78	20	1	5. BASIC I/O TTY INTERFACE AND CONTROL
	3	21	1	
	1	55	:4.0	SUMMARY
	; COPYRIGHT 🔘 DATA GENERAL CORPORATION, 1978	53	1	
	: ALL RIGHTS RESERVED.	24	1	THIS PROGRAM IS A FUNCTIONAL TEST OF ALL OPERATIONS
	: LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION.	25	1	PERFORMED BY THE DGC NOVA FLOATING POINT ARITHMETIC
	3	56	7	UNIT. IT IS MADE UP OF MANY SUNTESTS WHICH INCHEAS
	;	27	1	IN COMPLEXITY FROM SIMPLE STATUS AND INTERRUPT TEST
		85	1	THROUGH EXERCISENS OF ARITHMETIC OPERATIONS USING
		29	8	RANDOM NUMBERS AND SOFTWARF SIMULATORS.
		30	3	
		31	:5.0	OPERATING PROCEDURE
		32	1	
		33	1	THIS PROGRAM MAY BE RUN STAND-ALONE OR UNDER A DIOS
		34	1	OR DODS OPERATING SYSTEM. THE TEST STARTS AT ADDRES
		35	1	200 (OCTAL), PHINTS OUT THE PROGRAM TITLE, AND AT
		36	7	THE CONCLUSION OF EACH PASS PRINTS THE NUMBER OF PASSES COMPLETED. THE STANDARD DIOS SWITCHES ARE
		37	7	USED TO ENABLE LOOPING ON EPHOR, PRINTING THE ERADA
		38	1	
	NYFLTY	39	7	SUMMARY REPORT, ETC. AS DESCRIPED IN SECTION 8.0. Cat/kitten may be used if a disk or 1/0 tester
		40	T	IS AVAILABLE. FORON PRINTOUTS ARE DESCIBED IN
		41	T	SECTION 6.0 AND THE URDER OF TESTING IS DESCRIBED
		42	T	IN SECTION 7.0.
	a	43	T	In SECTION 1979
		44	1	EDDOD DESCRIPTION
		45	15.0	ERROR DESCRIPTION
		46	3	EACH POSSIBLE ERROR IN THIS TEST HAS BEEN GIVEN A
		47	1	UNIQUE ERROR HUMAER, AND A RECORD OF ALL FAILURES
		48	7	ENCOUNTERED IS MAINTAINED BY THE ERROR HANDLER
		49	T	SUBROUTINE. THIS ALLOWS OVERNIGHT RUNS OF THE TEST
		50	7	NITH LOOPING ON ERROP AND PRINT DISABLED WHILE
		51	T	STILL INDICATING WHICH SUBTESTS, IF ANY, FAILED
		52	T	THROUGH A SUMMARY REPORT THE NEXT MORNING. THIS
		53	T	RECORD IS CLEARED WHEN THE TEST IS RESTARTED OF
		54	I I	WHEN SWITCH 7 IS TURNED ON AND A SUMMARY REPORT
		55	1	
		56	7	REQUESTED. EITHER THE FIRST TIME THAT AN ERROR
		57	:	IS ENCOUNTERED OR WHENEVER SWITCH & IS ON, IF THE
		58	1	CONSOLE AUDIOR LINE PRINTER ARE ENABLED A DETAILED
		50		FRAGE REPORT WILL BE PRIMIED IN THE FOLLOWING

:

FORMATI

ERROR REPORT HILL AF PRIMTED IN THE FOLLOWING

0003	NGCEP					0004	NGCEP					
01		*				01		: 4.1	SHITCH	OPTIONS		
02		1	ERRON NUMBE	R XXX ENCOUNTERED SURT	EST XXX	50		1			AND THET	N INTERPRETATION AT LOCATION
03			CRY ACO		PC	03					HLLOWS:	
04				XXX XXXXXX XXXXXX XXXXXX		04		;	0			
05		1				05			HIT	OCTAL	GINAHY	INERPRETATION
06		1	REFERENCE I	N THE LISTING TO THE SUNTEST	AND ERROR	06		1		VALUE	VALUE	
07		1		CATED WILL EXPLAIN EXACTLY MM		07		1				
08		7		D AND THE MEANING OF THE ACCU		08		1	1		0	LOOP ON ERROR
09				IN CASES WHERE FLOATING POINT		09		1		40000	1	SKIP LUOPING ON ERROR
10		7	CALCULATION	S ARE REING MADE, AN ADDITION	AL PRINTOUT	10		7				
11		1	MAY BE PROV	IDED. GIVING THE FULL FLOATIN	GPOINT	11			s		0	PRINT TO CONSCLE
12		7	NUMBERS CON	CERNED IN HEX FORMAT. IN THO	SE CASES	12		1		20000	1	ABORT PRINT OUT TO CONSCLE
13		3	WHERE RANDO	M NUMBERS ARE USED AS OPERAND	S, THESE	13		:				
14		1	OPERANDS WI	LL ALSO BE PRINTED. AN EXAMP	LE OF ONE	14		:	3		0	DO NOT PRINT & FAILURE
15		;	OF THESE PR	INTOUTS FOLLOWS:		15		1		10000	1	PRINT & FAILURE
16		;				16		1				
17		1	FLOATING PO	INT DATA IN HEX FORMAT FOLLOW	S 1	17		7	4		0	ALLOW END OF PASS PRINT OUT
18		1			MANT	18		:		04000	1	SUPPRESS END OF PASS PRINT OUT
19		3	OPERAND A	X XX XXXXXX OPERAND R X XX	XXXXXX	19		t				
20		3	EXP. RESULT	* ** ****** ACT. RESULT * **	XXXXXX	50		:	5		0	DO NOT PHINT ON THE LINE PRINTER
21		3				21		1		02000	1	PRINT ON THE LINE PRINTER
55		:7.0	TEST DESCRI	PTION		22		T				
23		:				53		1	6		0	DO NOT HALT ON ERROR
24		3	THIS PROGRA	M IS DESIGNED TO PROCEED FROM	VERY SIMPLE	24		7		01000	1	HALT ON ERROR
25		:	TESTS OF ST	ATUS AND REGISTERS THROUGH MC	RE AND MORE	25		1				
26		7	COMPLEX OPE	RATIONS UNTIL ALL FUNCTIONS H	AVE REEN	26		*	7		0	DU NOT PRINT SUMMARY AND/OR
27	~~,	1	CHECKFD. T	HE OPERATIONS CHECKED BY VARI	DUS TESTS	27		1				PASSING OF EACH SUBTEST
85		1		D BELOW. ALL TEST NUMBERS AR		28		1		00400	1	PRINT SUMMARY AND/OR
29		1		EAR IN THE LISTING.		29		1				PASSING OF EACH SUBTEST
30						30		1	8		0	PRINT ONLY THE FIRST ERROR
31			TESTS	FUNCTIONS CHECKED		31		1		00200	1	PRINT EVERY ERROR
32						32						
33		7				33		18.2	SWITCH	COMMANDS		
34		1	1-10	READ & WRITE STATUS, INT	ERRUPTS	34		1	ONCE TH	E PROGRA	M STARTS	EXECUTING THE STATE OF ANY OF
35		1	11-21	CLEAR, LOAD EXP., READ H		35		1	THE BIT	S CAN BE	CHANGED	BY HITTING KEYS 1-9, A-F. THE
36		3	22-23	STORE FPAC		36		3	PROGRAM	WILL CO	NTINUE R	UNNING AFTER UPPATING THE OPTIONS.
37		3	24-26	LOAD FPAC		37		1	EACH KE	Y WILL C	OMPLEMEN	IT THE STATE OF THE BIT AFFILIAT-
38		7	27-30	COPY FPAC -> TEMP, TEMP	-> FPAC	38		1				CAN HE ALTERED MY HITTING KEY 4.
39		1	31	NEGATE, ABSOLUTE VALUE		39		1				OCATION "SWREG" WILL SET BIT 0.
40		7	32-50	NORMALIZE		40		7				D AS ALL BITS OF SWREG SET TO 0)
41			51-73	SCALE, CHECK GUARD DIGIT		41		1	THE PRO	GRAM CAN	HE LOCK	ED INTO SWITCH MODIFICATION MODE
42		8	74-104	ADD SINGLE AND DOUBLE		42		1				CASE MORE THAN ONE BIT CAN BE
43		1	105-111	SURTRACT SINGLE AND DOUR	LE	43		1	CHANGED	BEFORE	CONTROL	, IS ALLOWED TO RETURN TO THE
44		:	112-121	MULTIPLY SINGLE AND DOUP	LE	44		3	MAIN PR	OGRAM.		
45		:	122-131	DIVIDE SINGLE AND DOUBLE		45		1				
46		;				46		:8.2.1	OTHER C	OMMANDS		
47						47		1				
48						48		3	"C×"			BE TYPED TO CONTINUE THE PROGRAM
49		18.	SWITCH SETT	INGS		49		2		AFTER	ITS LOCKE	ED IN A SWITCH MODIFICATION MODE
50		1				50		1				
51		3	LOCATION "S	WREG" IS USED TO SELECT THE P	ROGRAM OPTIONS	51		1	°D			IVEN AT ANY TIME WILL RESET "SMREG"
52		,		CONFIGURATION). WHILE RUNNIN		52		Ŧ		TO DEF	ULT MODE	AND RESTART THE PROGRAM.
53		1		ON WILL BE LOADED BY THE MONI		53		7				
54		1		ER STAND ALONE AND PROGRAM LO		54		:	* R	THIS CO	DEMAND GI	IVEN AT ANY TIME FILL RESTART THE
55		1		LL BE SET ACCORDING TO THE AN		55		3		PROGRAM	A. SWITCH	ES ARE LEFT WITH THE VALUES THEY
56		1		ATOR. IN ANY CASE THE OPTIONS		56		1		HAD HE	ORE THE	COMMAND HAS ISSUED.
57				BY USING ONE OF THE COMMANDS		57		1				
58			8.2			58		1	^ 0	THIS CO	MMAND GI	IVEN AT ANY TIME HILL CAUSE THE
59			··· • E			59		1				TO GO TO ODT (NOTE: THIS IS AN
59		1				60				OPTION	L COMMAN	ND AND IS AVAILBLE UNLY IF
60		1										

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0005	NGCEP			0006 0	GCEP			
01		1	ODTPK IS PRESENT)	01		1	.+"ADH"	ADD "ADR" TO THE POINTER, OPEN THE CELL
50		\$		50		1		AND PRINT ITS CONTENTS.
03		3	M THIS COMMAND GIVEN AT ANY TIME WILL PRINT THE	03		T	"ADR"	
04		2	CURRENT OPERATING MODES.	04		2		THE CELL AND PRINT ITS CONTENTS.
05 06		7		05		3	"CR"	THE HETURN KEY IS USED TO CLOSE THE OPEN CELL
07		;		06		1	"LF"	WITH OR WITHOUT MODIFICATION. Line fefd is used to close the open cell with or
08		•		0.0		1	C. C	WITHOUT MODIFICATION AND TO OPEN THE SUCCEEDING
09		:9.	OCTAL DEHUG TOOL (ODT)	09		2		CELL.
10		3		10		1	•	CLUSE THE OPEN CELL WITH OR WITHOUT HODIFICATION
11		:	THE DIAGNOSTIC IS EQUIPED WITH A RUILT IN ODT WHICH CAN	11		1		AND OPEN THE PRECEDING CELL
12		1	BE ACCESSED BY HITTING CONTROL ((*O) AT ANY TIPE DURING	12		2	/	CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
13		7.	THE EXECUTION OF THE PROGRAM (AFTER SETTING THE PARA-	13		7		OPEN THE CELL POINTED TO BY ITS CONTENTS.
15		7	METERS). On entering odt the address of the location having the	14		1	+"ADR"/	CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
16			NEXT INSTRUCTION TO BE EXECUTED WILL BE TYPED-OUT.	15		7		OPEN THE CELL POINTED TO BY ITS CONTENTS + "ADDR". CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
17		:	HEAT INGINOCITOR TO BE EXECUTED FILE BE THEDECOID	16 17		*		OPEN THE CELL POINTED TO BY ITS CONTENTS - "ADR".
18		19.1	CONVENTIONS AND SYMBOLS	18		:		
19		3	THE FOLLOWING CONVENTIONS ARE USED BY THE DDT:	19		19.1.2	MODIFIC	ATION OF A CELL
50		2	? PRESSING ANY ILLEGAL KEY CAUSES THE OUT TO RES-	20		1		CELL MAS REEN OPLNED ITS CONTENTS CAN BE MODIFIED
21		1	POND WITH A "?".	21		1		NG THE NEW VALUE THE CELL IS TO CONTAIN IN THE
55		2	a) OOT IS READY AND AT YOUR SERVICE.	55		3		AN OCTAL EXPRESSION FOLLOWED BY "CR" OR "LF".
23		19.2	COMMAND STRUCTURE	23		1		OR - IS TYPED AS THE FIRST CHARACTER OF THE EX- N THEN THE VALUE OF THE EXPRESSION IS ACDED TO OP
25		\$ 7 + C	AN ODT COMMAND HAS THE FOLLOWING FORMAT:	24				TED FROM THE OLD CONTENTS OF THE CELL. THE
26		2	(ARGUMENT) (COMMAND)	56		2		ITSELF OR AN EXPRESION RELATIVE TO THE ADDRESS
27		1	AN ARGUMENT MAY BE ONE OF THE FOLLOWING:	27		1		DEPOSITED BY TYPING A "." OR ".+/-OCTAL EXPRESS-
28		8	"EXP" AN OCTAL EXPRESSION CONSISTING OF OCTAL NUMBERS	85		7	ION". A	RUNQUE COMMAND GIVEN RIGHT AFTER OPENING & CELL
29		:	SEPARATED BY PLUS (+) OR MINUS (-) SIGNS. LEAD-	29		2		THE MODIFICATION OF ITS CONTENTS AS IF THEY WERE
30		3	ING ZEROS NEED NOT BE TYPED.	30		2	TYPED I	N JUST BEFORE THE COMMAND WAS ISSUED.
31		;	"ADR" AN ADDRESS IS THE SAME AS AN EXPRESSION EXCEPT	31		1		
32		1	THAT BIT O IS NEGLECTED. A COMMAND IS A SINGLE TELETYPE CHARACTER	32		19.3.3		DT CUMMANDS
33		7	A CUMMANU 13 A DINGLE PELETTE CHARACTER	33		1	NUNUUI	THIS KEY IS USED TO DELETE ERRONEOUSLY TYPED Digits. EACH time the key is pressed the right most
34 35		19.3	ODT COMMANDS	34		1		DIGIT IS DELETED AND ECHOED ON THE TERMINAL. IF
36		1	THE LOCATIONS THAT CAN BE EXAMINED AND MODIFIED BY THE	36		:		THE RUBOUT KEY IS PRESSED RIGHT AFTER OPENING A
37		2	USER ARE CALLED CELLS. THESE CELLS ARE OF THO TYPES:	37				CELL THEN IT DELETES THE RIGHT MOST DIGIT OF THE CELLS
38		3	INTERNAL CPU CELLS AND MEMORY LOCATIONS.	38		*		CONTENTS. THIS ALLOWS THE MODIFICATION OF THE CELL
39		1		39		1		AS IF ITS CONTENTS WERF TYPED IN JUST BEFORE THE
40		:9.3.1	OPENING INTERNAL CELLS	40		1		KEY WAS PRESSED.
41		3	THE COMMAND TO OPEN ONE OF THE INTERNAL REGISTERS IS OF	41		1	"ADR"8	INSEPT A BREAK POINT AT LOCATION "ADA".
42		7	THE FORM "NA" WHERE N IS ANY OCTAL EXPRESSION HETWEEN	42		\$		ONLY ONE HREAK POINT CAN RE INSERTED AND ANY ENTRY TO ODT AFTER EXECUTING A RREAK POINT WILL
43		1	0 AND 7 0-3 FOR ACCIMULATORS 0-3	43		2		CAUSE IT TO BE DELETED.
45		7	4 FOR PC OF THE NEXT INSTRUCTION TO BE EXECUTED IN	44 45		1	0	DELETE THE BREAK POINT IF ANY.
46		*	THE EVENT OF A "P" COMMAND.	46			P	RESTART THE EXECUTION OF THE PROGRAM AT LOCATION
47		,	5 CPU AND TTO STATUS	47				POINTED BY 44.
48		1	AIT INTERPRETATION	48		1	"ADR"R	START EXECUTING THE PROGRAM AT "ADR" AFTER AN
49		1	15 STATUS OF TTO DONE FLAG	49		1		IO-RFSET.
50		2	14 STATUS OF INTERRUPTS (ION FLAG)	50		1	ĸ	KILL THE STRING TYPED SO FAR. THE ODT RESPONDS
51		2	13 STATUS OF CARRY RIT	51		1		WITH A "?" AND THE OPEN CELL IS CLOSED WITHOUT
52		2	6 ADDRESS OF THE LOCATION HAVING THE BREAK POINT (IF	52		1	-	MUDIFICATION. Print the octal value of the input only.
53		1	ANY) 7 INSTRUCTION AT THE BREAK PUINT LOCATION	53 54		1	=	THIS WILL CLOSE ANY OPEN CELLS WITHOUT
54 55		2	1 INDIKICION KI INC DASKK POINT COCATION	55				HODIFICATION AND WILL NOT OPEN A CELL
56			OTHER COMMANDS TO OPEN CELLS ARE:	56				
57			Aller an course is aller assessments	57		1		
58		1	"ADR"/ OPEN THE CELL AND PRINT ITS CONTENTS	58		1	NOTE:	IN PROGRAMS WHICH RELOCATE THEMSELVES THE
59		1	./ OPEN THE CELL CURRENTLY POINTED TO BY THE POINTER	59		1		THE USER SHOULD PLACE HREAK POINTS ONLY IN THE
60		2	AND PRINT ITS CONTENTS.	60		1		THE ORIGINAL PROGRAM AREA, IF A BREAK POINT IS

0001 V4MP0	MACRO REV 06.30 00:12:43 12/22/78	10002 M4MPD	
01		01	
50		50	INAMPDIAG-NOVAA MMPH DIAGNOSTIC
03		03	
04		0.4	THIS DIAGNOSTIC IS DESIGNED TO RUN IN AN
05		05	TAUTO-LOAD ANTO-RIN ENVIRONMENT.
06		06	
07	;**************************************	07	110. REVISION MISTURY
08	2	0.8	18 REV. 00 WAS CREATED FROM REV 03 OF N3MMPU.
09	S NAMES NAMPOIAG. TX PART NUMBERS 097-001131	09	SLIGHT MODIFICATIONS WERE NECESSARY TO RUN
30	3	10	TE ON THE NOVA 4.
11	1	11	2 8
12	2 DESCRIPTION: NOVA 4 MMPU DIAGNOSTIC	12	11.0 ANSTHACT
13	1	13	THIS TEST IS
- 14	7	14	DESIGNED TO VERIFY THE OPERATION OF THE
15	1 REVISION HISTORY:	15	S MEMORY MANAGEMENT UNIT (MMU) FEATURE.
16	5	16	THIS PROGRAM IS A PREREAUSITE TO THE
17	S REV. DATE	17	MULTIPROGRAMMING RELIAPILITY TEST PROGRAM.
18	2	1.8	2
19	2 00 12/29/78	19	12.0 MACHINE REQUIREMENTS
20	1	20	2.1 YOVA & PROCESSOR WITH MMU OPTION.
21	1	21	2 2.2 BK OF READ/WRITE MEMORY.
25	1 COPYRIGHT (C) DATA GENERAL CORPORATION, 1978	22	2.3 TTY OF CRT
23	ALL RIGHTS RESERVED.	23	2 2 4 RTC (OPTIONAL)
24		24	\$ 2.5 I/O TESTER (OPTIONAL)
25		25	: 2.6 FLOATING POINT UNIT(OPTIONAL)
26		26	
27		27	13.0 OPERATING PROCEDURE
		85	I 3.1 LOADING
		29	: LOAD PROGRAM VIA THE BINARY LOADER.
		30	1 3.2 START ADDRESS
		31	TYPE 200R ON CONSOLE.
		32	PRESS NEW-LINE.
		33	THE PROGRAM STARTS BY PRINTING OUT THE

35

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37

38

39

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NYMMPU

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ER. THE PROGRAM STARTS BY PRINTING OUT THE 1 PROGRAM NAME AND REVISION NUMBER. IT . THEN INFORMS THE OPERATOR OF THE EXISTENCE 1 OF THE RTC. I/O TESTER, AND FPU. THIS IS FOLLOWED 3 BY THE MEMORY SIZE INFORMATION BOTH WITHOUT AND . WITH THE MAP FEATURE BEING USED. .

77

0.5 NAMPD					0004 14480	1		
<i>a</i>		S?WPD 3.3			01	. 13.5.2.	2.1	OTHER COMMANDS
					50	3		
					03	1	"CR"	A "RETURN" CAN HE TYPED TO CONTINUE THE PROGRAM
	13.3.	SWITCH SETTING	.3		0.4	1		AFTER ITS LOCKED IN A SWITCH MODIFICATION MODE
	7	COCATTON BOND		APA TA API CAT THE BRAADAN ARTIANA	05	1	**	THE POWER PICK AT ANY TIME WILL DERET READER
	T .			SED TO SELECT THE PROGRAM OPTIONS	06	1	^ D	THIS COMMAND GIVEN AT ANY TIME WILL RESET "SWREG"
	5			TION), WHILE RUNNING UNDER DTOS,	07	1		TO DEFAULT MODE AND RESTART THE PROGRAM.
	7			LOADED BY THE MONITOR. Lone and program load modes this	08	2	ňų.	THIS COMMAND GIVEN AT ANY TIME WILL RESTART THE
	*			ACCORDING TO THE ANSWERS SUPPLIED	10		-	PROGRAM, SWITCHES ARE LEFT WITH THE VALUES THEY
	1			NY CASE THE OPTIONS CAN BE CHANGED	11	1		HAD REFORE THE COMMAND WAS ISSUED.
	1			ONE OF THE COMMANDS GIVEN IN SEC.	12	3		
		5.3.2			13	1	^ n	THIS COMMAND GIVEN AT ANY TIME WILL CAUSE THE
	1				14	\$		PROGRAM CONTROL TO GO TO ODT (NOTE: THIS IS AN
	3				15	3		OPTIONAL COMMAND AND IS AVAILBLE ONLY IF
	13.3.1	SWITCH OPTIONS			16	3		ODTPK IS PRESENT)
	1			EIR INTERPRETATION AT LOCATION	17	1		
	8	"SWREG" IS AS	FOLLOWS:	i -	18	3	м	THIS COMMAND GIVEN AT ANY TIME WILL PRINT THE
	\$				19	1		CURRENT OPERATING MODES.
	3	BIT OCTAL		Y INERPRETATION	20	1		
	1	VALUE	VALUE		21	-		
	1	4	0		55	T .	3.3	KEY ENTERED OPTIONS
	1	1 40000		LOOP ON ERROR Skip Looping on Error	23		3.3	KET ENIERED OFIIONS
	1	40000	1	SKIP LOOPING ON ENNON	24 25	3		KEY 1 (0) = LOOP ON ERROR
	1	2	0	PRINT TO CONSOLE	26	*		KEY 1 (1) = PROCEED FROM ERROR
	7	20000	•	ABORT PRINT OUT TO CONSOLE	27	· •		KEY 2 (1) = INHIBIT PRINTOUT
	7		*	BODEL LETUE AAL IA AALAADE	28			KEY 3 (1) # PRINT FAILURE RATE
	9	3	0	DO NOT PRINT % FAILURE	29	1		KEY 4 (1) # DELETE PRINT OF "PASS XX"MESSAGE
	1	10000	•	PRINT & FAILURE	30	1		KEY 5 (1) = OPTIONAL LINE PRINTER OUTPUT
	1		•		31	1		KEY 6 (1) = HALT ON ERROR
	1	4	0	ALLOW END OF PASS PRINT OUT	32	2		
	1	04000	1	SUPPRESS END OF PASS PRINT OUT	33	1		KEY M = PRINT CONTENTS OF SWREG
	1				34	1		
	1	5	0	DO NOT PRINT ON THE LINE PRINTER	35	1		KEY (C)D = SET SWREG TO DEFAULT MODE AND
	2	00050	1.	PRINT ON THE LINE PRINTER	36	1		RESTART PROGRAM.
	2		-	AAAAA	37	1		
	1	6	0	DO NOT HALT ON ERROR	38	1		KEY (C)R = RESTART PROGRAM WITH CURRENT OPTIONS.
	8	01000	1	HALT ON ERROR	39	1		IF THE SYSTEM DOESN'T CONTAIN A TERMINAL/TTY THEN
	3	-	•		40	1		OPTIONS MAY RE SELECTED BY PATCHING INTO LOCATION
	\$	7	0	DO NOT PRINT SUMMARY AND/OR	41	1		"SWREG".
	\$	00/00	4	PASSING OF EACH SUBTEST	42	3	7 A	
	1	00400	1	PRINT SUMMARY AND/OR Passing of Each subtest	43	3	3.4	NORMAL OPERATION Program will execute all tests in sequence
	3	8	0	PRINT ONLY THE FIRST ERROR	44	3		AND AUTOMATICALLY LOOP.
	1		1	PRINT EVERY ERROR	45	7		IF A DEVICE IS FOUND TO NOT EXIST THE
	1	10 V E V V	1	ANTEL CACUL CHARM	47	ž .		TEST USING THIS DEVICE WILL BE RAPASSED.
	41.1.2	SWITCH COMMAND	~ *		48			A MESSAGE "PASS " WILL BE PRINTED AT THE
	130300			IS EXECUTING THE STATE OF ANY OF	49			END OF EACH SUCESSFUL PASS IF OPTION 4
	*			ED BY HITTING KEYS 1-9, A-F. THE	50			IS NOT SELECTED.
				RUNNING AFTER UPDATING THE OPTIONS.	51	1		to were action to a
				ENT THE STATE OF THE BIT AFFILIAT-	52	,		
	*			CAN BE ALTERED BY HITTING KEY 4.	53			
	1			LOCATION "SWREG" WILL SET BIT 0.	54		07010	D 3,5
	1			VED AS ALL RITS OF SWREG SET TO 0)	55			
	1			CKED INTO SWITCH MODIFICATION MODE	56	13.5.	OCTAL	L DERUG TOOL (ODT)
	1			CH CASE MORE THAN ONE BIT CAN BE	57	1		
	1			DL IS ALLOWED TO RETURN TO THE	5 A	1		DIAGNOSTIC IS EQUIPED WITH A RUILT IN ODT WHICH CAN
	3	MAIN PROGRAM.			59	2		CCESSED BY HITTING CONTROL O ("") AT ANY TIME DURING
					6.0	*	THE EF	EXECUTION OF THE PROGRAM (AFTER SETTING THE PARA-

0005 N44PD			0006 N4MPD		
01	7	METERS).	01	\$ +*ADH*/	CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
2	1	ON ENTERING OUT THE ADDRESS OF THE LOCATION HAVING THE	50	1	OPEN THE CELL POINTED TO BY ITS CONTENTS + "ADDR".
3	1	NEXT INSTRUCTION TO BE EXECUTED WILL BE TYPED-OUT.	0.3	* -*AUR*/	CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
4	1		04	1	UPEN THE CELL POINTED TO BY ITS CONTENTS - "ADR".
5	13.5.1	CONVENTIONS AND SYMBOLS	05	1	
5	2	THE FOLLOWING CONVENTIONS ARE USED BY THE ODT:	06	13.5.3.2	MODIFICATION OF A CELL
7	2	PRESSING ANY ILLEGAL KEY CAUSES THE ODT TO RES-	07	S ONCE A	CELL MAS REEN OPENED ITS CONTENTS CAN BE MODIFIED
A	F	POND WITH A "?".	0.8	3 HY TYPE	NG THE NEW VALUE THE CELL IS TO CONTAIN IN THE
9	1	ODT IS READY AND AT YOUR SERVICE.	0.9		AN OCTAL EXPRESSION FOLLOWED BY "CP" OR "LF".
0	1		10	I IFA+	OR - IS TYPED AS THE FIRST CHARACTER OF THE EX-
1	:3.5.2	COMMAND STRUCTURE	11	I PRESSIO	N THEN THE VALUE OF THE EXPRESSION IS ADDED TO OR
5	7	AN ODT COMMAND HAS THE FOLLOWING FORMATS	12	SUNTRAC	TED FHOM THE ULD CONTENTS OF THE CELL. THE
3	1	[ARGUMENT] [COMMAND]	15	a ADDRESS	ITSELF OR AN EXPRESION RELATIVE TO THE ADDRESS
4	1	AN ARGUMENT MAY BE ONE OF THE FOLLOWINGS	14	S CAN HE	DEPOSITED BY TYPING A "." OR ".+/-OCTAL EXPRESS-
5	1	"EXP" AN OCTAL EXPRESSION CONSISTING OF OCTAL NUMBERS	15	1 ION". A	RIHOUT COMMAND GIVEN RIGHT AFTER OPENING & CELL
	1	SEPARATED BY PLUS (+) OR MINUS (-) SIGNS. LEAD-	16	1 ALLOWS	THE MODIFICATION OF ITS CONTENTS AS IF THEY WERE
7 -	1	ING ZEROS NEED NOT RE TYPED.	17	I TYPED I	N JUST REFORE THE COMMAND WAS ISSUED.
8	1	"ADR" AN ADDRESS IS THE SAME AS AN EXPRESSION EXCEPT	18	1	
,	1	THAT BIT O IS NEGLECTED.	19	13.5.3.3	OTHER ODT COMMANDS
)	1	A COMMAND IS A SINGLE TELETYPE CHARACTER	20		THIS KEY IS USED TO DELETE ERRONEOUSLY TYPED
			21	1	DIGITS. EACH TIME THE KEY IS PRESSED THE RIGHT MOST
	13.5.3	ODT COMMANDS	22		DIGIT IS DELETED AND ECHOED ON THE TERMINAL. IF
3		THE LOCATIONS THAT CAN BE EXAMINED AND MODIFIED BY THE	23		THE RUBOUT KEY IS PRESSED RIGHT AFTER OPENING A
4		USER ARE CALLED CELLS. THESE CELLS ARE OF TWO TYPES:	24		CELL THEN IT DELETES THE RIGHT MOST DIGIT OF THE CE
5		INTERNAL CPU CELLS AND MEMORY LOCATIONS.	25	:	CONTENTS. THIS ALLOWS THE MODIFICATION OF THE CELL
		THEFT FOR CEEPS AND WENGER FOCHTIONS			AS IF ITS CONTENTS WERE TYPED IN JUST REFORE THE
	13.5.3	OPENING INTERNAL CELLS	26		KEY WAS PRESSED.
7	\$ 3 6 7 6 3	THE COMMAND TO OPEN ONE OF THE INTERNAL REGISTERS IS OF	27 28	* ****	INSERT A BREAK POINT AT LOCATION "ADR".
8		THE FORM "NA" WHERE N IS ANY OCTAL EXPRESSION BETWEEN	29	a mon o	ONLY ONE HREAK POINT CAN BE INSERTED AND ANY
9		0 AND 7	30		ENTRY TO ODT AFTER EXECUTING & PREAK POINT WILL
0		0-3 FOR ACCUMULATORS 0-3			CAUSE IT TO BE DELETED.
1	1		31	5 D	DELETE THE BREAK POINT IF ANY.
S	1	4 FOR PC OF THE NEXT INSTRUCTION TO BE EXECUTED IN The event of a "P" command.	35	3 U 3 P	RESTART THE EXECUTION OF THE PROGRAM AT LOCATION
3	1	5 CPU AND TTO STATUS	33 34		POINTED BY 44.
4	1	BIT INTERPRETATION		1 140050	START EXECUTING THE PROGRAM AT "ADR" AFTER AN
5	1		35	- AUH H	IO-RESET.
6			36	1	KILL THE STRING TYPED SO FAR. THE ODT RESPONDS
7		14 STATUS OF INTERRUPTS (ION FLAG)	37	1 K	
8	3	13 STATUS OF CARRY BIT	38	3	WITH A "?" AND THE OPEN CELL IS CLOSED WITHOUT
9	2	6 ADDRESS OF THE LOCATION HAVING THE BREAK POINT (IF	39	8	MODIFICATION.
	1	ANY)	40	1 =	PRINT THE OCTAL VALUE OF THE INPUT ONLY.
	3	7 INSTRUCTION AT THE BREAK POINT LOCATION	41	1	THIS WILL CLOSE ANY OPEN CELLS WITHOUT
2			42	8	MODIFICATION AND WILL NOT OPEN A CELL
1	3	OTHER COMMANDS TO OPEN CELLS ARE:	43	3	
8	8		4.4	1	
5	1	"ADR"/ OPEN THE CELL AND PRINT ITS CONTENTS	45	8 NOTER	IN PROGRAMS WHICH RELOCATE THEMSELVES THE
6	1	./ OPEN THE CELL CURRENTLY POINTED TO BY THE POINTER	46	1	THE USER SHOULD PLACE BREAK POINTS ONLY IN THE
7	1	AND PRINT ITS CONTENTS.	47	1	THE ORIGINAL PROGRAM AREA, IF A BREAK POINT IS
9	1	.+"ADR"/ ADD "ADR" TO THE POINTER, OPEN THE CELL	48	:	PLACED DUTSIDE THIS AREA THE RESULTS WILL
9	1	AND PRINT ITS CONTENTS.	49	2	BE UNPREDICTABLE.
)	1	"ADR"/ SUBTRACT "ADR" FROM THE POINTER, OPEN	50	1	
1	1	THE CELL AND PRINT ITS CONTENTS_	51	T	
	3	"CR" THE RETURN KEY IS USED TO CLOSE THE OPEN CELL			
1	1	WITH OR WITHOUT MODIFICATION.			
	2	"LF" LINE FEED IS USED TO CLOSE THE OPEN CELL WITH OP			
5	1	MITHOUT MODIFICATION AND TO OPEN THE SUCCEEDING			
	1	CELL.			
	1	CLOSE THE OPEN CELL WITH OR WITHOUT MODIFICATION			
		AND OPEN THE PRECEDING CELL			
с С		/ CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND			
9 D		OPEN THE CELL POINTED TO BY ITS CONTENTS.			
	I	ALE I S APPR LATION IN IL SIG MALINITY			

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10007 N4MPD

10004 V4MPD

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10007 N4MPD				1000M JAMPD		
01				01	1	
02	1			02	1	LODP
03	\$4.0	ERROR C	DESCRIPTION	03	;	THIS ROUTINE IS CALLED AT THE END OF EACH TEST
04	1	4.1	NORMAL	0.4		SEQUENCE. IT IS USED TO ITERATE THE SEQUENCE
05			UPON THE DETECTION OF AN ERROR THE PROGRAM WILL	05	,	100 TIMES IF NO EHROR HAS HEEN DETECTED.
-	:		PRINT OUT THE CONTENTS OF ACCUMULATOR, ETC.	06		IF AN ERROR HAS BEEN DETECTED, IT IS USED TO
06	8					
07	1		AND IF SWITCHES ARE APPROPRIATE, IT WILL HALT.	07	1	MAINTAIN THE SCOPE LOOP AND INTERROGATE THE
0.8	1		CONSULT THE	08	8	SWITCHES, ETC.
0.9	3		LISTING FOR A DETAILED TEST DESCRIPTION.	09	2	
10	1		SET THE SWITCHES AS DESIRED AND PRESS CONTINUE.	10	. 1	
11 -	1	4.2	ABNORMAL	11	3	LEOPH
12	1		THERE ARE SEVERAL TYPES OF UNEXPECTED FAILURES	12	1	MAP ALL OF MEMORY TO
13	1		ANICH WILL CAUSE THE PGM TO ENTER ODT. THEY ARE AS	13	1	LOGICAL = PHYSICAL
14			FOLLOWSS	14	2	FOR MAP USERS ABB
15			UNEXPECTED INTERRUPT	15		
			STACK OVERFLOW	16		LEPHD
16	3		THE CAUSE OF ANY OF THESE FAILURES SHOULD BE	17	5	
17	3					MAP DCH LOGICAL=PHYSICAL
18	3		CORRECTED BEFORE RESUMING TESTING.	18	1	FOR ROTH MAP ASR
19	1			19	3	
20	\$5.0	PROGRAM	DESCRIPTION	20	1	HTVIO
21	\$	5.1	COMMON SUBROUTINE CALLS	21	±	CHECK FOR VIOLATION FLAG SET
22	1		THE DIAGNOSTIC IS COMPRISED OF A SERIES OF	22	1	
23			SHORT TESTS. BASICALLY, EACH TEST CONSISTS	23	T	STSCK
24	:		OF A SETUP PROCEDURE, ONE OR MORE EVALUATING	24	1	COMPARE SPECIFIER WORD WITH STATUS
			CASES WITH ERROR CALLS, AND A LOOP CAPABILITY.	25		REGISTER CONTENTS
25	7		EACH PARTICULAR TEST CASE IS DESCRIBED IN THE	26		
56	8			-		CMUL D
27	\$		LISTING. THE COMMON ROUTINES FOR SETUP (SETUP),	75	1	CKVLD
58	2		ERROR CALLS (EHALT), AND LOOP (LOOP) ARE	85	8	COMPARE SPECIFIER WORD WITH VIOLATION
29	\$		DESCRIBED HERE, ALONG WITH OTHER	29	1	DATA REG. CONTENTS
30	1		COMMONLY CALLED ROUTINES.	30	3	
51	1			31	1	HUFCK
32			SETUP	32	3	COMPARES SPECIFIER WORD WITH THE
33			EACH TEST BEGINS WITH A CALL TO BETUP. THIS	33	,	CONTENTS OF THE DATA BUFFER AREA
34	:		ROUTINE SETS UP THE LOOP ADDRESS,	34		ACOBACTUAL
35	3		RESETS CERTAIN ERROR SWITCHES AND ITERATION	35		ACISEXPECTED
-	1		COUNTS. IT ALSO STORES AN ADDRESS OF AN ENTRANCE	36		AC2=ADDRESS OF WORD
36	2			37		ACEARDRESS OF WORD
37	3		TO AN EMALT WITHIN EACH TEST INTO		1	
38	1		LOCATIONS 3, AND 41 AND INTERRUPT	38	1	STHUF
39	3		HANDLER ADDRESS INTO LOC 1 .	39	2	STORES THE SPECIFIED WORD THRUOUT
40	9			40	1	THE DATA RUFFER AREA
41			EHALT	41	1	
42	1		THIS ROUTINE IS CALLED WHEN AN ERROR IS	42	*	
43			DETECTED. THE CONTENTS OF THE ACCUMULATORS,	43	P?HEO	5.1.1
	3		THE PASS COUNT, CONTENTS OF LOC 0, ARE PRINTED.	4 4	15.1.1. PRE M	
44	3		THE PRODUCT CONTENTS OF COL OF WE FRETTED	45		MACRO PROVIDES ALL THE NECESSARY PRE-
				46		OSTIC PHOGRAM COMMUNICATIONS WITH DTOS.
				47		ZES MEMORY, MONITORS THE EGGS BLOCK,
				4.8	1 AND P	PROVIDES TO THE USER THE FOLLOWING:
				49	1	
				50	1 1)	THE LOGICAL TOP OF MEMORY
				51	1	
				52	1 5)	THE TOPMOST MEMORY LOCATION AVAILABLE
				53		FOR THE DIAGNOSTIC PROGRAM
					1	FUR INC UIRGNUJIIG FRUGRAM
				54	7	
				55	1 3)	THE HIGHEST 1K BLOCK OF MEM (IF MAPPED)
				56	1	
				57	\$ 4)	A STATUS WORD CONTAINING THE STATE OF
				54	1	THE CATSWITCH, THE MODE OF OPERATION,
				59		AND THE TEST PROGRAM PASS COUNT
				60		
				80	,	

0009 %4MPD			0010 44MPD			
01	1 5) A STATUS WORD CO	INTAINING, CPU TYPE,	01	1	P7664 M1	TOP, TIOP, STAT1, STAT2, BEGIN, C?ATF, 5
50		-NO MAP), AND THE	50	1		
03	1 MAP TYPE, IF APP	LICABLE.	03	. NOTE: TE TH	F USEN TATE	ENDS TO USE THE PAGE ZERO DEFINITION
04	1		04			MPPGO, AND HE ALSO INTENDS TO START
05	1 6) A POINTER TO THE	I/O MODULE	05			PROGRAM BY CALLING THE PRE?M MACRO,
0.5	1		06			PASS THE LAREL "REGIN" AS THE FIFTH
67	7) A POINTER TO THE	CAT/KITTEN PROGRAM	07		LENT OF THE	
04	IF DESIRED.		.0.0			ENDS TO USE THE PIGOU MACRO AND
09	1		09			DGRAM RY CALLING THE PRE?M MACRO,
10	15.1.1.1 THE USER MUST AL	LOCATE PAGE ZERO STORAGE FOR	10			THE SAME STARTING ADDRESS TO THE
11	THESE PARAMETERS, AND DE		11			TO THE P?GOU MACRO.
12	I CALL.		12			S NOT INTEND TO USE ANY OF THE PAGE
13	1					S MACROS, HE CAN PASS ANY STARTING
14	8			T ADDHE		3 - AC4003 HE CAN FA33 ANT 314411NG
15	15.1.1.2 CALLING SEQUENCE		15			·
16	1 and a contraction of the contraction	CTATE	16	**************************************		TEM WITH AN "MMPUI", THE BANK JUMPERS
17		ARG 3, ARG 4, ARG 5, CPATP, ARG 7	17			V INSERTED ON INCORRECT SIZING WILL
18	1 1100 10 11 110 21	BLANK	10			INSCRIED ON INCOMMENT SISING WILL
19			19			
20	15.1.1.2.1 ARGUMENTS		20	1		
21	Fleterer middicity			15.1.1.3	SIZING	
	ARG 1	IS THE LOCATION WHERE THE PHYSI-	21	1		
22	1 440 1	CAL MEMORY SIZE WILL BE STORED.	22			NO PHYSICAL MEMORY
		(OR THE HIGHEST IK BLOCK IF MAPPED)	23			ITTEN PROGRAM WAS LOADED
24	ARG 2	IS THE LOCATION WHERE THE TOP-	24			AS LOADED IT PROVIDES ROOM AT MEMORY
25	ARG E	MOST MEMORY LOCATION FOR THE	25			NITOR, I/O MODULE, CAT/KITTEN PROGRAM
56	1		26			FOR THE DISK/IORD OPERATIONS
27	1	DIAGNOSTIC PROGRAM WILL BE	27			AS NOT LOADED IT PROVIDES ROOM ONLY
28	100.0	STORED. Is the location where the first	24	FOR M	AINI-MONITOR	R AND I/O MODULE
59	arg 3		29	1		
30	1	STATUS WORD WILL RE STORED.	30			PRESENCE OF A MAP AND THE MAP TYPE
51	1 ARG 4	IS THE LOCATION WHERE THE SECOND	31			E. PROVIDES THE HIGHEST 1K PHYSICAL
32	1	STATUS WORD WILL BE STORED	32		OF MEMORY	(IN OCTAL)
53	1 ARG 5	IS THE STARTING ADDRESS OF THE	33	1		
34	1	PRE?M MACRO. (SEE NOTE).	34	15.1.1.4		RO ALSO SETS TWO STATUS WORDS WHICH CONTAIN
35	I ARG 6		35	THE F	OLLOWING:	
36	t C?ATF	(OPTIONAL) THESE CALLS MUST BE	36	1		
37	1 C?ATP	USED IF THE USER WANTS THE	37	1	(STATUS	WORD 1)
38	1	CAT/KITTEN PROGRAM TO RUN.	34	1		
39	8	CTATE MASKS OUT THE TTI, TTO,	39	I BIT N	UMBER	SIGNIFICANCE
40	3	LPT, AND MTA INTERRUPTS.	40	1		•
41	\$	CTATP MASKS OUT ALL OF THE	41	1 0 - 7		SPARE
62	1	ABOVE, EXCEPT THE TTI.	42	1 8 - 1	0	RESERVED FOR I/O MODULE OP
43	s ARG 7	CPU NUMBER TO INHIBIT EXPANSION	43	1		CODES (NOT IMPLEMENTED)
44	3	OF UNNECESSARY CODE WHEN THE CPU	44	1 11		0 = NO CAT/KITTEN
45	1	TYPE IS PRE-DEFINED. BY DEFAULT, (NO	45	1		1 = CAT/KITTEN PROG HAS BEEN LOADED
46	\$	ARGUMENT PASSED), ALL CODE IS	46	1 15		O = MANUAL OR DEBUG MODE
47	3	EXPANDED. THE NUMBERS ARE	47	3		1 = AUTO OR SEMI-AUTO MODE
48			48	1 13 -	15	# OF PASSES OF PROG TO RUN
49	3	AS FOLLOWS:	49			
50	1	0 = 1200	50	1		
51	1	1 = 800	51	1	(STATUS	(S 090#
52	2	S = S A V O M = S	52	1		
53	1	3 = NOVA/3	53	1 N TT N	NIMAER	SIGNIFICANCE
54	1	4 = MICRONOVA	54	8		
55	3	5 = ECLIPSE	55	1 0		8 = UNMAPPED
56	1	6 = RESERVED	56	1		1 = MAPPED
57	\$	7 = RESERVED	57	1		
58			58	1 1		O = MMPU (ECLIPSE ONLY)
59	1		59	1		1 = MMPU1 (ECLIPSE ONLY)
60	15.1.1.2.2 EXAMPLE OF A MAD	RO CALL FOR ECLIPSE	61	1		

0011 N4MPD			OOI2 NAMPD				
01	1	2 - 12 SPARE	01	I CALL. TH	E FIRST ARGU	SUMENT MUST RE DEFINED, THE	
50	1		50	I NEXT THO	ARE UPTION	VAL. THESE ARE:	
03	:	13 = 15 0 = 1200 NOVA/2 800	0 5				
04		1 = RESERVED	04	1 100 1		OF & NEW PASS" ADDRESS	
	1			1 4401	THE START	UP # NEW P#33 #DURE33	
05	2	2 = RESERVED	05	1			
06	3	3 = NOVA/3	06			THE USER CAN EITHER PASS THE MACH	
07	1	4 = MICRONOVA	07	E P?PAS	CALL "P?PAS	S" AS THE SECOND ARGUMENT, IN WHIC	;H
0.8	1	5 = ECLIPSE	0 A	1	CASE, THE FI	FOLLOWING MESSAGE WILL HE PRINTED:	
09	2	6 = RESERVED	09	1			
10		7 = RESERVED	10	1	" P.	PASS # "	
11			11	9	WHERE # TS	THE PRESENT PASS COUNT IN DECIMAL	
12		5 THE MACRO ALSO PROVIDES A POINTER TO THE	12				
	15.1.1.		15			PASS & CALL TO A USER DEFINED	
13	1	I/O MUDULE. THE CALLING SEQUENCE IS:		•			
14	8		14) OR A CALL WHICH EXPANDS TO A JSR	r
15	B	JSH ACKOLA + COSMOIA AR	15			HOUTINE. (IF THE USER DOES NOT	
16	1	OP CODE	16			JSE THE SECOND ARGUMENT (NO PRINT-	
17	1		17	3	OUT DESIRED!)) HOWEVER HE DOES INTEND TO USE	
18	15.1.1.	6 THE MACRO ALSO PROVIDES A POINTER TO THE START	18	3	THE THIRD AF	ARGUMENT (L?CAT) HE SHOULD PLACE T	*0
19	1	OF THE CAT/KITTEN PROGRAM (IF THE USER PASSES	19	1	CONSECUTIVE	COMMAS DIRECTLY AFTER ARGUMENT 1).
50		THE SIXTH ARGUMENT OF THE MACRO CALL)	20	1			
21		THE CALLING SEQUENCE IS:	21	ARG 3	(OPTIONAL)	IF THE USER WANTS THE CAT/KITTEN	
		JSR DICA?T	22			RUN HE MUST PASS "LICAT" AS THE	
55		004 010411	23			MENT OF THE MACRO CALL.	
53	*		24		INTRO MADONE	THE PREME CALLS	
24	15.1.1.	7 PAGE ZERO DEFINITION REQUIREMENTS		1			
25	3		25			THIS ARGUMENT MAY BE USED TO INSE	* 1
56	1	1) THE FIRST FOUR ARGUMENTS USED IN THE MACRO	56	2	USER DEFINER	to LUDE.	
27	\$	CALL MUST BE DEFINED IN PAGE ZERO	27	1			
24	2		85	: THE CALLING SE	QUENCE IS:		
29	1	2) THE POINTER TO THE I/O MODULE MUST BE	29	1		P?STM ARG 1,ARG 2,L?CAT,ARG	4
50		DEFINED IN PAGE ZERO AS FOLLOWS:	30	1		P?PAS	
81		IOM70D: 0	51	1			
32			32	1	WHERE ARG	1 IS THE STARTING ADDRESS OF A	NEW
53		3) IF THE USER WANTS THE CAT/WITTEN PROGRAM TO RUN	5.5			PASS	
34		HE MUST DEFINE IN PAGE ZENO THE FOLLOWING:	54				
	1	ICA?TI 0	35	:	ARG	2 (OPTIONAL) THE USER CAN EITH	FD
35	3	TCHIL! A	36	:	P7PI		
36	\$	The supervise was used assume the BERAN					
57	1	4) IF THE USER HAS NOT USED EITHER THE DEFAULT	37	2		SECOND ARGUMENT, IN WHICH CA	
38	2	PAGE ZERO DEFINITIONS MACRO (P7GOD) OR THE	38	1		THE FOLLOWING MESSAGE WILL B	t.
39	1	USER DEFINED PAGE ZERO DEFINITIONS MACRD	39	\$		PRINTED:	
40	*	(P?GOU) HE MUST DEFINE A POINTER TO THE EGGS	40	1		" PASS # "	
41	*	BLOCK AS FOLLOWS:	41	8		WHERE # IS THE PRESENT PASS	COUNT
42		IEGG?\$1 EGGS	42	1		IN DECIMAL	
43			43	1			
		5) IF THE USER DOES NOT INTEND TO USE ANY OF THE	44	1		OR THE USER COULD PASS & CAL	LIO
44	1	PAGE ZERO DEFINITIONS MACROS, HE MUST DEFINE	45			A USER DEFINED PRINT MACRO O	
45	1	THE FOLLOWING PAGE ZERO COUNTER:	46			CALL WHICH EXPANDS TO A JSR	
46	1					USER DEFINED PRINT ROUTINE.	
47	7	PAS7S: 0	47	3			*0
48		P?STD 5.1.2	48	1		(IF THE USER DOES NOT INTEND	
49			49	1		USF THE SECOND ARGUMENT (NO	
50	:5.1.2	P?STM	50	1		OUT DESIRED) HOWEVER HE DOES	
51	1		51	1		TO USE THE THIRD ARGUMENT (L	TCAT)
52		THIS MACRO IS USED TO HANDLE ALL POST-DIAGNOSTIC	52	1		HE SHOULD PLACE TWO CONSECUT	IVE
		PROGRAM COMMUNICATIONS WITH DTOS	53	1		COMMAS DIRECTLY AFTER ARGUME	NT 1)
53		IT'S PURPOSE IS TO MONITOR THE EGGS BLOCK AND THE DTOS	54				
54	2		55	:	L?C	CAT (OPTIONAL) IS THE CALL WHICH	THE
55	3	PASS COUNTERS (PA7SIN AND PAS7S)			6.707	USER MUST SPECIFY IF HE WISH	
56	3	IT WILL DECIDE WHETHER TO RETURN TO THE START OF THE	56	Ŧ			
57	1	DIAGNOSTIC PROGRAM, JUMP TO A USER DEFINED PRINT MACRO	57	1		THE CAT/KITTEN PROGRAM TO BE	
58	1	(OR PRINT ROUTINE) OR TO START THE CAT/KITTEN PROGRAM	58	3		STARTED AFTER THE FIRST PASS	e 1º
59	;		59	2		IT IS LOADED.	
60		THE USER MAY DEFINE FOUR ARGUMENTS IN THE MACRO	60	1			
54 17	-						

01 2	ARG 4 (OPTIONAL) IF USED, SHOULD BE A
50	
93 :	
04 2	
	EXAMPLE OF THE MACRO CALLS
06 2	
07 5	
08 8	
	THIS CALL WILL CAUSE THE MACRO POSTM TO RETURN DIRECTLY
	TO "NUPASS", THE LOCATION THE USER DEFINED AS THE
	START OF THE NEXT PASS OF THE DIAGNOSTIC PROGRAM, IT WILL
	NOT PRINT AFTER EACH PASS, BUT IT WILL RUN THE CAT/KITTEN
	PROGRAM.
14 1	
15 1	
16 7	PAGE ZERO REGUIREMENTS:
17 3	
16 7	IF THE USER INTENDS TO ALLOW THE CAT/KITTEN PROGRAM TO
19 5	RUN, HE MUST DEFINE IN PAGE ZERO THE FOLLOWING:
50 82	ICAPT: 0
21 1	
55 1	
	CONJUNCTION WITH THE PRSTM MACRO, HE MUST SUPPLY THE
24 1	
25	
26 1	
27 1	THE PROVIDENT OF AND AND THE PROPERTY AND
	IF THE USER INTENDS TO USE THE "P?PAS" MACRO HE SHOULD
29 5	
-	THE REAL PROPERTY AND AND AND AND ALLOS AND AND
31 1	
35 1	
33 1	
34 1	IPDE?C: PDE?C
35 1	
36 1	
37 1	
38 1	DEFINED PAGE ZERO DEFINITIONS MACRO (P?GOU), ME MUST
39 1	DEFINE THE FOLLOWING IN PAGE ZERO:
40 1	
41 1	IEGG78: EGGS
42 1	
43 1	
44 1	
45 1	
	* THESE CONSTANTS MUST BE DEFINED WITH SOME VALUE
47 1	THE ALL BOOK OF THE HARD BOLD HAR SHEEND TO
48 5	
49 5	AND I PLEAS ADDINERS TA DEPENDED BY THE MODES MAPON
50 8	
51 1	
	PHOGRAM SEQUENCE:
53 1	A THE MARKER BORRE THE FOLLOW THE
54 3	THE MACRO PISTM DOES THE FOLLOWING:
55 7	
56 5	FIRST, IT WILL CHECK IF A PASS HAS BEEN COMPLETED, THIS
	OCCURS WHEN PATSINED. AT THIS POINT IT WILL EITHER EXE-
58 1	CUTE THE CALL SPECIFIED BY ARGUMENT 2 OR CONTINUE IT'S
59 1	A THE ADDRESS ADDRESS A LAR MAY ADDRESS SOUTHING
40	

NEXT THE MACRO AILL CHECK IF IT HAS JUST COMPLETED THE FIRST PASS OF THE DIAGNOSTIC PHOGRAM, IF SO IT WILL CHECK AMETHEN THE CAT/KITTEN HAS HEEN LOADED BY DTOS. IF IT HAS IT WILL START THE CAT/KITTEN.

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LASTLY, IT WILL CHECK THE MODE OF OPERATION, IF IT IS IN MANUAL MODE OR AUTO MODE WITH THE PASS COUNT IN THE EGGS BLOCK NOT EQUAL TO 0, THE MACRO WILL REFURP TO THE START OF THE WEXT PASS OF THE DIAGNOSTIC PROGRAM, HOBEVER IN AUTO MODE WITH THE PASS COUNT EQUAL TO 0 THE PROGRAM WILL REFURM TO DTOS.

1015 NAMPO		# 3				6 NAMPO
	1	5.2 MON1	TOR LOCATIO	UN 3	01	
	3				50	
	8	LOC	500	USED BY DTOS	03	
	\$	LOC	201	CURRENT TEST ADDRESS LOCATION		
	1	LOC		STARTING ADDRESS FOR PROGRAM		
	1	LOC		PROGRAM PASS COUNT		
	3	LOC	204	TEST ITERATION COUNT		
	:					
	1	5.3 MEMO	RY MAP			
	\$					
	1	UNLE	SS OTHERWIS	SE MENTIONED IN THE		
	8	SPEC	IFIC TEST.	EMORY FOR USERS A		
	3			MAPPED TO ITSELF.		
			IS LOGICAL			
	3	1 19 46 1	To FOOTCH			
	8					
7	1					
	16.0	SEQUENCE OF	TESTING			
	1					
	1	THE	TESTING SEC	BUENCE FOR PROGRAM		
	3		P IS AS FOI			
	-	14 2010				
	1			DESCRIPTION		
	\$	LABE				
	3		*****			
	3 .		1	and page		
	1	A SE	RIES	UNMAPPED LOGIC TESTS		
	1	400	- A06	DIAGNOSTIC RESET TESTS		
	1	A07	- A15	STATUS REGISTER TESTS		
	1	A14		VIOLATION DATA REG. TEST		
		A15		VIOLATION PC REGISTER TEST		
	7			INVALIO SINGLE CYCLE TEST		
	\$	A19		MAP ENTRY REG. TESTS		
	8		- A27			
	3	A 2 8		PGM MAP INHIBIT-TRAP TEST		
	3	424	- A31	MAPPED SINGLE CYCLE TESTS		
	1					
	1	8 SE	HIES	VIOLATION CIRCUITRY TESTS		
	,		- 803	WRITE VIOL. TESTS		
		604		1/0 VIOL. TEST		
	1			AUTO INDEX VIOL. TESTS		
	3		- R06			
	1		- 808	VALIDITY PROTECT VIOL. TESTS		
	1	809		WRITE PROTECT (USER B)		
	1	810	- 811	VALIDITY VIOL.(USER B)		
	1	612		VIOL. PC REGISTER TEST		
	1					
	-	r	RIES	PROGRAM MAP ENABLE TESTS		
~ 1841	\$			PGM MAP ENTRY		
j.	2	C00				
,	8	C01		MAP DONE FLAG TEST		
	1	C05	- C04	DEFER VIOL. TESTS		
	1	C06		I/O VIOLATION TEST		
	1	C07		WRITE PROTECT VIOL. (USER A)		
	-		- C10	PAGE CHANGING, STATUS BIT CHANGING,		
1	1	. U 0		MAP ENTRY CHANGING WHILE MAPPING		
	3					
	\$	C11		PROGRAM MAP INHIBIT TEST		
	1					
	1	D SE	RIES	I/O TESTER DCH TESTS		
	1	000	- 002	DCH TESTS		
	1		- 006	DCH MAPPING TESTS		
		002				
	1		0158	FPU TESTS		
	3		RIES			
	3	E 0 0		FPU DCH TEST		
	1	E01		FPU WHILE MAPPING TEST		

FPU USING PGM MAP TEST FPU DCH ERROR FPU,I/O TESTER INTEPREACTION TEST

E 0 2

E04

10017 NAMPO				10018 .4MPD				
01	\$			01	3			
50	:7.0	PROGRAMMING DESCRIPTION FOR MMPU FEATU	RF	50	7			
05	2			03	7	7.5	HEAD V	IULATION PC COMMAND (DIH AC.3)
04	1	THE INSTRUCTIONS WHICH MAY BE		69 GB	1			
05	2	USED TO SETUP AND INTERROGATE		05	3			
86	5	THE MMPU FEATURE ARE BRIEFLY		0.6	3		THE BI	T SIGNIFICANCE IS AS FOLLOWS:
07	2	DESCRIHED WERE.		07	1			
6 H	1			0.8			BIT	CONTENTS
09	3	7.1 READ STATUS COMMMAND [DIA AC.2)	09	,			
19				10	1		0	NOT USED (WILL HE 0)
11		7.2 WRITE STATUS COMMAND (00A AC.21	11	1		1-15	SAVED PC RITS 1-15
12				12	1			
14	:			13				
14		THE STATUS BITS SIGNIF	TCANCE	14				
15		ARE AS FOLLOWST		15		7.6	NFAD V	ICLATION DATA COMMAND (DIB AC.2)
16				16	:			
17	,	BIT CONTENTS		17	:		THE BI	T SIGNIFICANCE IS AS FOLLOWS:
18		or contents		18				
19		0 PGM MAPPING EN	481 50	19			817	CONTENTS
	1	1 DCH MAPPING EN		20			011	Contents
20	3			21			0	VIOLATION FLAG
21	3		HIBIT(READ ONLY)					
55	1	5-8 UNUSED(0'S)		55	1		1-5	VIOLATION PAGE
23	1		RITE PROTECT ENABLE	53	1		6-8	NOT USED (WILL BE 0'S)
24	3	10 SINGLE CYCLE P		24	3		9	SSE ERROR
25	1	11 AUTO INDEX PRO		25	1		10	VALIDITY PROTECTION ERROR
56	3	12 DEFER PROTECT	ENABLE	26	1		11	AUTO INDEX PROTECTION ERROR
27	3	13 I/O PROTECT EN	ABLE	27	1		12	DEFER PROTECTION ERROR
28	2	14 WRITE PROTECT	ENABLE	28	1		13	I/O PROTECTION ERROR
29	1	15 PROGRAM MAP A/	8	29	1		14	WRITE PROTECTION ERROR
30	*			30	1		15	VIOLATION A/B USER
31	1			31	;			
52		7.3 WRITE MAP ENTRY COMMAN	(5.2A 800) C	32	1			
33				33	1	7.7	SELECT	PAGE COMMAND [DOA AC, 3]
54		7.6 READ MAP ENTRY COMMAND	IDTA AC.31	34				
	:		60 a	35			BIT	CONTENTS
35	7			36				
56	1	THE SIGNIFICANCE OF TH	E MAD ENTRY BITS	37			0	PROGRAM/DCH MAP
37	7		E HAP ENTINE DITA	38			1-5	PAGE
38	8	ARE AS FOLLOWS:		39			6	USER SELECTION A/H
39	3	BIT CONTENTS		40	1		7-15	UNUSED AITS
40	\$				1		/-15	UNUSED MITS
41	8	0 PROGRAM/DATA C	HANNEL MAP	41	3			
62	1	1-5 PAGE						
43	8	6 USER SELECTION	0=A, 1=8					
44	8	7 WRITE PROTECT						
45		8-15 EXTENDED ADDRE	33					
46	1							
47	1							

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10019	NAMPO				10050 MAMPO			
1		3			01			
2		8			02	1		
5		14.0	1/0 T	ESTER HARDWARE DESCRIPTION	0.5	1	8.3	PULSE DETECTOR HIT ASSIGNMENTS
		1			0.4	1		
			8.1	TEST HUARD COMMANDS	05	1		BIT O IOPLS
					06	1		HIT 1 INTA (INTA AND DEMP)
+				IURST - CLEAR THE TESTER	07	1		HIT 2 MSKO
				NIOC 0 - CLEAR THE TESTER (INC. NEW MODE)	08	1		HIT 3 DCHI
		3		INTA - READ THE DATA BUFFER (NOT NEW MODE)	09	1		RIT 4 OVFLO
		1		DATIC - READ THE PULSE DETECTORS	10	1		HIT 5 DCHO
		7		DATIB - READ THE DATA BUFFER	11	1		HIT 6 DCHA
		3		DATIA - READ THE DCH ADDRESS BUFFER (NEW MODE)	12	8		HIT 7 ROFNE (COMPLEMENTS WITH EACH PUL
		3		DATCA - LOAD THE DATA BUFFER	15	8		HIT 6 DATOA
		\$		DATOR - LOAD THE FUNCTION BUFFER	14	1		BIT 9 DATOR
		1		DATOC - LOAD THE DATA AND DCH ADDRESS BUFFERS	15	8		HIT 10 DATOC
		3			16	8		BIT 11 DATIA
		3	A.2	FUNCTION REGISTER BIT ASSIGNMENTS	17	8		BIT 12 DATIB
		8			18	1		BIT 13 DATIC (NOT SET IF DEV CODE = 0)
		3		BIT O SET DCH SYNC	19	8		UIT 14 STRT BIT 15 CLR
		1		BIT 1 SET DCH MODEO	50	1		RIT 15 CLR
		2		BIT 2 SET OCH MODEL	21	8		TEST BOARD LOGIC
		3		BIT 3 SET PI SYNC	55		8.4	IESI HUAND LUGIC
		3		BIT 4 BUSY (IF NOT IN NEW MODE)	25			THE TEST BOARD CONTAINS 16 PULSE
		1		HIT 5 DONE (IF NOT IN NEW MODE)	24			DETECTOR FLIP FLOPS. THESE FF'S MAY
		\$		BIT 6 NEW MODE	25			RE READ BY A "DIC" WITH A DEVICE
		1		BITS 7-9 AN OCTAL # WHICH SPECIFIES THE	26			CODE OF O. THEY MAY BE CLEARED BY
		1		# OF ROENS PULSES BETWEEN	27	T		IORST OR NIOC O (IF IN NEW MODE).
	· •	8		SUCCESSIVE DCH CYCLES. (NEW MODE ONLY)	85			A PARTICULAR FF SETS WHENEVER
		1		NOTE THAT O SPECIFIES 1 ROEND PULSE.	59			A PULSE OCCURS ON THE LINE TO
		3		RITS 10-15 # OF DEM CYCLES TO BE RUN.	30	T		WHICH IT IS CONNECTED.
		1		(NEW MODE ONLY)	31			WHICH II IS CONNECTED.
		1		NOTE THAT O SPECIFIES 1 DCH CYCLE.	32 33	Ŧ		THE TEST BOARD ALSO CONTAINS
		3			34	1		A 16 BIT DATA BUFFER. THIS
		\$			35			AUFFER MAY BE LOADED/READ ETC.
					35			UNDER PROGRAM CONTROL. THIS
					30			BUFFER IS ALSO USED FOR DCH
					31			OPERATIONS. IT SHOULD BE NOTED THAT
					39			IN NEW MODE, ANY LOAD DATA BUFFER
					40			PROCEDURE, ACTUALLY LOADS THE
					40 (7			EVELUETVE OF OF THE OUTPUT DATA

.EUT

EXCLUSIVE OR OF THE OUTPUT DATA AND THE DATA PREVIOUSLY STORED IN THE BUFFER.

A 15 BIT DCH ADDRESS BUFFER Is used to direct DCH requests

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0001 24MD	4 MACHU NEV MA.SU 1415A15U 12/24/78	10005 N440M	
01		01 000	
0.2		50	CONTENTS
08	r · · · · · · · · · · · · · · · · · · ·	0.5	32233222
44		04	
05		05	
46		0.6	1. GUAL
07		07	
68		0.4	TI. DESINED ATTRINUTES
63 43		0.9	
10		10	III. WHAT THE PROGNAM WILL DO AND WHY
11		11	
12	2 DESCRIPTIONS HOVA 4 TEHONY DIAGNOSTIC / MAPPED	12	IV. DESIGN HIGHLIGHTS
14		14	
14		14	V. KNUNN ANUMALIES
	* HEAESTON HERLONAS	15	
15		16	
15	s vev. Date	17	TABLE 1- TEST NAMES' AIT POSITIONS
17	J TETE		
1.5	2 10 12/29/78	1.0	TABLE 2- CONTROL FLAGS' DEFAULT SETTINGS
1.4	1 10 16/67/17	30	
2 13	3	21	TANLE 5- SMALLEST AREA OF MEMURY THAT CAN BE TESTED,
61	2 CUPYRIGHT (C) DATA GEMERAL COMPONATION, 1978	21	LISTED BY TEST NAME
22		~~	LISTED HT TEST HAME
5.8	T ALL VIGHTS HESEAVED.	~	TARLE 4- PRUGNAM RUNITUR COMMANDS
A 64	; * * * * * * * * * * * * * * * * * * *	24	INCLE SO PROGRAM MONITUR COMMENCE
		C)	
		60	
		27	FIGURE 1- FAULT TYPES VS. MEMORY TEST PATTERNS

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TEALE & PRUGRAM MUNITUR COMMANUS FIGURE 1- FAULT TYPES VS. MEMORY TEST PATTERNS FIGURE 2- Enror Log output FIGURE 5- MEMORY TOPOLOGY, 4K RAMS FIGURE 4- MEMORY TOPOLOGY, 16K KAMS

LAST MODIFICATION: 12/27/78 14:38

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I. GOAL 3523

> PHOVIDE A MEANS OF TESTING UP TO 256K NORDS OF MOS DYNAMIC NAMS ON THE NOVA 4.

11. DESIRED ATTHINUTES **********************

A) SPEED- ENTIRE PHOGNAM SHOULD RUN NO LONGER THAN 10-15 MINUTES IN AUTO MODE.

4) THOROUGNESS- ALL MEMORY FAULT TYPES SHOULD BE TESTED.

C) STRENGTH- EACH MEMORY FAULT TYPE SHOULD HE CHECK BY A MEMORY TEST PATTERN OF AT LEAST MEDIUM STHENGTH. THE STRONGEN A TEST, THE MORE LIKELY IT IS TO FIND A BUG. IN A SIMILAN VEIN, "WEAK" TESTS FIND HARD ERADRS, "STHONG" TESTS FIND SOFT (I.E., INTEN-MITTENT, INTENACTIVE) LARONS.

0) DTOS COMPATIBLE.

E) HE USED UNDER ANY SIZE MEMORY (UP TO 256K WORDS) HSING ANY OF THE FOLLOWING HOARD TYPES:

> 1. 16K WITH &K RAMS 2. 32K " 4K " 3. 644 * 164 4, 128K * 16K *

F) OPTIONS- UNDER MANUAL CONTROL, THE USEP MAY OPT FOR TESTS WHICH COVER LESS IMPONTANT FAULT TYPES AND/OR TAKE A LONG TIME TO RUN (GREATER THAN 1 HOUR). HE CAN ALSO ENABLE SPECIAL FEATURES MHICH AID IN THE LOCATION OF DIFFICULT ERRORS.

G) IF AN ERROR IS FOUND, PRINT OUT THE EXACT LOCATION OF THE SAD CHIP.

H) PROGRAM LENGTH WILL HE BK OR LESS. THIS ALLOWS THE TESTING OF 4% RAMS/16K ROARD SYSTEMS.

1) AN ERHOW LOG BE KEPT, WHICH CONTAINS A HISTORY OF ALL ERRORS ENCOUNTERED.

III. WHAT THE PROGRAM WILL DO AND WHY

A) IN AUTO MODE ----------

DEFINITIONS IN AUTO MODE. ALL CONTROL FLAGS (CF'S) ARE SET TO . DEFAULT, SEE TABLE 2 FOR DEFAULT SETTINGS. "AUTO MODE" IS RUN BY ISSUING ANY AUTO MODE COMMAND IN DTOS (E.G., LOAD.NN HEND, AUTO). ALSO, AUTO MODE CAN BE SIMULATED BY RUNNING UNDER DTOS MANUAL MODE NUT USING THE DEFAULT SETTINGS FOR

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1. SIZE ALMURY- HUN A TOP DOWN MEMORY SIZING HOUTINE TO DETERMINE THE TUP OF MEMORY.

STANIING WITH THE FIRST HOARD, DETERMINE WHAT CJWFIGUHATIO4 IT 15. THE FOUN POSSIMLE RGARD CONFIGURATIONS ARE LISTED IN 11.C.D. THIS IS NECESSANY FON CONTROL OF VARIOUS PARAMETERS WITHIN THE PHOGRAM, ESPECIALLY IN DETERMINING THE EXACT LOCATION OF ANY EMENRS (MOAND, MODILE, MANN, MIT).

2. TEST THE HUARD

SEVEN TESTS MAVE HEEN CHOSEN THAT MOST OPTIMALLY HEET THE DESINED ATTMINUTES: 1) MODIFIED DATA=ADDRESS; 2) DATA=ADDRESS UPPER; 3) STUCK AUDRESS HIT; 4) MARCHING 1/0; 5) GALLUPING COLUMN; 6) GALLUPING RUAS; AND 6) GALLOPING DIAGONAL.

THE TESTS WILL BE RUN IN THAT ONDER. THIS MAY, IF THE FAULT IS A MAND EWNOM, THEN UNE THE FIRST THREE QUICK TESTS AILL FIND IT. IF NOT, THE GALLOPING TESTS WILL THEN RE RUN. SEE TANLE 1 FUR APPNOXIMATE TEST TIMES FOR EACH PATTERN.

THE MODIFIED DATAEADDRESS TEST WILL CONSIST OF TWO PMASES. IN THE FIRST PMASE OF THE MUDIFIED DATAEADDRESS TEST, THE DATA MURD WHITTEN TO AND SUBSEQUENTLY NEAD FROM THE MEMORY LUCATION AILL 3E THE LOWER 14 AITS OF TIS 20-BIT ADDRESS. ON THE SECOND PMASE, THE COMPLEMENT OF THE LOWEN 14 BITS OF THE 20-BIT ADDRESS WILL HE WHITTEN TO AND THE LOCATIONS.

THE DATARADORESS UPPER IS ESSENTIALLY THE THIRD PHASE IN THE DEA TESTING. THE DEA UPPER TEST WILL WHITE AND SUBSEQUENTLY READ The upper a mits uf the paysical address of the location under test.

THIS MEINOR CHECKS FON CFLL FUNCTIONALITY (FIRST AND SECUND PHASE), ADDRESSING ENRORS HETWEEN ALL IK PHYSICAL BLOCKS (THIRD PHASE), AND ADDMESSING ERNORS MITHIN EACH 16K PHYSICAL BLOCK (FIRST PHASE), PHASE 1 AND 2 ARE NUN IN 16K "CHUNKS", AND PHASE 3 IS RUN IN 1K "CHUNKS",

THE GALLOPING TEST PATTERNS WILL HE RUN IN 16K CHUNKS FUR 4K HANS AND IN 32K CHUNKS FOR 16K RAMS. IN EACH CASF, Extensive use of the mapui and microcode support 18 MADE.

THESE SEVEN TESTS COVEN THE FOLLOWING SEVEN FAULT TYPES: 1) FAULTY ADDAESS DECODERS; 2) INTERACTIVE COUPLING RETWEEN CHLLS; 3) REFRESH SENSITIVITY; 4) SLOW ACCESS TIME; 5) SENSE AMPLIFIER RECOVERY; 6) CELL FUNCTIONALITY (CAN THE CELL MOLO MAI IT'S TOLD TO1: AND 7) STUCK ADDRESS BITS AT THE CMIP LEVEL.

FIGURE '1 DETAILS WHICH TESTS COVER WHAT FAULT TYPES.

EACH TEST WILL HE RUN SEQUENTIALLY DEPENDENT ON ENROR CONDITIONS, SPECIFICALLY, TEST 1 IS RUN, IF AN ERROR OCCURS, A MENTOUT EXPLAINING THE NATURE AND LOCATION (BOARD, MODULE, HANK, AND HILL OF THE ERRON IS GENERATED AND CONTROL IS RETURNED TO DIDS, IF NO ERROP OCCURS, TEST 2 IS RUN. EACH TEST IS RUN IN A SIAILAR MANNER UNTLE AN EMMON OCCURS OR ALL THE TESTS AND COMPLETED, A COMPLETION MESSAGE IS THEN PRINTED OUT (SEE SECTION 111, C) 2.). 01

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FOR THE FINST HOARD, TESTING PHOCEEDS IN A SPECIALIZED MANNER (SEE IV. D), FON THE SECUND THHOUGH LAST BUAND, ALL THE Selected tests are run first against mank O, and then against

HANK 1 (THIS ACCOUNTS FOR A DOUBLE LISTING OF TEST NAMES). 5. ASSUMING NO ENHOR HAS OCCURRED ON THE PRESENT BOARD UNDER TEST. THE PRUGHAM ADULD CONTINUE ON TO THE NEXT BOARD.

4. STEPS 1-5 ARE REPEATED FOR EACH BOARD IN MEMORY.

B) IN MANUAL MODE

DEFINITION: IN MANUAL MODE, THE OPERATOR CAN TAILOR THE PROGRAM TO EXAMINE MORE SPECIFIC PRONLEMS. THE OPERATOR MUST ENTER THE SETTINGS FOR ALL THE CF'S BEFORE THE TESTS CAN BE RUN (I.E., AT THE STANT OF THE FIRST PASS). A «LF» RESPONSE WILL SET THE CF TO ITS DEFAULT. SEE TABLE 2 FOR DEFAULT SETTINGS. MANUAL MODE IS RUN MY USING ANY DTOS MANUAL MODE COMMAND (E.G., LOAD MEMO, DEMIG MEMD).

ALL NUMERIC QUESTIONS SHOULD BE ANSWERED IN OCTAL Nummers. All yes/nd questions must me answered with "Y" «CR», "n" «CN», or «LF». The «LF» sets the CF to the default, which "s "no".

1. STARTING AUDRESS AND ENDING ADDRESS

47 ENTERING A STARTING ADDRESS (STADR) AND ENDING ADDRESS (ENDADR), THE HISER ENAMLES THE PROGRAM TO RUN SLOWER HESTS AND STILL COMPLETE THEM IN AN ACCEPTABLE AMOUNT OF TIME MY REDUCING THE SIZE OF MEMORY BEING TESTED.

THE STADR AND ENDADR ENTERED IS THE PHYSICAL 1K BLOCK OF THE INTENUED ADDRESSES. SINCE 1K=2000 OCTAL LOCATIONS, TO TEST PHYSICAL LOCATIONS 200000 TO 377777, FOR EXAMPLE, ENTER "100" AND "177" FUN STADR AND ENDADR, RESPECTIVELY.

HESTRICTIONS: 1) 04=STADR«TOP ; AND 2) 04ENDADR==TOP. IF THE ENDAUN ENTERED EXCEEDS TOP, THEN ENDADR IS SET TO TOP (OF HEMORY).

THE USER SHOULD NOTE THE SMALLEST AMOUNT OF MEMORY THAT CAN BE TESTED, BY TEST NAME, AS OUTLIMED IN TABLE 3. FAILUME TO DU BO COULD MESULT IN CRASHING THE PROGRAM (I.E., IF USING GALLUPING PATTERNS, DON'T RELOCATE THE PROGRAM IN THE SAME HANN).

PAGE 3

10007 NAMDM		0008 44404		
01	PAGE 4	01		PAGE 5
02	2. MODULES TO BE TESTED	50		
03		0.3	MIT SET VAN (-SV) VOD (+12V)	VCC (+5V)
04	ENTER A BIT PATTERN TO DETERMINE WHAT MODULES ARE	04		
05	TO BE TESTED. A "O" RESPONSE TESTS ALL MODULES. THIS CF	05		
0.6	APPLIES TO ALL TESTS EXCEPT THE MODIFIED DATA=ADDRESS AND	06	15 -5.25 10.8	4.5
07	DATAHADDHESS UPPER.	07	14 -4.5 12.6	5.25
0.8		0.0		
0.9	MUT MODULE TESTED (MUT=MODULES UNDER TEST)	09		
10		10	IF HU HITS ARE SET, THE TESTS WILL RUN	
11	15 A	11	VULTAGES (MHICH IS THE DEFAULT CONDITION). OTH	
12	14 8	12	WIL BE RUN UNDER EACH CHOSEN MARGINAL CONDITIO	N .
13	13 C	15		
14	12 0	14	EXAMPLES (OCTAL NUMBERS): 1=HI/LO/LO O	
15		15	UNLY: S= FIRST RUN AITH HI/LO/LO, SFCOND RUN W	ITH LOVHIVHIS
16	AS USUAL, A BIT SET MEANS THAT THAT MODULE WILL BE	16	OS NOMINAL VOLTAGES ONLY.	
17	TESTED.	17		
18		14	PSV MAY NOT RE USED WHEN ECH#2 (HALT O	
19		19	THIS IS TO ASSURE THAT THE VOLTAGES ARE RETURN	
50	3. ERROR CONTROL MODE (ECM)	20	LEVELS HEFORE ANY UTHER PROGRAM IS NUN. FOR T	
21		21	PRUGRAM MONITUR'S "H" (HALT) COMMAND WILL HE R	EJECTED IN PSV>0.
55	"ECH (0-4)? " -THE NUMBER ENTERED WILL AFFECT THE	22		E ENANE DANES
53	ACTION TAKEN UPON HITTING AN EPROR:	23	PHUGHAM USING SWITCH PACK), 'ANEAK', OR HIT TH	
24	COM ACTION TAKEN	24	RESET SWITCH DURING ANY RUN WHERE VOLTAGES ARE IF IT IS VITAL TO STOP THE PROGRAM DURING A PS	
25	ECH ACTION TAKEN	. 25	FULLOWING SEQUENCE:	a south that the
26	0 PAINT AN ERNOH REPORT AND RETURN TO DTOS.	25	FOLLOWING SCHOCKLES	
27			1) "CNTHL-C'I PUTS YOU IN THE PROGRAM	MONTTOR.
85 95	2 PRINT AN ENNOR REPORT AND CONTINUE.	29	2) "A"S ABORTS THE PROGRAM, RETURNS V	
50	3 PRINT AN ERHOR REPORT AND GO TO PROGRAM MONITOR.	30	NOMINAL LEVELS, AND RETURNS T	
\$1 \$1	4 ENTER ERROR IN ERROH LIG AND CONTINUE.	31	3) 'EXIT': A DIUS COMMAND WHICH HALTS	
32		32	,	
3 5	ECM=2 IS ILLEGAL WHEN USING POWER SUPPLY VOLTAGE	33	IF YUU RESET PSV=0 USING THE PROGRAM M	ONITOR DURING A
34	MARGINING. (SEE B) 5.)	34	PSV RUN, THE PROGRAM AILL SUBSEQUENTLY ALLOW Y	
35		35	"H" COMMAND, HOWEVER, THIS IS NOT ADVISABLE BE	CAUSE THIS WILL
36	THE DEFAILT ECM IS 3.	56	NOT RESET THE VOLTAGES TO THEIR NOMINAL VOLTAG	
37	IF "4" IS ENTERED, THE USER MUST THEN SET THE LOG	37	RULE, WHEN USING PSV, AND YOU WANT TO STOP THE	PROGRAM, USE
38	PRINT (LP) CONTROL FLAG:	38	THE PROCEDURE OUTLINED ABOVE.	
39	"PRINT ERROR LOG AT CONCLUSION (Y/N)? "	39		
40		40	AS USUAL, IF AT ANY TIME AN EHROR IS E	
41	FOR FURTHER INFORMATION III.A)7., III.C)1., III.D) .	41	PROGRAM WILL PROCESS IT ACCOMDING TO THE PRESE	NT ERROR CONTROL
42		42	MUDE.	
4 5		43		
44	4. SUPPLEMENTAL ERROR INFORMATION	4.4	L LOCE ELANIE	
45	"SUPPLEMENTAL ERROR INFORMATION (Y/N)? "	45	6. ERCC EVANLE	
46	-SOLLFSWERING ENKON JALDAWATION (1)411	4 th 4 7	"ENAMLE ERCC (Y/N)? "	
47 48	IF YES, THEN THE FAILURE ADDRESS, EXPECTED DATA, AND	5A	Cumpe cree (1747)	
49	ACTUAL DATA ANE PRINTED IN ADDITION TO THE (DEFAULT) ERROR	49	TU CHECK THE ENCC BITS, ANSWER "Y". WI	TH ERCC ENABLED.
50	REPORT FORMAT, SEE III.C) .	50	THE ENCO LUGIC WILL COPY THE ERCO HITS (MEMIN	
51	allout contaits one states a	51	DATA 8175 11-15.	
52		52		
53	5. POWER SUPPLY VOLTAGES (PSV)	53	IF ERCC IS ENAHLED AND AN ERHOR IS REP	ORTED IN RITS
54		54	11-15, THEN THE USER SHOULD TRANSLATE THAT TO	
55	THE PROGRAM CAN EITHER RUN THE TESTS UNDER NOMINAL	55	HITS (I.E., HITS 16-20). TO HEMIND HIM OF THI	
56	CONDITIONS OR UNDER MARGINAL CONDITIONS, TO RUN UNDER MARGINAL	56	HESSAGE WILL HE PRINTED ALONG WITH THE ENROR P	RINTOUT, AND
57	VOLTAGES, THE BACKPANEL PROGRAMMING PLUG MUST BE IN THE CORRECT	57	IF LUGGING ENHORS, AIT O OF THE TEST HAMES' HI	
58	POSITION.	54	BE SET.	
59				
60	THE USER ENTERS AN OCTAL HIT PATTERN AS FOLLOWS:			

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01		PAGE 6	01	PAGE 7
45			0 2	
0.5		TE TMAT AN ERCC ENRUR IS TAFATED JUST LIKE ANY	0.4	A HOTE UN THE OPTIONALLY AVAILABLE PATTERNS-
04	1114FH EN40M	NHICH NOULD HE UEIECTED HY A TEST PATTENN.	04	
05			05	GALLUPING PATTERN IS A VERY SLOW AUT COMPREMENSIVE TEST
114		CC ENAMLE" IS ONLY IMPLEMENTED AT THE HEGINNING	0 m 0 7	PAITERN WHICH OFFENS STHONG TESTS FON FAULTY ADDRESS DECODENS,
07		RAM (I.L., CHANGING THE CF'S VALUE IN THE PHOGRAM	08	ALL TYPES OF CFLL INTERACTIVE COUPLING, SLOW ACCESS TIME, AND CELL FUNCTIONALITY.
អត្ត ភ្លំធ្	CONTINUE WILL	HAVE NO AFFECT UNTIL THE NEXT PASS OF THE PROGRAM).	U G	CEPP LOAD (Town File
10			10	GALLUPING ROAS TESTS MULTIPLE WRITING WITHIN ROWS AND
11	7. EM404 LU	6	11	REFRESH SENSITIVITY.
12	ra Lo tron Lo		12	
13	THE	FRHUN LUG CONSISTS OF A LIST OF 4-WOND BLOCKS THAT	13	THE CHOSEN TESTS ARE THEN HUN UNDER THE DESIGNATED
14		FULLOWING INFORMATIONS	14	PARAMETERS UT THE MEMORY BUUNDED MY STADE AND ENDADR.
16	•		15	
1.	x0+0 #	CHNTENTS	10	
17		*******	17	9. MULTIPRUGHARMING RELUCATION TEST
14	1	HOARD, HANK, MUDULE, HIT NUMMER	10	
19	à	HATHER OF PHYSICAL HLOCK ADDRESSES	19	THIS TEST TREATS EACH HANK IN MEMORY AS IF IT WAS
2.1	\$	TEST NAMES" HIT PATTENN	e ()	"THE ONLY HANK IN TOKN." (BAD PUN) SERIOUSLY SPEAKING,
21	4	FAILINE COUNT	21	IT PLACES THE PROGRAM IN THE SAME BANK THAT IS BEING TESTED
22			22	AND DOES THIS FOR ALL THE BANKS IN MEMORY.
25	Int	FAILUNE COUNT IS THE TOTAL NUMBER OF TIMES AN	23	
24		CCURNED UNDER ALL TESTS HIN FOR THE CHIP WHOSE	24	THIS TEST SHOULD BE HUN LAST AND ALONE (IT'S A DANGEROUS
25		SPECIFIED IN WOND 1.	25	ANIMALI). CHOOSING MULTIPHOGRAMMING CANCELS MANUAL PROGRAM
16			26	RELOCATION.
27	LOG	GING AN ERNON ENTAILS THE FULLOWING ACTIONS:	27	
24			26	
24	A/	ENHON'S CHIP LOCATION IN LOG?	29	10. MANUAL PROGRAM RELOCATION (MPR)
50			50	
11	8/	IF IT IS IN THE LOG, UPDATE THE RANGE OF PHYSICAL	31	IF ENABLED, THE USER ENTERS AN ADDRESS (MPR) TO AMERE
32		THE TEST NAMES' HIT PATTENN, AND INCHEMENT THE	32	THE PRUGHAM WILL BE HELDCATED. THE HANGE MPH TO MPHOAK-1
53	FAILUNE COU	vf.	55	WILL HE THE LUCATION OF THE PROGRAM DURING EXECUTION OF ALL THE
34			54	CHUSEN TESIS.
45	C/	IF IT IS NOT IN THE LOG, CHEATE A NEW WODE WITH	15	
36	ALL PENTINE	NT INFURMATION ENTENED FOR IMAT ERNOR, OPDATE	56	MPH IS ONLY IMPLEMENTED AT THE BEGINNING OF THE PROGRAM
\$7	LING. ENU PUL	同于花碑。	37	(1.E., CMANGING THE CF'S VALUE IN THE PROGRAM MONITOR WILL HAVE
5 R			54	NU AFFECT UNTIL THE NEXT PASS OF THE PHOGRAM).
44	15	AN ATTEMPT TO CHEATE ANOTHER NODE ADULD OVENFLOA	59	
40	THE LUG, TH	EN A WANNING MESSAGE IS ISSUED, AND THE PROGRAM	4.0	TU ENDAUR: 2) MPH TO MPR+8K-1 MUST EXIST IN MEMORY: 3) IF
41	40.VITON 15	ENTEWED.	41	RUHWING GALLOPING TEST PATTERNS, MPR TO MPR+8K-1 MUST NOT BE IN
42			42	A MAHK WHICH IS TO BE TESTED. REMEMBER THAT IS ENDADH OR STADR
45	F1G	URE 2 IS AN EXAMPLE OF AN ERROR LOG PRINTOUT.	4 5	SPILLS UVEN INTO ANOTHER BANK, THAT WHOLE BANK WILL HE TESTED.
44	SEE THE NOT	ES UNDER FIGURE 2 FOR MORE INFORMATION.	44	SEE TANLE 3 FUN THE SMALLEST AREA OF MEMORY THAT CAN HE TESTED
45			45	FOR A PARTICULAR TEST. 4) DO NOT RUN MULTIPROGRAMMING WITH M.P.R
46	H. TEST PAT	TERUS	46	
47			47	FAILURE TO COMPLY WITH THESE WARNING WILL, IN MOST CASES
48.04		EN A SIT PATTERN TO DETERMIVE WHAT TESTS AND TO HE	46	MARE THE PRUGRAM CHASH.
43 mil		AHLE 1 FUN TEST NAMES' BIT POSITIONS. A HIT SET	49	
70	ATHE I MEAN	THAT THAT IEST WILL HE RUN.	50	
			51	C) EANON NEPORTING
			56	***********
			53	
			54	UPON HITTING AN ERROR, THE PROGRAM PRINTS OUT 1.
			55	2. IS PHINTED OUT AT THE END UF EACH BOARD. 3. IS PRINTED
			94	OUT AT THE END OF THE PRUGRAM.
			57	
			5*	IF THE SEI CF IS SET, 4. IS PRINTED ALONG WITH 1.

10011 N4MDM		10012
01	PAGE 8	01
50		02
03	1. ENHOR REPORT FORMAT	64
04	****************	05
05		06
06		07
07	TEST NAME:	0.6
08	BOARD NUMBERS	04
09	MODULE:	10
10		11
11	NIT NUM4ER(S)=	12
12	AR ADDENDED THE FORD OF BODAT FORMAT	15
13	SE APPENDEU TU THE ERROP REPORT FORMAT.	14
14		15
15	S MUGDAL TEGMINATION FORMAT	16
16	2. NUNMAL TERMINATION FORMAT	17
17		18
18	TESTING COMPLETED	19
19	IESTING COMPLETED	20
20	antañ mumer a	21
21	BOARD NUMBERS STARTS	25
55	HUGHEGG GINNIM menemangan	25
23	ADDRESS ENDS K	24
25		25
59	THE "ADDRESS START" REFERRED TO IN THE NORMAL TERMINATION	26
27	REPORT IS THE BOARD STANTING ADDRESS. THE 'ADDRESS END' IS THE	21
28	BDARD ENDING ADDRESS.	28
29		29
30		30
51	S. END PROGRAM FORMAT	31
32		32
33		3 5
34		54
35		15
36	(MAKES SENSE, MUH?)	36
37		37
38		38
39	4. SUPPLEMENTAL ERROR INFORMATION	39
40		40
41		41
	ADDRESS (PHYS,/LOG)= /	42
43	EXPECTED DATA=	43
44	ACTUAL DATAZ	44
45	"你一吃,你,你,你会没有是你?" 计学学学校会会会会 化分子合金合金合金合金合金合金合金合金合金合金合金合金合金合金合金合金合金合金合金	45
46	THE AUDRESS OF ERRON IS IN TWO PARTS, "PHYS." AND "LOG." .	66
47	THE FIRST NUMBER IS THE PHYSICAL IN BLOCK OF THE ADDRESS, AND THE	47
48	SECOND THE WOHD WITHIN THAT IN BLOCK.	40
49		44
50	THE SUPPLEMENTAL ENROW INFORMATION IS PRINTED BETWEEN	50
51	REPORT FORMAT.	51
		52
		53
		54

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0) PROGRAM MONITOR -----

IN NOTH MANUAL AND AUTO MODES, AT THE END OF EACH TEST, AT THE OCCURRENCE OF AN ENHON, AND AT THE END OF EACH PASS, THE TTY IS TESTED FOR IMPUT. IF & VALID SWITCH PACK COMMAND WAS ENTERED, IT IS THEN EXECUTED. IF NUT, A CHECK FOR 'CNTRL-C' IS PERFORMED. IF "CNTHL-C" WAS TYPED, A SMALL "PROGRAM MONITOR" IS EXECUTED. A "++?" PROMPT SIGNALS THE USER TO ENTER ONE OF THE VALID COMMANDS LISTED IN TANLE 4. ILLEGAL COMMANDS MAVE NO ILL EFFECTS.

UNCE IN THE PHOGRAM MUNITUR, SWITCH PACK COMMANDS ANE NOT ACCEPTED. FUR THIS REASON, IN ORDER TO GET A HARD COPY OF THE ERHON LUG PHINTOUT, IT IS NECESSARY TO ENABLE SWREG'S BIT 5 SEFORE ENTERING THE PROGRAM MUNITUR (1.E., TYPE '5' REFORE 'CNTHL-C' AND 'P' UH 'D').

ANY CHANGES MADE IN THE PATS, PNV, ON ECCE OF'S WILL NOT TAKE EFFECT UNTIL THE NEXT BOAND (FUR BOANDS 2 THRU LAST) ON THE NEXT MANK (FOR HUARD 1).

IV. DESIGN HIGHLIGHTS -----

A) ALL GALLOPING TEST PATTERNS WILL BE HUN USING A MICROCODE ROUTINE TO ACHIEVE THE GREATEST SPEED AND TO TEST THE ME 40RY TO ITS FULLEST.

B) MEMURY SIZING WILL TAKE ADVANTAGE OF A MICROCODE ROUTINE THAT ACCESSES TWO HEMORY LOCATIONS FAST FNOUGH TO CAUSE MEMORY INTENPENENCE. USE OF THE REAL TIME CLOCK WILL COMPLETE THE MEMORY SIZING ALGORITHM.

C) EXISTING DLIN ROUTINES THAT ARE APPLICABLE APE TO HE USED.

D) AUTOMATIC PROGNAM RELOCATION SCHEME

AS USUAL, THE PROGRAM WILL TEST THE MEMORY ON A BUARD MY NOAND BASIS. THE PROGRAM NEED DNLY BE RELOCATED AMEN TESTING THE FINST MOAND, FUR MUARUS 2 THNU LAST, THE PROGRAM WILL RESIDE IN THE FIRST AK OF MEMORY AND THE WHOLE POARD UNDER TEST WILL HE USED FOR TESTING. MONEVER, AMEN TESTING ROARD 1, THE LOCATION OF THE PROGNAM WILL VANY ACCORDING TO THE FOLLOWING SCHEMES:

1. 16K HAMS/128K HOANDE A)PROGRAM IN PHYSICAL BLOCKS (P.8.) 0-7, TEST P.H. 100-177. H) PROGNAM IN P.B. 100-107, TEST 0-77.

2. 4K HAMS/32K HOARD: A) PROGRAM IN P.H. 0-7, TEST 20-37. #) PHOGRAM IN P.H. 20-27, TEST 0-17.

3. 15K HAMS/64K HOARD: A) PHOGHAM IN P.R. 0-7, TEST 40-77. AT PROGRAM IN P.H. 40-47, TEST 0-37. C) PROGRAM IN P.H. 0-7, TEST 20-57. D) PROGRAM IN 20-27, TEST (10-17,60-77).

PAGE 9

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d. 4K NAMS/16K HUA4DI A) PRUGPAM IN P.R. 0-7, TEST A-15. d) PRUGRAM IN P.H. 8-15, TEST 0-7. C) PRUGRAM IN P.R. 4-11, TEST (0-3,12-15). D) PRUGRAM IN P.B. (U-3,12-15), TEST 4-11.

E) INTERMUPTS WILL RE ENABLED ONLY FOR DETERMINING BOARD CURFIGURATIONS AND DURING POREN SUPPLY VOLTAGE MARGINING MITHIN IME PRIGRAM EXEC. THEY WILL RE DISABLED THE REST OF THE PROGRAM.

F) IF THE MMPH1 DOES NUT EXIST, NAMOM WILL IMMEDIATELY RETURN TO DIOS, IN THIS CASE, IT IS NECESSARY TO HUN NAHDU1 AND NAHDU2.

V. KNOWN ANOMALIES

A) RUA AND HIT COLUMN RIPPLING

1/ A HAD CHIP MAY LOAD DOWN A SIGNAL (E.G., RAS OR CAS) SUFFICIENTLY TO CAUSE SOME OR ALL OF THE OTHER CHIPS IN THE SAME DAMK-HODDILE (I.E., HON) OR GIT COLUMN TO GENERATE ERROWS, IN THE ERROR LUG, THE GENUINE HAD CHIP CAN BE SPOTTED AS THE ONE WITH THE HOST ENHARS (A FAILURE COUNT ONLY THE THOUSANDS), WHILE THE GOOD CHIPS AUGUD MAYE A FAILURE COUNT ONLY THE HUNDEDS. IF THIS OCCURS, REPLACE (HE CHIP WITH THE HIGHEST NUMMER OF REPORTED ERRORS AND RERUN THE PRUGHAM. IF ALL THE OTHER CHIPS WERE KEALLY GOOD, THEM ALL THE NELLATED ERRONS SHOULD DISAPPEAR.

2/ YOU RUN THE PROGRAM WITH ENROR REPORTING (AS WOULD BE THE CASE IN AUTO MODE). AN ERROR IS REPORTED, AND YOU REPLACE THE REPORTED CHIP. IF, AFTEH HERUNNING THE PROGRAM, YOU STILL GET AN ERROR IN THE SAME ROW AND/OR THE SAME BIT COLUMN, THIS MAY BE THE DREADED 'RIPPLING' EFFECT. INSTEAD OF COMMITING SUICIDE, RETURN THE DFFENDED CHIP (WITH APPHUPMIATE APOLOGIES) TO THE MOARD AND REPUN THE DFFENDED CHIP (WITH APPHUPMIATE APOLOGIES) TO THE MOARD AND REPUN THE PHOGRAM USING EKROM LOGSING, FOLLDWING THE PHOCEDURE DUTLINED IN '1/'.

3/ IF THE LOADING FROM THE GENUINE BAD CHIP IS SEVERE ENOUGH, IT CAN PULL A CHITICAL SIGNAL DOWN OR UP AND CAUSE ALL THE "GOOD" CHIPS IN THE SAME NUM AND/OR BIT COLUMN TO GENERATE AS MANY EFRORS AS THE MAD CHIP ITSLE. IN THIS CASE, YOU'ME OUT OF LUCK, AND MUST RESORT TO EMULATING A BIPO (IN OTHEN WORDS, THE "OL "MUNT AND PECK" METHOD).

B) IF YOU TYPE 'CHTRL-C' DURING AN ERROR REPORT HHEN ECHES (EYTEN PHOGRAM MONITOR UPON ENROR), WHEN IT COMES TIME TO 'EXIT PHOGRAM HOWITOR', YOU WILL HAVE TU ENTER THE 'E' COMMAND FWICE-UNCE FOUR YOUM 'CNTRL-C' AND ANOTHER BECAUSE ECHES.

C) IF YOU FIYD AN ERROR IN THE SECOND RANK HHILE HUNHING IN AUTO MODE, AND YOU MANT TO VERIFY IT USING EMBON LUGGING, HE SUME TO IMPLEMENT STANTING AND ENDING ADDRESS SU FMAT TERTING IS HESTRICTED TO THE SECOND RANK ONLY (E.G., UNA 524 HUNHD, SIADH2DO, EMBADER27), IF THIS IS NOT DOME. THE PROGRAM, WHEN FINISHED TESTING THE SECOND RANK, WOULD MELOCATE THE PROGRAM IN THE SECOND RANK (IN OWDER TO TEST THE FIRST HANK) AND ROULD THEREFORE CRASH/BOMB/SELF-DESTRUCT/ GO ULT TO LUNCH/FLY SOUTH.

D) THE NAMOM PROGRAM IS DESIGNED SPECIFICALLY TO RUN IN A DIDS STREAM. IT IS NOT NECOMMENDED TO MALT THE PROGRAM AND ATTEMPT TO CUNTINUE PROCESSING AFTER EXECUTING SOME WORTHLESS SOFT CONSOLE CUMMANDS. IN THE MAJOHITY OF THE CASES, IMPORTANT DATA (E.G., MACKGROIND DATA IN THE MEMORY UNDER TEST) MAY BE LOSTA ALONG WITH THE MAPING INFORMATION. IF IT IS NECESSARY IO «NESTANT» THE PROGRAM (I.E., "FROM THE BEGINNING"), THAT IS 0.K., AS LONG AS YOU DON'T ATTEMPT TO RETURN TO DTOS USING THE PROGRAM MONITOR "A" COMMAND (IT WORK).

THE AHOVE REFERS TO THE PROGRAM MONITOR "H" COMMAND. THE SAME WILL APPLY IF YOU PRESS THE MACHINE'S 'RESET' RUITON. IN THAT CASE, YOU'NE RETER OFF RELOADING DIOS AND STARTING AGAIN.

TABLES AND FIGURES FOLLOW

10015 N4MDM 01 02 03		TARLE 1: TEST NAMES' HIT REFEREN	POSITIONS	
04 05 06 07	617 PCS17104 ####################################	TEST NAME #38653555	MODE RUN	ESTIMATED Test time
08 09 11 12 13 14 15 16 17 18 19 20	*****	MODIFIED DATA=ADDRESS DATA=ADDRESS, UPPER STUCK ADDRESS BIT MARCWING 1/0 GALLOPING COLUMNS GALLOPING COLUMNS GALLOPING DIAGONAL GALLOPING DIAGONAL GALLOPING DIAGONAL GALLOPING DIAGONAL GALLOPING DIAGONAL GALLOPING DIAGONAL GALLOPING DIAGONAL GALLOPING DIAGONAL GALLOPING DIAGONAL	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	15 SEC 5 SEC 3 SEC 15 SEC 1 MIN 1 MIN 1 MIN 2 MOURS
22 23 24 25 26 27 28 29 30 31	MEMORY, S/ TEST MINUTE/S 2 MINUTE 4/ TEST 06 TECTEO MEING LO	USING THO 128K RAM BOARDS TIMES FOR 4K RAM BOARDS I 2K BOARD WITHOUT GALLOPI S/32K BOARD WITH GALLOPI TIMES LISTED ASSUME NO J (I.E., IF THERE ARE ERRI IGGED, NOT PRINTFU), THEN O COMPLETE).	B (WITH 16K R Ng Pattfrn, A Ng Pattgrn, A Ng Pattgrn, MgMory Errors Drs, and Ecm=	ANS). N ONE ND ARCUT ARE 4 (ERRORS

01			OL FLAGS' DEFAUL	T SETTINGS
02	22222	=		
03				
04				
05			PROGRAM OCTAL	
06	DESCRIPTION OF CF	CF	VALUE	DEFAULT
07	****************		3283222233333	*****
0.4				
0.9	STARTING ADR. IN MEM.	STAUR	0	REG. OF MEMORY
10	ENDING ADM. IN MEMORY	ENDADY	TOP	TOP OF MEMONY
11	MODULES UNDER TEST	MUT	0	ALL
12	ENRON CONTRUL MODE	ECM	0	PHINT EHROR, RETURN TO
13	SUPPL. ERROR INFO.	SE.I	0	NONE .
14	POWER SUPPLY VOLTAGES	PSV	0	NOMINAL UNLY
15	ECC ENABLE	ECCE	ø	NOT AVAIL./NOT ENABLED
16	ERRUR LOG PHINT	LP	0	NO LUG PHINT & CONCL.
17	PATTERNS TO HE NUN	PATS	177	ALL EXCEPT GALPAT
14	MULTIPROGNAMMING	MULTI	0	NONE.
14	MANUAL PHUG. RELOC.	P 49	0	DONE HY PHOGRAM.
20				
21				
22	HOTES: 1/ CF=CONTROL	FLAG		
23				
24	2/ THE DEFAULT	PATTERNS	ANE THE FIRST 7	PATTERNS LISTED
25	LISTED IN T			
26				
27	BA FREACOAM OF	TAL MALUE	" REFERS TO THE	VALUE THE "CE"

10017 14404		
01	TANLE ST SMALLEST AREA	OF MEMORY THAT CAN HE TESTED,
65	BEBERR LISTED MY TES	ST NAME
0 %		
45 48	TEST NAME	SMALLEST AREA
05	********	***********
0.6	MUUTFTED DATASADDHESS	16K BLOCK
07	HATAS ADDRESS UPPEN	STADY TO FNDADN (1K BLOCK)
0.4	STUCK ADDWERS HIT	168 BLOCK WITHIN 1 MODULE
09	MANCHING 1/0	16K BLOCK WITHIN 1 MODULE
10	ALL GALLOPING TEST PATTERNS	1 MODULE WITHIN 1 HANK

.

in h

10018 \440	4			
01		TANLE 48 PROGRAM	MONITOR COMMANDS	
90		******		
0.5				
04	C() 4/44 \()	(STANDS FOR)	ACTION TAKEN	
05	******	*****	***********	
0.6				
07	A	THORE	RETURN TO DTOS	
08	c	CLEAR	CLEAR ERROR LOG	
09	5	0.044	PRINT & CLEAR ERROR LOG	
10	E	EXIT	RETURN TO MAIN PROGRAM	
11	F	FLAGS	PHINT CONTROL FLAGS	
12	н	HALT	PROGRAM MALTED	
13	ρ	PHINT	PRINT ERROR LOG	
14	H	RESET	PRINT CF'S; INPUT NEW VALUES	
15	T	TENHINATE	TERMINATE THE CURRENT TEST,	
16			AND RETURN TO THE	
17			PROGRAM EXEC.	
19				
19				
20				
21	NUTES: 17 A	N ILLEGAL COMMAND WILL	. CAUSE A MESSAGE TO BE	
55	P	RINTED, LISTING THE VA	LID COMMANDS THAT MAY	
23	4	E ENTERED.		
24				
25	2/ F	OR ONVIOUS REASONS, DO	NOT ATTEMPT TO "ABORT" TO	
26	. 0	TOS IF YOU HAVE MALTED	AND SUBSEQUENTLY RESTARTED	14
21	T	HE PROGRAM (WHICH IS N	IUT RECOMMENDED IN ANY CASE).	10.4
65	I	T WON'T WORK.		
21	Ť	HE PROGRAM (WHICH IS A		

1 13

10019 NEMDM		10020 1440M	
01	FIGURE 11 FAULT TYPES VS. MEMORY TEST PATTERNS	01	FIGURE 2: FRANK LOG OUTPUT
02	****	02	*****
03		03	
04	TEST NAME I MAJOR FAULT TYPES TESTED	- 04	
06		06	
07	MUDIFIED DEA 1 1,2,8	07	
08		0.8	CHIP_LOCATION ADR. HANGE TEST FAILUHE
09	DEA UPPER 1 1,2,8	09	NUARD AANK MOD HIT LON HIGH NAMES COUNT Beers est see see see sees
10	sonsessessessessessessessessessessessesses	11	
12		12	1 1 C 9 102 137 000140 360
13	MARCHING 1/0 1 2,8	15	1 1 C 12 102 137 000140 360
14		14	1 1 0 0 105 105 000140 32157 1 0 4 5 75 77 000202 3
15	GALLOPING COL. 1 4.5	15	1 0 A 6 75 77 000202 3 2 0 F 9 200 377 000040 64
16	GALLOPING ROWS 1 3,5,7	17	2 0 H 10 200 277 000040 64
18		18	2 0 15 200 377 000040 64
19	GALLOPING DIAG. 1 3,4,6,7	19	
20		20	
21	GALLOP'G PATTERN: 1,2,3,4,6,7,8	21	HOTESE 1/ THE NUMBERS LISTED UNDER "ADR. RANGE" ARE Physical 14 Hlock Numbers. They are the range
52	÷=====================================	23	IN WHICH ERRORS OCCUPRED ON THE SPECIFIED
24		24	CHIP. (E.G., 102-137 MEANS THAT ERRORS OCCURRED
25	KEAS	25	FRUM P.H. 107 TO PA. 137; 105-105 WOULD MEAN
26	\$ 8 9	26	THAT EHROHS OCCURRED ONLY WITHIN P.R. 105.)
27	1: FAULTY ADDRESS DECODING- WRONG CELL OR CHIP ACCESSED	27	2/ 'TEST NAME(S)' IS A RIT PATTERN, A RIT SET MEANS
28 29	1: FAULTY ADDRESS DECODING- WRONG CELL OR CHIP ACCESSED 2: FAULTY ADDRESS DECODING- CELL INACCESSIBLE	24	THAT AN ENROH HAS UCCURRED UNDER THE CORRESPONDING
30	3: INTERACTIVE COUPLING WITHIN ROWS	10	TEST LISTED IN TABLE 1 FOR THE SPECIFIED CHIP
31	A: INTERACTIVE COUPLING WITHIN COLUMNS	51	LOCATION. (E.G., 41= BITS 10,15 => GALLOPING RJWS
32	SI REFRESH SENSITIVITY	32	AND MODIFIED DATA ADDRESS, IF PUNNING THE MAPPED VERSION).
33	63 SLOW ACCESS TIME 73 SENSE AMPLIFIEN RECOVENY	53 34	BIT O SET MEANS THAT ERCC WAS ENABLED DURING TESTING.
34 35	7: SENSE AMPLIFIER RECOVERY 8: Cell Functionality	35	3/ THE TEST NAMES LISTED INDICATE UNDER WHAT
33		56	TESTS AN ERRON MAS OCCURRED IN THE WORD.
		37	
		38	4/ 'FAILURE COUNT' IS THE NUMBER OF TIMES AN FRHON MAS
		39 40	OCCURNED AT THE SPECIFIED CHIP LOCATION. IF The Failure Count=177777, Then There was an overflow
		41	IN THE FAILURE COUNT DATA WORD (I.F., THE NUMBER OF ENGORS
		42	FOR THAT CHIP HAS >=177777).
		43	•
		44	5/ ALL NUMBERS AME IN OCTAL.
		45	A/ "ADR. RANGE/LOW, HIGH" IS NOT INCLUDED IN THE
		46 47	UNMAPPED VEHSIONS.
		48	
		49	77 TO GET A MAND COPY OF THE ENROR LOG PRINTOUT, IT IS
		50	NECESSARY TO SET SWREG'S AIT 5 REFORE ENTERING THE
		51	PROGRAM MONITOR (UNLESS, OF COURSE, THE CONSOLE DEVICE IS A printer or teletype). If the log is to be printed out
		52	ONLY AT THE CONCLUSION OF THE PROGRAM, SET AIT 5 ANYTIME
		54	DUHING THE EXECUTION OF THE PROGRAM.
		55	
		56	A/ A "GALLOPING PATTERN" FAILURE COUNT OF 1 SHOULD HE Interpreted as a hard error, ("1" is the maximum failure
		57	INTERPRETED AS A MAND ENNOR. ("I" IS THE MAXIMUM PAILURE Count that Galpat will generate).
		90	CONTENT OFFICE FLE OFFICE (

10053 N4MDM 01 02 03		GURE 4: MEMORY TOPOLOGY, 16K RAMS	
04 05	817 15		AIT O
06			
87	***************		********
08	10 1000 1770001		
09	14 1	BANK O	
10	1. 1		1 1
11	1 e		1 1
12	1774 177741		1 1
13	*****************		
14	**********		
15	12000003770001		
16	1200004 1		
17	1. 1	BANK 1	1 1
18	12007743777741		1 1
19	***************		********
20			
21	*******************		
55			
23	****************		
24	11 10011770011		. 1 1
25	15 1	BANK	1 1
26	1. 1		1 1
27	1. 1		1 1
29	1775 177751		i i
29			********
30			******* *
31	12000013770011		1 1
· · · · · · · · · · · · · · · · · · ·	1200005 1	1 P -	i i
33	1. 1	BANK 1	i i
34	12007753777751		i i
35			
35			
37			
38			
39			******
40	12 10021770021		1 1
41	16	SANK O	i i
	1. 1		i i
42	1. 1		i - i
4 3 6 4	1776 177761		i i
45 46			
46 47	12000023770021		1 1
- /	1200006 1		1 1
48		BANK 1	
49	1. 12007763777761	Delaw 1	1. 1
50			
50 51 52	***************		******

10054 N4M0M

0.6

1.8

15 10051770031			1	1
17 1	AANK	0	1	1
1. 1			1	1
1. 1			1	1
1777 177771			1	1

2000053770031			1	1
1200007 1			1	1
1. 1	BANK	1	1	1
200777 3777771			1	1

EACH HLOCK REPRESENTS & CHIP. THE NUMBERS WITHIN THE BLOCK DENOTE PHYSICAL ADDRESSES.

THIS IS THE VIEW IF THE FRONT END (1.E., THE ONE WITH THE PINS) IS TOWARDS YOU, THE HANKS ALTERNATE: THE MODULES RUN BACK TO FRONT (A-D); THE HIT NUMBERS RUN RIGHT TO LEFT. IF THERE ANE ANY ERCC CHIPS, THEY WOULD HE APPENDED TO THE LEFT.

A 128K BOARD WOULD HAVE ONLY BANK 0. A 256K BOARD WOULD HAVE BOTH BANK O AND DANK 1.

> .ENDC .EJEC

021 N&MDM			
		INE 31 MEMORY TOPOLOGY, AK RAMS	
		· · · ·	
	817 15		BIT 0
	511 13		
	********		********
	10 400 574001		1 1
	14 1	BANK O	1 1
	1. 1		1 1
	1. 1		1 1
	1574 377741		1 1

	140000 774001		1 1
	140004 1	*	1 1
	1. 1	BANK 1	1 1
	140374 777741		1 1
	************		********
	***************************************	***************************************	
	******		********
	11 401 374011		
	15 1	HANK O	1 1
	1. 1		
	1375 377751		* *

	140001 774011		1 1
	140005 1		ii
		BANK 1	i i
	1. 140375 777751	GALLY 1	1 1
	12 402 374021		1 1
	16 1	BANK O	1 1
	1. 1		1 1
	1.		1 1
	1376 377761		1 1
	****		********
	140002 774021		1 1
	140006 1		1 1
	1. 1	HANK 1	1 1
	140376 777761	1 P	1 1

************** 13 405 ... 374031 17 BANK 0 1 1. 1.377 377771 ----------140003... 774051 140007 1 BANK 1 1. 140577 ... 777771 ***************

MOMBN 55001

01

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0.5 09

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51 15

14 15

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EACH HLOCK HEPRESENTS & CHIP. THE NUMBERS WITHIN THE BLOCK DENOTE PHYSICAL ADDRESSES.

- 1

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1

THIS IS THE VIEW IF THE FRONT END (I.E., THE ONE WITH THE PINS) IS TOWARDS YOU, THE HANKS ALTERNATE: THE MODULES RUN RACK TO FRONT (A-D): THE BIT NUMBERS RUN RIGHT TO LEFT. IF THERE ARE ANY ENCC CHIPS, THEY WOULD HE APPENDED TO THE LEFT.

A 16K ROARD WOULD HAVE ONLY BANK 0. A 32K BOARD WOULD HAVE BOTH BANK B AND BANK 1.

MAIN	MACHO REV 06.30 00:03:35 12/27/78	. 50001	MAIN
0		01	
		02	
		03	102032 .DALC SGE # ADCZ# 0,0,82C
		04	102432 .DALC SGT # SU82# 0,0,SZC
	P	05	
	******************	06	
		07	
	S NAMES NEEXER.SR PART NUMBER: 094-001539	08	INGVAS INSTRUCTION SET
		09	
		10	061401 .DIAC PSH = 61401
	DESCRIPTION: EXERCISER FOR NOVA 4 TEST.	11	061601 .DIAC POP = 61601
		12	061001 .DIAC MTSP = 61001
		13	060001 .DIAC MTFP = 60001
	S REVISION HISTORY:	14	061201 .DIAC MFSP = 61201
		15	060201 .DIAC MFFF = 60201
	REV. DATE	16	062401 .DUSR SAVE = 62401
		17	062601 .DUSR RTRN # 62601
	12/22/78	10	100010 .DUSR .SCL = 100010
		19	ODOOOS ,DUSR MMU = 2 IMAP DEF.
		05	000004 DUSR PRTY = 4 PARITY DEF.
	S COPYRIGHT (C) DATA GENERAL CORPORATION 1978.	21	060104 .DUSR CODP = NIOS PRTY
	ALL RIGHTS RESERVED.	55	060204 DUSR CLRP = NIOC PRTY
	E LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION.	23	073301 .DUSR MUL= 73301
		24	077201 .DUSR MULS= 77201
		25	073101 .DUSR DIV= 73101
		26	077001 .DUSR DIVS= 77001

NOUA4 EXERCISER

000000 .TXTM

0001 PHCST	ADS ASSEMBLER REV 02.02 15:27:44 01/02/79	10002 PHCST		
01		01		.TITL NALGCIST
50		U S	2	NOVA 4 LOGIC TEST
03		04		ANSTRACT
0.4		05	2	THE NOVA & LUGIC TEST IS A MAINTENANCE PROGRAM
05		06		DESIGNED TO TEST THE NOVA 4 CENTRAL PROCESSING
06		07		UNIT. IT IS A GATE BY GATE TEST OF THE LOGIC
07	2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	0.8	1	USED TO IMPLEMENT THE NOVA 4 INSTRUCTION SET.
08	3	09	2	ALSO INCLUDED IS A MINIMUM LEVEL TEST OF THE
09	2 NAME: NALGETST.TX PART NUMBER: 097-001137	10	1	CPU I/O INSTRUCTIONS, TELETYPE I/O, AND
10	5	11	3	PRUGNAM INTERNUPT.
11	3	12		
12	; DESCRIPTION: NOVA 4 LOGIC TEST	13	15.	MACHINE REQUIREMENTS
15	3	14	12.1	NUVA 4 PROCESSUR
14	3	15	15.5	8K OF WEAD/WRITE MEMORY
15	; REVISION HISTORY:	16	15.2	HASIC I/O TELETYPE INTERFACE
16	3	17	3	
17	; HEV, DATE	10	8	
18	1	19	14.	UPERATING PROCEDURE
19	12/22/21 00 1	50	14.1	VERIFY THAT THE NOVA 4 HILL PERFORM ALL
20	3	21	3	CONSOLE FUNCTIONS. I.E. EXAMINE/EXAMINE NEXT
21		55	8	DEPOSIT/DEPOSIT NEXT AC'S EXAMINE/DEPOSIT
55	; COPYRIGHT (C) DATA GENERAL CORPORATION 1978.	23	14.2	LOAD THE PROGRAM VIA THE BINARY LOADER.
23	; ALL RIGHTS RESERVED.	24	14.5	SET THE SHITCHES EQUAL TO 200
24	; LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION.	25	14.4	PRESS START
25	;	56	14.5	MACHINE SHOULD HALT M/A=201. PRESS CONTINUE
		27	14.6	PROCESSOR SHOULD CONTINUE TO RUN WITHOUT HALTING Teletype should stutter for 60 characters
		28	8	THE TYPEOUT "PASS" SHOULD OCCUR AND THE TEST
		29	8	SHOULD CONTINUE TO LOOP WITH THE TELETYPE RUNNING
		30	3	AT A SLOWER HATE.
		31 32	3 4.7	TO RESTART AFTER FIRST PASS, START AT LOC 170
		35	1 - 1	
		33		
		35	:5.	ERROR DESCRIPTION
		36	15.1	DETECTED ERRORS WILL CAUSE THE PROGRAM TO DO A
		37	1	PROCESSOR HALT.
		38	:5.2	RECORD THE STATE OF THE PROCESSOR AND REGISTERS
	N4 GOIL	39	1	AT THE TIME OF THE HALT. CONSULT THE LISTING
	N4LOJIC /	40	8	AT THE ADDRESS OF THE ERROR HALT FOR PROB-
		41	1	ABLE CAUSES OF THE FAILURE. CONSTRUCT A LOOP
		42	3	THAT WILL REPEAT THE FAILURE AND SCOPE AS REQUIRED.
		43		
		44	10.	PROGRAM DESCRIPTION
		45	1	THIS PROGRAM IS A COLLECTION OF SMALL TESTS,
		46	2	EACH TEST IN SEQUENCE BASED ON PREVIOUS TESTS
		47	2	WURKING AND DESIGNED TO TEST AS SMALL AN ADDI-
		48	8	TIONAL PIECE OF THE LOGIC AS POSSIBLE.
		49	1 · ·	
•		50	1	
		51	: 7.	CAT/KITTEN OPERATION
		52	1	TE THE BUOCHAM WAR LOADED EROM DINE HITH CAT
	1.1.6	55	1	IF THE PROGNAM WAS LOADED FROM DTUS MITH CAT Or kitten the program will run it in
	WARNINS	54	3	THE BACKGHOUND AFTER ONE PASS OF USING THE TTY
	TE T ANT TEMPART	55	3	INTERRUPTS, THE PROGRAM WILL RUN MUCH
	NYLGCIST DORS WITSWART THE DIAGNOSTIC SWITCH PACKAGE TYPINGON THIS	56 57	F o	SLOWER ALLOWING THE CAT/KITTEN AMPLE TIME TO
	THE DIACNOSTIC SWITCH	57		COMPLETE A PASS.
	a start and the	59		90.186.96 H
	PACKAGE TYPINSON MIL	57	1	
		W V		
	TREETYPIC MAYCAUSE			
	PROSRAM ERRORS			
	FREE PERCENS			